



**ADDIS ABABA UNIVERSITY FACULTY OF BUSINESS AND  
ECONOMICS DEPARTMENT OF ACCOUNTING AND FINANCE.**

**DETERMINANTS OF PRIVATE INVESTMENT IN ETHIOPIA**

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# **DETERMINANTS OF PRIVATE INVESTMENT IN ETHIOPIA**

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### **Declaration**

I, the undersigned, hereby declare that this thesis work entitled, Determinants of Private Investment in Ethiopia. Submitted by me for the award of the degree of Master of Accounting and Finance of Addis Ababa University At Addis Ababa Ethiopia, is original work and it hasn't been presented for the award of any other Degree, Diploma and other titles of any other University or institution and that all source of material used for the thesis have been duly acknowledged.

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### Statement of Certification

This is to certify that the thesis prepared by Wasihun Demeke Kibret, entitled Determinants of private investment in Ethiopia and submitted in partial fulfillment of the requirements for the degree of Master of science in Accounting and Finance complies with the regulations of University meets the accepted standard with respect to originality and quality.

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## **ABSTRACT**

*In the growth literature, investment has been regarded as one of the primary engines of growth. However, the Ethiopian private investment performance has been weak for long time. It had been stagnantly low until the end of the socialist regime. In spite of little improvement in the post-socialist era, the share of private investment in GDP has never been above 6 percent even until 2003(IMF, 2005). Yet, the reasons behind the weak performance has not been well studied. Hence, investigating the performance trend and main constraints of private investment in Ethiopia becomes the core theme of this study. Targeting at addressing a question of what measures should be taken to promote investment in the country, the research proceeds to test empirically whether Real GDP Per-capita; Inflation Rate; Real Lending Interest Rate; public Investment, External Debt Burden, and International Trade; improve the private investment performance of Ethiopia. The study was conducted basically using a 26-years secondary data (i.e. from 1991 to 2016) on some important variables. The data is gathered from various sources such as NBE, NPC & MoFEC. Then, multiple regressions using OLS model was applied. And, to account for inherent problems of time series data, stationarity test was applied. The study made diagnostic tests to assess the fitness of the model. The study reveals that growth domestic product, and external debt burden, have significant positive relationship with private investment. However, inflation, annual interest rate and public investment have significant negative relationship with private investment. Hence, to promote the performance of private sector in the country, it is essential to take measures that can improve real income of people and enhance external debt, as long as it is used in productive investment (without creating serious debt servicing burden on the economy). Finally, as policy implication the study recommends government provision of fertile macroeconomic and investment climate.*

**Key words:** private investment: Determinants: Time Series analysis: Ethiopia

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## **Acronyms and Abbreviations**

ADF: Augmented Dickey-Fuller

AR: Auto Regressive

EDS: External debt burden

GDP: Gross Domestic Product

IMF: International Monetary Fund

IR: Interest rate

NBE: National Bank of Ethiopia

NPC: National Planning Commission

OLS: Ordinary Least Square

PP: Phillips-Perron

PUI: Public Investment

RPRI: Real Private Investment

INF: Inflation

CSA: Central Statistical Agency

ECM: Error Correction Model

FDI: Foreign Direct Investment

RGDP: Real Gross Domestic Product

MoFEC: Ministry of finance and Eco. Corporation

SSA: Sub-Saharan African

## **Unit One**

### **Introduction**

This chapter embraces: back ground of the study, statement of the problem, main research questions, objective of the study, hypothesis of the study, Significance of the study, scope of the study, and limitation of the study.

#### **1.1 Back ground of the study**

Investment is defined as the accumulation of newly produced physical entities, such as factories, machinery, houses, goods, and inventories. Investments can also be defined as putting money into an asset with the expectation of capital appreciation, dividends, and/or interest earnings. Investment is an act of current spending for expected future return. It expands the productive capacity of a nation and plays a crucial role in the economic growth and development process. Investment has been regarded as one of the primary engines of growth (Wade, 1989, P. 71, UNCTAD, 2001, P. 1) and the proposed solutions to Sub-Saharan Africa (SSA) economic and geographic disadvantages (Sachs, 2005, P. 273). It seems why almost all nations try to motivate the internal and attract foreign investment. However, investment performance varies across borders and over time. Hence, what determine investment spatially and temporally remains a vital question?

Investment is a key macroeconomic variable necessary for economic growth and development of countries (Harrod1939; Domar 1946). For this reason many developed and developing countries have for several decades relied greatly on it to solve problems, particularly those related to growth and development. There exists a close connection between the level of investment and the rate of economic growth (Durham, 2004). Empirically, countries that were able to accumulate high levels of investment achieved faster rates of economic growth and development. It is in this respect that investment culture needs to be given a top priority by individuals in their country through their daily activities, government in its policy planning and implementation.

Investment has both private and public components, but in recent years, developing countries have placed greater emphasis on the development of the private sector since it has remained the main engine of growth in all modern economies across the globe. This sector enhances competitiveness of a country's products and services in both regional and global markets.

Hence, the government of Ethiopia is taking steps to make the private sector to enable it lead the country's transition to upper middle-income status. Some of these steps taken include targeting to reduce its interest rate, provides investment incentive;( fiscal like Customs duties & Income tax exemption , non-fiscal , such as effective regulation, access to land, and a healthy business environment) , and expanding access to medium and long-term finance etc.

The crucial role of private investment in sustainable economic growth is also evidenced by data indicating high growth rate of economies with dominant private sector. The literature is replete with evidences that private investment in many developing countries is more directly related to economic growth than public investment (Khan and Reinhart, 1990).

The role of investment in the economic growth of nations has been one of the most crucial issues for development related discussion among policy makers, researcher, donors, scholars as well as various economic and financial institutions in developing as well as developed nations. This view emanates mainly from the fact that investment plays a central role in economic development in every country. According to Khan (2008), investment is taken as one of crucial determinants of the rate of physical accumulation and productive capacity of an economy by raising the productivity of factors of production through the use of new techniques of production and promotion of technological progress.

The investment sector has the significant contribution to the economic growth through creating an employment opportunities, enhancing technical progress and introducing new techniques of production. In the investigation of Greene and Villanueva (1991) in developing countries during the year 1980s, decline in economic progress of countries was directly linked with the decline in gross capital formation.

Economic literatures prove that investment is, both empirically and theoretically, the key determinant to economic growth. Economic growth refers to an increase in a country's

production or income per capita. It is usually measured by gross national product (GNP) or gross national income (GNI), used interchangeably, an economy's total output of goods and services. Investment is the source of manufactured goods that will be used to produce other goods. It is the major foundation of enhancement in the level of literacy, improvement in technology and increase in the capital stock (Hashmi et al 2012). For developing countries like Ethiopia the basic question in their economy is increase the production and hence improve the standard of living of their people so that there will be dramatic change in their economic, political and social conditions. For this purpose different alternatives are on the table. Investment promotion is one key instrument and primary engine of economic growth (Mustefa, 2014). As a result due attention has been given to development of private sector in developing countries to help improve economic growth (Ouattara, 2004). Reliable and continuous increase in domestic private investment also helps in reduction of poverty.

Understanding the status and determinants of private investment is essential for successful and effective implementation of sustainable development goals (SDGs). According UN World Investment Report (UN, 2014b) SDGs will require huge levels of both public and private investment in all countries. Even if public finances are considered as central to investment in SDGs, they cannot meet all SDG-implied resource demands. So far, various studies were conducted to identify the determinants of private investment. There has been mounting evidence that private investment depends on number variables which significantly contributes to its growth. Monitoring and maintaining these variables well is a precondition for growth and development and it is believed to be the most certain way of enhancing private investment. In view of that, the primary aim of this study is to investigate the main factors affecting private investment in Ethiopia.

## **1.2. Statement of the problem**

Being one of the least developing countries, Ethiopia has been characterized by low and fluctuating private investment performance which partly contributed for the very low advancement in the economy. The private investment has shown different trends of growth and performance in the case of Ethiopia due to shifts in the regimes and political processes. During the imperial era (1960/61- 1973/74), private investment as a percent of GDP at market price was

about 10.5 percent and growing by about 6 percent per annum on average. The reasons for a relatively good performance of private investment in this period include the existence of import substitution strategy, market-oriented financial sector policies, a developing share market, the free market where prices were determined purely by supply and demand. (Alemayehu and Befekadu, 2002).

However, this promising trend was reversed due to the socialist ideology persuaded by the military government that replaced the monarchy in 1974. Thus, the period 1974/75-1990/91 witnessed centralized economic system, where the state was given a significant role in all sphere of the economy. The private investment was given little rooms due to the ideology.

During this period (1974-1991), the ratio of private investment as a percent of GDP declined to 4.5 percent. This ratio is far below the SSA countries where the average rate of private investment to GDP was 10.6 percent (IMF, 1995).

After the down fall of the Derge regime in 1991, the country adopted the market-oriented economic policy, placing due emphasis on the role of the private sector in its development efforts. In line with this policy, new investment policy and declaration was publicize and successively amended with the aim of expanding private investment. As a result, the share of private investments in the GDP has registered an encouraging improvement.

The economy has undergone series of reforms i.e. from a liberalized economy (till 1974) to command type (from 1974-1989/90), and again liberalized after 1991(following the fall of military regime).Since 1991, a comprehensive structural adjustment programs (SAP) such as macroeconomic stabilization, privatization and public sector development, decentralized governance and other reform packages have been implemented in line with the free market ideals. However, deviations from such ideals became evident since recently due to changes in government policy and strategy in favor of developmental state ideology. Hence, important sectors like postal services (with the exception of courier services), transmission and distribution of electricity through the integrated national grid system; and air transport services (using aircraft with seating capacity of more than 50 passengers) and the like are still exclusively reserved for government, while manufacturing of weapons and ammunition, and telecom service can be undertaken jointly by government and private investors. And, a considerable portion of the

remaining investment areas are also exclusively permitted for domestic private investors (Investment Proclamation 769/2012).

Nevertheless, there are still huge investment opportunities in the country for the foreign private investors too in various sectors/sub-sectors of the economy as indicated in the Council of Ministers Regulation No. 270/2012. Besides, the gradual opening of sectors set aside for government and/or exclusively reserved for domestic private investors alone, is believed to eventually create more space for foreign investors too as indicated in the Growth and Transformation Plan (GTP), which is being implemented since 2010. Along with opening of more sectors for private investors, packages of investment incentives are also being given.

In spite of such macro-economic and political reforms and ranges of investment incentives given, private investors have remained very shy to make significant strides thus far. Hence, their enormous development potential is far under fetched till now. This suggests that, in the face of present-day international competitions, promoting private investment should be approached with locally fit and globally responsive investment policies and strategies. But, the shortage of contemporary and contextual research on the area has remained to be a serious bottleneck for such policy making and action taking efforts (Mustefa, 2014). The purpose of this study is, therefore, to investigate and analyze factors that determine private investment in the country, and there by contribute its level best in this connection.

### **1.3. Main Research Questions**

The study is aimed to answer the following core research question:

What is the effect of key determinant factors on private sector investment?

### **1.4. Objective of the study**

#### **1.4.1. General Objective**

The main objective this study is investigating and analyzing major factors that determine private investment during the period 1991-2016 in Ethiopia.

### 1.4.2. Specific objective

The specific objectives of this study include:

- ✚ To investigate the effect of gross domestic product on private investment
- ✚ To investigate the effect of inflation on private investment
- ✚ To investigate the effect of external debt Service on private investment
- ✚ To investigate the effect of annual interest rate on private investment
- ✚ To examine the effect of international trade openness on private investment
- ✚ To investigate the effect of public investment on private investment

### 1.5 Hypothesis of the study

In this section, different hypothesis of interest in the study is discussed with intent to determine whether a relationship that is supported by literature holds true in my studies.

The dependent variable is real private investment and the explanatory variables that are expected to determine private investment are and Real GDP; Inflation Rate; Real Interest Rate; External Debt Service; public investment; and International Trade openness ; were analyzed.. The explanatory variable that may affect the decision to invest in the literature are very wide and only variables having sound theoretical explanations and empirical evidences are selected for this study.

H 0. There is no positive and significant relationship between GDP and private investment.

H 1. There is negative and significant relationship between GDP and private investment.

H 0. There is no negative and significant relationship between inflation and private investment.

H 1. There is positive and significant relationship between inflation and private investment.

H 0. There is no significant and negative relationship between interest rate and private investment.

H 1. There is significant and positive relationship between interest rate and private investment.

H 0. External debt service has no positive and significant relationship with private investment.

H 1. External debt service has negative and significant relationship with private investment.

H 0. There is no significant and positive relationship between public investment and private investment.

H 1. There is significant and negative relationship between public investment and private investment.

H 0. There is no significant and positive relationship between trade openness and private investment.

H 1. There is insignificant and positive relationship between trade openness and private investment

### **1.6. Significance of the study**

The findings of the study are important to a diverse number of people. Among those that would profit are policy makers, entrepreneurs, investment analyst and academics. The study provided scientific findings on the subject of private investment; in particular, it will be of significant importance to policy makers in their quest of providing the appropriate incentives to promote private investment in Ethiopia. This will prevent the situation where limited resources will be directed towards wrong policies as far as promoting private investment is concern. For investors and investment analyst the findings will provide an insight of understanding the actions of governments and give proper interpretations to policy directions. Finally, researchers and academicians will find this work useful as there is limited research on the subject matter within the Ethiopian context. The study will therefore add to the existing knowledge in the subject area

### **1.7 Scope of the study**

This study delimits to assess the determinants of private investment in Ethiopia over the period between 1991/92 and 2015/16, Since it starts from the period where: the country adopted the market-oriented economic policy such as; major economic reforms encompassing currency devaluation, trade liberalization, deregulation of markets, removal of restrictions on private sector participation, and modest privatization and reform of State-Owned Enterprises (SOEs). And the study period is also selected based on the availability of data about the private investment, & placing due emphasis on the role of the private sector in its development efforts.

In the analysis, the relationship between private investment and Real GDP; Inflation Rate; Annual Lending Interest Rate; External Debt Service ; public investment; International Trade ;were analyzed. Moreover, the contribution of private investment in Ethiopia is investigated.

### **1.8. Limitation of the study**

The study has a number of limitations in many aspect (1) the problem of identifying the correct model specification (2) the adequacy and reliability of data on macroeconomic variables in general and data on private and the limited knowledge about the subject matter and (3) Models used in this study do not include all the variables, because of inherent data problems associated with developing countries like Ethiopia. In this case, some problems, especially those that are qualitative in nature, such as investors' perception of the sub-Sahara African region in terms of politics, corruption, diseases and natural disasters, are excluded from the model.

### **1.9. Organization of the paper**

This study is organized in to four chapters. The first chapter explains background of the study, statement of the problem, objective of the study, research questions, hypothesis, significance of the study, and Limitations of the study and scope of the study. The second chapter deals with review of related literature. The third chapter is about research methodology. Data presentation and analysis is undertaken in the fourth chapter. The final chapter is about the conclusion and recommendations.

## **CHAPTER TWO**

### **LITERATURE REVIEW**

This chapter contains four essential components; these are theoretical review, empirical review, research gap, and finally conceptual framework.

#### **2.1 History and Overview of Private investment in Ethiopia**

We can safely say that private sector investment started in Ethiopia during Emperor Menelek II with acquisition of land. This era was characterized by scramble of principalities more or less waging unsettled war against each other for control of the area and also to defend Ethiopia from foreign aggression. In this process acquisition of private property in the form of land, began and was seen as sign of prestige. However, development of the land by the owners for economic purposes was unknown because of rudimentary market linkages. Private sector started developing during Emperor Haile Selassie's time. Even during this period much of the private sector clustered around land and related activities. Land owners developed commercial farms and as a forward linkage agro-processing small scale industries were established by private owners. The constitution clearly supported the right of individuals to possess and develop private property.

Land, on which the livelihood of 90% of the Ethiopia populations is based, was privately owned and owners had confidence to develop it until confiscated by the Socialist Military Regime in 1974. In other sectors such as transport and services there were no big private investments. There were very few establishments that involved the private and public jointly owned companies.

Private sector development cannot be discussed much during the socialist military government. The policy was very clear and was to systematically hinder the private sector. Since the beginning of the region, the impact of the policy was total failure. The country experienced chronic food shortages. This resulted from confiscation of private property mainly land. Even after the collapse of the Regime, this situation continued at higher scale. The recent joint World Food Program (WFP) and Food and Agricultural Organization (FAO) report estimated that more than 40% of the agriculturally based population cannot feed itself. Structural food deficit, poor land management and other policy related problems exacerbated the indigent state of food production in the country. (Adugna, 2013).

Knowing of the fact the importance of private sector, the Socialist Government introduced a new period in Ethiopian political and economic history on March 5, 1990. In this economic history the change introduced was far reaching. The proclamation recognized the role of private sector development and stated that private sector could compete with public sector in all the economic sectors. The policy, however, did not last long. Between March 1990 and May 1991 very little implementation of the policy was seen. When Transitional Government took power, the economic policies were largely based on the preceding policy that focused on deregulation of banned territory and prices control. Privatization of public ownership was clearly pronounced. Sectoral policies were designed and proclamations were pumped and implementing line organizations such as Privatization Agency. (Investment Proclamation 769/2012).

### **2.1.1. Policy Implementation of the Government**

The government took numerous measures as part of the fulfillment of the IMF and World Bank prescriptions. In 1992 the government agreed with IMF, World Bank and other donors to adopt a structural adjustment program. In September 1992 a policy framework paper for 1992/93 - 1994/95 was prepared and agreed upon with the World Bank and the IMF. It is worth noting here that all reform measures taken mainly concerned the nonagricultural sector.

During the first years of the transition period substantial liberalization of both factor and commodity occurred, price controls were eliminated for all goods except for petroleum and petroleum products, pharmaceuticals and sugar for household consumption. The road transport monopoly was eliminated and a new labor code was introduced.

Another set of changes that most people thought would have a positive impact on the functioning of the Ethiopian economy was the up-ward adjustment reform structure of private interest rates, and reformed income tax structure implying that the maximum marginal tax rate has been adjusted down ward. Furthermore, public enterprises were categorized according to their future states of ownership. The public sector proclamation implied not only privatization of state-owned enterprises, but also reorientation of the organizations of the remaining state owned enterprises to make them more efficient and profitable. The nine state corporations that

dominated the industry were dissolved to stimulate domestic and private investments. A new investment code was released and privatization agency was set up. The financial sector (banking and insurance business) was liberalized in order to stimulate investment in the private sector. Thus, we can conclude that the various liberalization measures meant positive changes along all economic system dimensions. (Mustefa, 2014).

### **2.1.2. History of Investment Law in Ethiopia**

Coming to Ethiopia, though it is not possible to pin point the date investment was started, it is not new to Ethiopia.

#### **I. The Imperial Era**

The Ethiopian economy after the war with Italy was described as a mixed economy in which the private and public sectors worked hand-in-hand to achieve economic progress. The private sector was having good ground during this period since there was no any law that limited the private business.

In the Imperial era, Proc. No 60/1944 and 107/1949 were enacted to promote foreign investment in Ethiopia. In 1950, the Minister of Finance gave an income tax exemption notice with a view to encouraging investment. After that, in 1956, the Income Tax Decree which provided for income tax emption to encourage investment was promulgated. However, this Decree was replaced by the Income Tax Proclamation of 1963. This Decree was the first proper law to regulate investment transaction in Ethiopia. After three years, i.e. in 1966, the Investment Proclamation No. 242/1966 was enacted.

What is special to those laws was that they did not provide investment areas for the government. Thus, investors could invest in all areas of the economy with no restriction. They also provided investment incentives which included: import export income tax exemptions, income tax holidays. It was also possible for foreign investors to own land required for their investment.

Though the private sector was in good condition, the share of the domestic investors was very small due to lack of entrepreneurship. (Investment Proclamation 769/2012).

## **II) The Derg Regime**

Then, the 1974 Revolution got rid of the concept of private property including private investment. This retarded the development in the sector. During the Derg regime, it was only the state that invests. After all that was considered investment proper.

The Derg regime adopted a socialist economic policy through National Democratic Revolution (NDR), which disfavors private investment. During this period, it was witnessed that nationalization was exercised repeatedly.

Proclamation No 26/1977 heralded the start of nationalization. The proclamation clearly stated that it was necessary to transfer to government ownership all resources that were crucial for economic development.

As a result, the government had controlled all private investments and the private sector was restricted to small industrial activities. However, the government allowed investment through joint venture, i.e. investment in Cooperation with the Ethiopian Government. The intention of the government was to introduce capital know-how, and technology into the country. But the law was taken as a disincentive to the private investors since the share of the government could grow from 51-99% while that of private investors could fall down from 49-1%.

The government felt the necessity to change the economic policy in the late period of the Derg Regime and adopted a mixed economic policy by adopting the Multilateral Investment Guarantee Agency (MIGA) of which Ethiopia became a member. Then, this economic reform was reiterated by the transitional Government of Ethiopia in 1992 after the down fall of Derg Regime.

## **III) The Period after Derg**

The Derg regime was replaced by the Transitional Government. The Transitional Government, which was established in 1991, adopted an economic and investment policy directly opposite to that of the Derg regime. The policy emphasized the role of private investment in the development of the Ethiopian economy. In 1992, Ethiopia embarked up on the liberal economic

policy which is deemed to be a favorable condition for investment. To implement this policy, the Transitional Government enacted Investment Proclamation No 15/1992 so as to open the door to private investment. The proclamation also reserved some sectors such as large scale eclectic power and postal service to the government. It also provided for joint investment with the Ethiopian government.

The proclamation provided for incentives to attract and promote private investment. It also guaranteed against nationalization and expropriation. Thus, "no assets of a domestic or foreign investor may be expropriated or nationalized wholly or partially except in accordance with the due process of law".

The Investment Office was established by the proclamation to regulate and supervise investment activities. The proclamation imposed a higher capital requirement for foreign investors and proclamation No 37/1996 was enacted to rectify this problem.

Thus, the following are essential developments in Proc No 37/1996 and Regulations No 7/1996.

The minimum capital required from foreign investors has been reduced from 500,000 USD to 300,000 USD to establish joint venture with our government. The minimum capital of retained profit and dividends reduced to 400,000 USD for expansion. Further, the capital requirement for foreign investors to invest in engineering and consultancy was reduced from 500,000 USD to 100,000 USD. Foreign investors were relieved from the obligation to deposit 1258,000 USD in blocked account. Foreign investors were also allowed to invest in building construction equipment, and in hotels whose standard was below the four star and five grades.

Foreign investors were allowed to repatriate capital from sale, liquidation or transfer of residence to their home country, in addition to profits, dividends, interests and payments arising from technological transfer. It also provided for internationally accepted investment dispute settlement procedures where it was not possible to solve the dispute amicably. Investment incentives were also extended to additional sectors such as education, hotels, tourism and health. Further, the period of incentives was extended from 3 to 5 years.

Banking and insurance, electricity generating up to 25 MW, air transport with the capacity of up to 20 passengers or 2,700kg were reserved for Ethiopian nationals. Both domestic and foreign investors were allowed to borrow money from abroad provided that they are registered with the NBE. It was also provided under the proclamation that investors should be provided land within sixty days from the date of application for land.

In general, despite its constraints and drawbacks, the law seems to be attractive to the private investment when compared to the past regime's restrictive policy. (Investment Proclamation 769/2012).

#### **IV) Investment (Amendment) Proclamation No 116/1998 and Regulations No 36/1998**

These laws were enacted with a view to encouraging and facilitating investment (both domestic and foreign). Thus, the amendment was made with the aim of opening more investment areas to the private sector. It also aimed at providing additional investment incentives.

These laws resulted in the following essential changes to the proclamation No 37/1996 and Regulations No 7/1996.

- ✚ The status of foreign nationals of Ethiopian origin: A number of Ethiopians were forced to leave Ethiopia and went abroad for political and other reasons (especially in the past regime).
- ✚ It is felt important to give them a chance to invest in their country and to contribute in the economic development by investing their capital and know-how that they acquired abroad. Thus, Proclamation No 116/1998 provides that foreign nationals of Ethiopian origin are at liberty to choose to be treated as domestic investors or foreign investors.
- ✚ If they opt to be considered as domestic investors they must apply to the then Ethiopian Investment Authority (EIA) and fill a form which is taken as a promise not to be considered as a foreign investor. Thus, they are relieved from a capital restriction on a foreign investors and be able to take part in investment with a capital of 250,000 Ethiopian Birr rather than 500,000 USD, 300,000 USD or 100, 000 USD.
- ✚ In addition, they will acquire a right to invest in areas exclusively reserved to domestic investors by Regulations No 35/1998. On the other hand, they will lose the rights of

foreign investors. Thus, they may not claim to repatriate their profits and capital outside Ethiopia, because such a right is given to foreign investors.

- ✚ Once an investor is considered a domestic investor, s/he/it may participate in investment areas exclusively reserved for Ethiopian nationals such as banking and insurance. (Investment Proclamation 769/2012).

## **2.2 Investment: Conceptual and Theoretical Background**

In economics, the concept of investment is used to mean the purchase of capital goods that actually end up improving the welfare of a population i.e. goods which are used in the production of other goods e.g. railroads, a factory, clearing land, or putting oneself through education. In other words, they increase output.

Private investment behavior is primarily influenced by profit motive and always characterized by risk and uncertainty. Risk is explained as a measurable possibility of losing money or not gaining interest on one's investment. Though investment is considered as a risky venture, individuals invest with the hope of earning a capital gain at the time of sale Weirich (1983). Again, people invest because they want a return to compensate them for the time, the expected rate of inflation (a general increase in the price of goods and services over time) and the uncertainty of the return (Pollack and Heighberger, 1998).

Investment theories can be broadly categorized into the simple accelerator theory associated with Clark (1917), flexible accelerator model associated with Keynes (1936), the neoclassical model associated with Hall and Jorgenson (1971) and the Tobin's Q model also associated with Tobin (1969).

### **2.2.1. The simple accelerator theory**

The simple accelerator model assumes that firms desired capital-output ratio is roughly constant. The model begins with the notion that a certain amount of capital stock (K) is necessary to support a given level of economic activity. We define this relationship as being proportional to output (Y), i.e.  $K_t = kY_t$  such that net investment is proportional to change in the desired output:

$$K_t - K_{t-1} = I_t = k dY_t \dots \dots \dots (1)$$

Where  $k$  is the desired capital-output ratio,  $Y_t$  is output,  $I$  is net investment, and  $K_t$  is the capital stock in period  $t$  while  $K_{t-1}$  is the stock of capital at the end of period  $t-1$ .

However, the simple accelerator approach is criticized for assuming that firms respond to changes in demand such that investment is always sufficient to keep the desired capital stock equal to the actual capital stock which is not necessarily true. In addition, the model also assumes that the ratio of desired capital to output is constant, yet it varies with a variation in the cost of capital and technology. The theory does not consider investors' expectations, profitability, and the cost of capital as determinant of investment behavior.

Due to the above limitations of the simple accelerator, Keynesians have traditionally favored a more general form of the accelerator model called the flexible accelerator model designed by and Hall and Jorgenson (1971) which is also known as the partial adjustment model of investment based on the optimal accumulation of the capital suggested by Goodwin (1951) and Tread way (1974).

### **2.2.2. Flexible accelerator theory**

The theory assumes that capital adjusts towards its desired level by a constant proportion of the difference between desired and actual capital. The basic notion behind this model is that the larger the gap between the existing capital stock and the desired capital stock, the greater a firm's rate of investment. Therefore firms plan to close a fraction of the gap between the desired capital stock ( $K^*$ ) and the existing stock of capital goods left over from the past period ( $K_{t-1}$ ). Hence the net investment equation can be written in the form of:

$$I = K_t - K_{t-1} = \lambda (K_t^* - K_{t-1}) \dots \dots \dots (2)$$

This theory again has other drawback by its underlying assumption of perfect competition which disregarded or over looked the role of dynamic expectations of investors behavior regarding the future prices, interest rate and output, where  $K$  is actual level of capital;  $K^*$  is the capital stock desired by domestic firms;  $K_{t-1}$  is the last period's capital stock and  $d$  is the partial adjustment coefficient. (Adugna, 2013).

### **2.2.3 Neoclassical Investment Theory**

The restrictive assumptions behind the accelerator theory led Jorgenson et al (1967), Jorgenson, to formulate the neoclassical approach. In this approach, which is a version of flexible

accelerator model, the desired (or optimal) capital stock depends on the level of output and the user cost of capital (which in turn depends on the price of capital goods, the real interest rate, and depreciation rate). Lags in decision making and delivery creates a gap between current and desired capital stocks, giving rise to an investment equation, that is , an equation for the change in the capital stock.

The foundation of this approach has been criticized on the ground that: the assumptions of perfect competition and exogenously given output are inconsistent, the assumption of static expectations about future prices, output, and the interest rate is inappropriate since investment is essentially forward-looking, and the lags in delivery are introduced( Birahanu ,2004)

**2.2.4. The Tobin Q theory of investment**

Another theory of investment is the Tobin's q model advanced by Tobin (1969). Tobin argues that firms' investment level depends on the ratio of the present value of installed capital to the replacement cost of capital. In the Tobin Q theory of investment, the ratio of the market value of the existing capital stock to its replacement cost (the Q ratio) is the main force driving investment (Chirinko, 1993, Ghura and Goodwin, 2000). That is to say, enterprises will want to invest if the increase in the market value of an additional unit exceeds the replacement cost. This ratio is Tobin's q. The q theory of investment assumes that firms will want to increase their capital when  $q > 1$  and decrease their capital stock when  $q < 1$ . If  $q > 1$ , additional investment in the firm would make sense because the profits generated would exceed the cost of firm's assets. Under those conditions, firms reap profits by investing in more capital, so we expect investment to be high. If  $q < 1$ , the firm would be better off selling its assets instead of trying to put them to use or the present value of the profits earned by installing new capital are less than the cost of the capital, therefore investment levels are expected to be near zero if  $q < 1$ . The ideal state is where q is approximately equal to one denoting that the firm is in equilibrium which is also called the general equilibrium theory or 'q' theory. The model is presented as follow:

$$q = (\partial/\lambda) \dots \dots \dots (3)$$

Where  $\partial$  stands for stock market value of a firm and  $\lambda$  stands for replacement cost of capital. The q model has been regarded as both a modified version of the neoclassical model (Hayashi, 1982) and as a profit model because of its emphasis on the role of profitability.

In relation to private investment, Rodrik (1991) introduced an element of policy uncertainty as a factor that drives private investment. He stated that when a policy reform is introduced, it is very unlikely that the private sector will see it as one hundred percent sustainable.

A number of reasons may be adduced, among them is the expectation that the political-economic configuration that supported the earlier policies may resurface. There is also the fear that unexpected consequences may lead to a reversal. Investors must respond to the signals generated by the reform for it to be successful. This will therefore call for prudent measures to be taken to withhold investment until much of the uncertainty regarding the eventual success of the reform is eliminated i.e. if the anticipated loss is high it will discourage private investors and vice versa.

Also, the rational choice theory influence private investment. This is an economic theory that assumes that individuals always make prudent and logical decisions that provide them with the greatest benefit or satisfaction and that are in the best self- interest. It is a framework for understanding and often formally modeling social and economic behavior. Hence, it enables private investors to compare the costs of their activity against benefits to arrive at an action that maximizes their personal advantage. Rational choices theorists believe that most human decisions as in private businesses are based on maximizing a person's own benefits, while minimizing that which can hurt them. Private investors usually adapt this theory of rational choice into their business models to enable them predict and explain future consumer spending decisions and whether to engage in such business ventures.

According to Acosta and Loza (2004), the theory of investment irreversibility also affects private investment. This theory suggests that the cost of investing in machinery and equipment is usually not recovered by a future resale. However, stable prices improve the informative content of the price system, allowing a favorable allocation of resources. Emerging countries are usually characterized by a high degree of uncertainty. Hence, for investment decisions to be made to yield the desired results uncertainty factors of such economies must be taken into consideration, since any sharp decline in aggregate demand would generate an unsustainable excess in installed capacity (Caballero and Pindyck 1996). This accounts for the reason why advanced countries with lower uncertainty rate have high levels of private investment, as compared to developing

economies with a higher uncertainty rate. The inflationary rate is normally use as a proxy for measuring uncertainty (Beaudry, 2001).

Again, private investment is hindered by restrictions on investment financing. Loungani and Rush (1995) suggested that small and medium enterprises (SMEs) are usually unable to finance their activities directly through open market debt. Hence, they resort heavily to the bank credit markets, which are also characterized by imperfections due to information asymmetry between lenders and borrowers. Developing countries are normally faced with the challenge of accessing credit due to the absence of futures market and poor access to long term financing.

Foot and Stein (1991) argued that depreciation of the exchange rate can also stimulate private investment. They suggested devaluation does not only favor the export sectors but also enable foreign companies to acquire local assets at a much lower price to increase investment. However, McCulloch (1989) opposed the relationship between private investment and exchange rate, because he believed it is the rate of return that determines investment but not the price of the local asset. He suggested that when a country's currency is depreciated in real terms, both the price of the asset and the nominal gain of the investment fall. This effect becomes particularly relevant in sectors producing non-exportable goods.

### **2.2.5 Models of private investment in developing Countries**

From the above mentioned theories and models of private investment, Accelerator Model of investment has been widely applied in developing countries. The other model of private investment has not been widely applied due to the assumption underlining their application. The direct application of those models except simple accelerator model to understand investment behavior in developing countries is difficult due to the following two reasons.

The first one is related with technical aspects and is related to scarcity of data on key variables such as wage rates, capital stock, real interest rates and stock market prices. The second one is related with incompatibility of the institutional and structural peculiarities of developing countries with the underlying assumptions of the basic models such as in the perfectly competitive markets, little or no government intervention and absence of liquidity constraints. These assumptions are hardly tenable in the context of developing counties making the models less relevant to apply (Shiferaw, 2002).

Due to difficulties with the measurement of key variables in developing countries and the expected influence of public investment, the application of flexible accelerator model require the identification of variables included as determinants of private investment in developing countries. As Blejer and Khan (1984) stated variable that are taken as determinants of private investment should be based on the specific realities of the country. That means the theory and variables that are found to be valid in developed country may not yield the same results in developing countries due to difference in the economic environment and institutional setup of the countries.

### **2.3. Empirical review on determinants of private investment**

The purpose of this section is to review related studies in Ethiopia and elsewhere to have a deeper understanding of the factors contributing for private sector investment growth. Many researchers have studied private investment from different perspectives in both developed and developing countries focusing on different variables that determine private investment.

Oshikoya (1992) investigated how interest rate deregulations have affected private investment in Kenya over the period 1970-1989. The dependent variable was the private investment ratio, while explanatory variables were: the real economic growth rate, real deposit rate of interest, changes in terms of trade, public investment ratio, inflation rate, and the lagged debt service ratio. The results showed that the real rate of interest is significant and positively related to the private investment rate. The other variables like inflation rate, terms of trade, and external debt service payments have negative and significant coefficients. The coefficient on the public investment ratio was positive and significant, thus implying that public investment is complementary to private investment.

Mbanga (2002) investigated the impact of external debt on private investment in Cameroon from 1970-1999 using time series data and found out that investment accelerator effect was in existence since a significant positive real GDP-private investment relationship was found. The “debt overhang” hypothesis was also confirmed in the case of Cameroon as well as the “crowding-out” effect of debt service ratio. Public investment however crowded-in private investment while the investment climate, captured by the lagged value of private investment, stimulates current levels of investment. There was also a confirmed positive and significant

relationship between credit expansion and private investment whereas deteriorating terms of trade and depreciating real exchange rate had negative effects on private investment.

Osmond (2014) studied the determinants of private investment in Nigeria for the period from 1970- 2012 by estimating the investment rate function derived from life cycle hypothesis while taking into account the structural distinctiveness of developing country. The results of the study confirmed that investment rate is positively influenced by the growth rate of disposable income and the real interest rate on bank deposits .investment rate in Nigeria is found to be influenced negatively due low public infrastructure, high lending rate, low saving rate and political insatiability.

Ronge and Kimuyu (1997) examined the determinants of private sector investment for Kenya using data over the period 1964-1996. A double-logarithmic form of the investment equation was Estimated using OLS. The results indicated that both the availability of credit and foreign exchange exerts significantly positive effects on private investment confirming the results in most empirical studies. Private investment however, was adversely affected by the stock of debt. Specifically, a 1% increase in the lagged debt to GDP ratio reduced private investment by 0.3%.

Jenkins (1998) estimated a model of private investment flows for Zimbabwe using annual data over the 1969-1990 periods using a two-step Engle-Granger method. The results show that in the long-run, gross profits have positive effects, while foreign capital inflows and the external debt-to GDP ratio negatively affect private investment, the availability of foreign exchange and the relative price of industrial output have positive effects and the change in the relative cost of capital is negatively related to the cost of capital.

Kazeem et al (2012) in the study which covered the period 1970 to 2010 used advanced econometric technique of ARDL bounds testing approach in modeling long run determinants of domestic private investment. Findings from the study showed clearly that difference exist between long and short run determinants. Interest rate, real GDP, exchange rate, terms of trade, external debts, public investments, credit to the private investment and reforms dummy are the key long run determinants of domestic private investment while real GDP, public investment and terms of trade are statistically significant in the short run. Kazeem et al (2012) recommended that necessary infrastructures to complement domestic private investment should be put in place and

that external debts reduced to the barest minimum and negative effects of external shocks endangered by foreign direct investment uncertainty and deficit terms of trade should be prevented all together.

Ribeiro (2001) employs the Johansen (1988) multivariate co-integration technique and Engle-Granger Two Step approach to model private-sector investment in Brazil during the period 1956-1996. The findings reveal a positive impact of the output, public investment and financial variables and a negative effect of the exchange rate. A test for weak exogeneity and super exogeneity were carried out and the result showed credit to the private sector and public investment to be an important economic policy instruments.

Erden (2005) uses a panel data set of 19 developing countries from 1980 to 1997 using a reduced-form neoclassical model of private investment that allows the estimation of both the short-run and long-run determinants of private investment. The results show that in both the long and short run public investment had a positive effect on private investment. Real interest rate was negatively significant impact on the level of investment, but credit availability to the private sector was positively significant. Macroeconomic uncertainty also has a negative impact in the long run, although its short-run impact is insignificant. Public investment also serves as a stimulus to private investment in developing economies.

Badawi (2004) investigated the impact of macroeconomic policies on private investment in Sudan employing annual data over the period 1969-1998. The results suggested significant crowding-out effect of public investment on private investment in Sudan, devaluation policies also contributed to discouraging private sector capital expansion.

Erden and Randall (2005) have examined the impact of public investment on private investment. They applied several pooled specifications of a standard investment model to a panel of developing economies from the period 1980 to 1997. Their study find out that public investment crowds in private investment i.e. an average, a 10% increase in public investment is associated with 2% increase in private investment. Moreover, the results also indicate that in developing economies availability of bank credit is the major constraint for private investment.

Sisay(2010) carried on the study of the determinants of private investment in Ethiopia over the period ranging from 1950-2003 motivated by modified flexible accelerator model by applying multivariate single equation ECM estimation methodology. According to his study private investment in Ethiopia is influenced by the domestic market, infrastructural facilities and FDI and negatively by macroeconomic uncertainty.

Lesotho (2006) investigated the determinants of private investment in Botswana using a time series data over the period 1976-2003, in both the short and long run. It employed the techniques of co-integration and error correction modeling. The results show positive and significant coefficients for public investment, bank credit and real interest rates for the short run model. GDP growth and real exchange rates are significant in the long run. Inflation was insignificant in both cases. This means that in the long run, the variations in private investment level is underpinned by; GDP growth, public investment, and the real exchange rate, while real interest rates, public investment and the availability of credit affect investment behavior in the short term.

Adugna (2013) studied the determinants of private investment in Ethiopia by using multiple regression OLS models for the period from 1981-2010 by using Engle granger two step error correction model .According to his study variables such as public investment, real GDP and external debt had the significant positive long run effect on private investment whereas lagged private investment (a proxy for investment climate) had significant negative long-run effect .in the short run external debt and real GDP had the significant contribution to private investment growth.

Siraj (2014) tried to evaluate the inter-relationship between private investment and economic growth both in the long and short run. He argued that there is evidence of uni-directional causality between economic growth and private investment. The findings showed that both private and public sector investment have a positive significant impact on real output/economic growth while in the short run public investment has a negative impact on growth and private investment has a positive impact on growth.

Akpalu (2002) used annual time series data from 1970 – 1994 to study the determinants of private investment. He employed the Engle-Granger Two Step procedure and the Johansen

multivariate test. The study reveals that in relative terms private investment in the short-run responds more to real per capita income growth, credit availability and public investment. Public investment was found to crowd-out private investment. There was also a significant negative relationship between cost of capital and private investment in both the short and long run. Further, a significant positive relationship between real GDP and private investment was found in both the short and long run models but was not significant in the short-run. This result indicates a confirmation of the accelerator theory of investment in Ghana. The Consumer Price Index however was found not to be significant in both situations.

In Nigeria, Ariyo and Raheem (1991) investigated the determinants of private investment and found that public investment, rate of GDP growth, domestic credit to private sector and interest rate impacted positively on private investment.

Chete and Akpokodje (1998) findings show that private investment in Nigeria is influenced by public investment, inflation rate, real exchange rate, and domestic credit to the private sector in addition to the private foreign capital inflow.

Obaseki and Onwioduokit (1998) assessed the relative contributions of the private and public sectors to long-run growth in Nigeria. The result showed that private investment, public investment and imports are important determinants of output growth in Nigeria. Their results further revealed that public and private investment were complementary in Nigeria; public investment contributed more to total output than private investment and public sector feeds the private sector. The assertion that public investment contributed more to total output in Nigeria than private investment was in order, considering long history of dominance of public sector, reliance of private sector on public sector for survival and the low level of private investment in Nigeria.

Asante (2000) examined the determinants of private investment in Ghana over the period 1970-1992. The results showed that the variables that had a significant positive relationship with investment are: lagged investment, public investment, private sector credit, real interest rate, and real exchange rate whilst trade, political instability, macroeconomic instability, and the growth rate of real GDP have had a negative relationship with private investment.

Ajide and Bello (2013) investigated the determinants of private investment placing greater emphasis on the role of governance, using an annual data over 1970 to 2010 periods in Nigeria. The Auto-Regressive Distributed Lag (ARDL) bounds testing approach was used to ascertain the long and short run association of various variables. Emanated from the estimated models showed that saving, real GDP, degree of openness, real interest rates, inflation rates and governance measures are strong determining variables on private investment but political stability and accountability indicators appear both to be negatively and significantly affect the private investment in Nigeria.

Bello and Lawanson (2012) explored the long run determinants of private investment in Nigeria over the period 1970 to 2010, employing an advanced econometric technique of Auto-Regressive Distributed Lag (ARDL) bounds testing approach. Public investment, real GDP, real interest rate, exchange rate, credit to the private sector, terms of trade, external debts and reforms dummy were the key long run determinants of private investment while public investment, real GDP and terms of trade are statistically significant in the short run.

### **2.3.1 Determinants of Private Investment**

Sakr (1993) as well as Ribeiro and Teixeira (2001) put forth that the major determinants of private investment levels across countries are essentially; domestic output, the real interest rate, public investment, credit available for investment, the size of the external debt, the exchange rate and macroeconomic stability. The discussion that follows provides a brief review of the major factors affecting investment in various countries and presents research findings on the relationship between such factors and private investment. Sakr (1993) empirically investigates the determinants of private investment in Pakistan with emphasis on the impact of government investment. The study makes use of an investment function and annualized data for the period 1973/74 to 1991/92. The findings reveal that private investment is positively correlated to GDP growth, to credit extended to the private sector, and to government investment in infrastructural projects.

Asante (2000) utilizes time series analysis coupled with cross-sectional analysis to investigate the determinants of private investment in Ghana. The study reveals that the growth of real credit to the private sector has a positive and statistically significant effect on private investment.

Moreover, much like in Pakistan, public investment in infrastructural projects has a positive effect on private investment.

Frimpong and Marbuah (2010) also look into factors that have either stimulated or damped private investment in Ghana. With the use of unit root tests, co-integration and error correction techniques within an Autoregressive Distributed Lag (ARDL) framework the results of the study indicate that private investment in the short-run is positively related to public investment, inflation, real interest rate, openness, real exchange rate and a regime of constitutional rule. Private investment in the long run is positively related to real output, inflation, real interest rate, openness and real exchange rate; while negatively affected by external debt.

Ouattara (2004) explores the determinants of private investment in Senegal through a long run private investment equation derived using the Johansen co-integration techniques and the bounds test approach. After testing variables in the equations for unit root using the Dickey-Fuller generalized least square de-trending test and the Ng-Perron test, the results indicate that public investment, real income and foreign aid flows positively affect private investment, while the impact of credit to private sector and terms of trade negatively affect the private investment.

Seck and El Nil (1993) examined how financial liberalization has affected investment in Africa using data for twenty one countries over the period 1974 to 1989. The dependent variable is the ratio of gross investment to GDP. Explanatory variables are real deposit rate of interest, nominal deposit rate, inflation rate, current account ratio, and growth in the M2 ratio. The effect of the real rate of interest and growth in the M2 ratio are positive and significant thus implying that financial liberalization has improved investment in these African countries.

Esubalew (2014) carried on studies on the macroeconomic determinants of private investment in east Africa region with panel data set from the period of 2000-2012. According to his studies macroeconomic factors such as variation in the output and real per capita growth fiscal and monetary policy as well as exchange rate are the most determinant factors for the variation of private investment in eastern African countries over the study period. His study confirmed that domestic private investment is positively influenced by real GDP growth, financial availability as measured by credit to the private sector as the percentage of GDP and the development of human capital as measured by school enrolment has significant positive influence on the private investment of the region. On the other hand variable such as unstable macroeconomic

environment, as measured by the inflationary situation, high external debt, fluctuation in the terms of trade, real exchange movement, public investment and real interest rate are found to hinder private investment significantly in East Africa.

Acosta and Loza (2005) reveal that private investment decisions are determined, in the short-run, by shocks in returns (exchange rate, trade liberalization) and in aggregate demand. Furthermore, it was found that capital accumulation by the private sector is positively determined by well-developed financial and credit markets as well as on perspectives of fiscal sustainability.

**Table 2.1: Summary of variables studied by different researchers:**

<b>Variables</b>	<b>Authors</b>	<b>Impact on Private investment</b>
GDP	Osmond(2014),Jenkins(1998),Lesotho(2006),Adugna(2013),Akpalu(2002), Ariyo & Raheem(1991),Ajide & Bello(2013),Bello & Lawanson(2012),Sakr(1993),Quatrara(2004), Kazeem et al (2012), Esubalew (2014),Riberio (2001),Seck El Nil(1993).	Positive & Significant
	Asante (2000),	Negative
Public investment	Oshikoya(1992),Riberio(2001),Erden(2005),Lesotho(2006),Siraj(2014), Akpalu(2002),Marbuah & Firimpong(2010),Ariyo & Raheem(1991), Chete & Akapokoji(1998),Asante (2000), Bello & Lawanson(2012), Sakr(1993), Quatrara(2004), Kazeem et al (2012),Adugna(2013), Obaseki and Onwioduokit (1998	Positive & Significant
	Badawi (2004), Esubalew (2014), Akpalu(2002), Asante (2000),	Negative & Significant
Inflation	Marbuah & Firimpong(2010), Chete & Akapokoji(1998), Asante (2000), Ajide & Bello(2013),	Positive & Significant
	Oshikoya (1992), Akpalu(2002), Esubalew (2014), Erden(2005),Sisay(2010), Asante (2000),	Negative & Significant
Annual lending interest rate	Oshikoya(1992),Osmond(2014), Lesotho(2006), Marbuah & Firimpong(2010), Ariyo & Raheem(1991), Ajide & Bello(2013), Bello & Lawanson(2012), Asante (2000), Seck El Nil(1993).	Positive & Significant
	Erden(2005), Esubalew (2014), Akpalu(2002),	Negative & Significant
International Trade openness	Marbuah & Firimpong(2010), Ajide & Bello(2013), Kazeem et al (2012), Adugna(2013)	& Significant
	Asante (2000), Esubalew (2014), Oshikoya(1992), Mbanga (2002), Rong and Kimuyo(1997),Jenkins(1998),	Negative & Significant
External	Adugna(2013), Marbuah & Firimpong(2010), Bello &	Positive

Debt	Lawanson(2012), Sakr(1993), Mbanga (2002)	& Significant
Service	Oshikoya(1992),Jenkins(1998), Kazeem et.al(2012),Esubalew (2014), Osmond(2014),,	Negative & Significant

As the above empirical observation reveals that; Gross Domestic Product (GDP), Public investment, inflation, real lending interest rate, and Trade openness have positive impact on private investment in a country especially in the sub-Saharan Africa countries in a consistent manner. External Debt Burden has both positive and negative impact on private investment, Moreover, Public investment has both crowding in and crowding out effect on private investment in a the sub-Saharan Africa countries. While inflation has a negative impact on private sector investment.

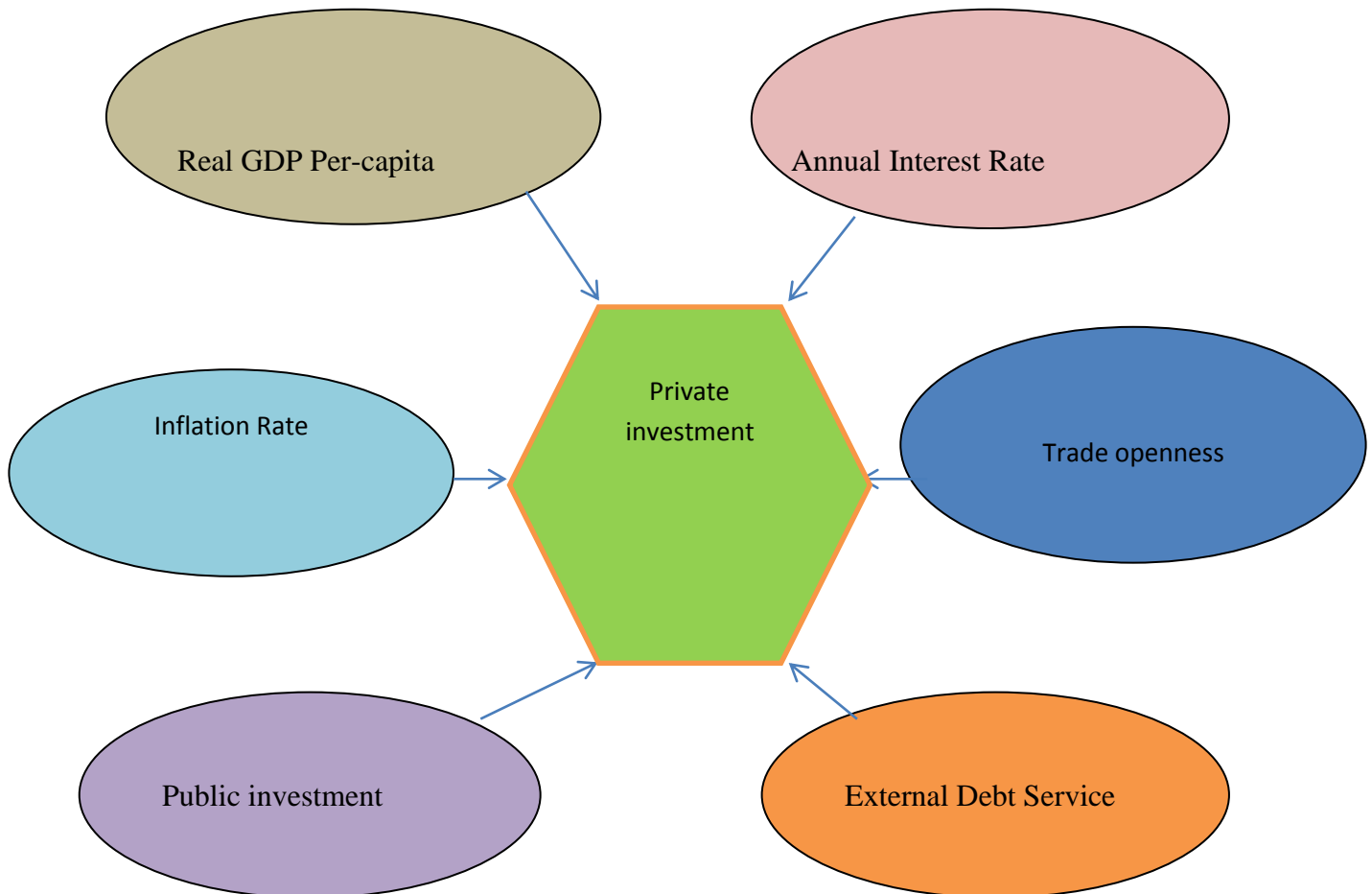
**2.4 The Research Gap**

In recent years, private investment has been accorded renewed emphasis and important place as engine of economic growth and development. It plays a crucial role and contributes a lot to the economic prosperity of a nation. In Ethiopia, the presence of little empirical analysis in this context makes this study vital to show the role of the private investment in the economy and to help the policy formulation incentive provision to the sector. This research also focused on studying the key determinants that are critical to determinants of private investment in Ethiopia. It depicts the relationship of variables within the investment status and data gather from 1991 to 2016. The study period is selected based on the: major economic reforms encompassing currency devaluation, trade liberalization, deregulation of markets, removal of restrictions on private sector participation, and modest privatization and reform of State-Owned Enterprises ( SOEs), thus it is assumed that major economic variables are somehow ‘normal’, can contribute positively to economic growth. Moreover, only a few explanatory variables were addressed under the previous studies that affect private sectors investment, and there is no the same sign agreement on the significance of independent variables on the dependent variable(private investment) leads to conduct a research.

## 2.5. Conceptual framework

The conceptual framework of the study include real private investment as a dependent variable and the explanatory variables such as Real GDP; Inflation Rate; Annual Lending Interest Rate; External Debt Service ; public investment; and International Trade openness as respectively.

**Figure 2.1:** Variables conceptual frame work



## **Unit Three**

### **3. Research Methodology**

This chapter commonly describes the types and sources of data and the methods and techniques used in the estimation of the models. It mainly covers data collection, analysis and evaluation of data, anticipating expected results and output of the study.

#### **3.1. Research Approach and Design**

The study adopts quantitative research design to meet the expectation of the course and in addition uses secondary data which is readily available for convenience, in terms of time available. A descriptive design will assume for analyzing the determinants of private investment in Ethiopian. Descriptive design allows for the explanation of how private investment relates with its determinants, through the use of quantitative methods (Rippy; 2004). Descriptive design gives room for the manipulation of independent variables to determine their effect on a dependent variable (Box and Draper; 1987).

#### **3.2. Target Population**

A target population, in statistics and other areas of mathematics, is defined as: a discrete group of individuals, animals, phenomenon or things that can be identified by at least one common characteristic for the purposes of data collection and analysis. The population under this study is all private sector investment in Ethiopia.

#### **3.3: Data collection, analysis and Model Specification**

The study will be conducted basically using secondary data. An attempt will be made to gather a 26-years data (i.e. from 1991to 2016) on some important variables. The data was mainly collected from National Bank of Ethiopia (NBE), and MoFEC. The secondary data will be collected and summarized using tables, charts and other appropriate statistical tools. Then, OLS regression model will be used together with other appropriate econometric techniques to explain factors that determine private investment in the country. This model is selected for its simplicity, and is also expected to fulfill the assumptions of efficiency, consistency and unbiasedness.

The model for this study can be stated as:

$$\text{PRI} = f(\text{PUI}, \text{RAIR}, \text{INF}, \text{GDP}, \text{EDB}, \text{and OPE}) \dots \dots \dots (1)$$

Where PRI being the dependent variable represents private investment and the explanatory variables PUI is public investment, RAIR is real interest rate, INF is inflation, GDP is gross domestic product, EDS external debt service, OPE is international trade openness.

The economic model in Equation (1) can be transformed into an econometric model as natural logarithm is applied in order to obtain a linear exponential trend (if any) in the time series data.

$$\ln \text{PRI} = \alpha_0 + \alpha_1 \ln \text{PUI} + \alpha_2 \ln \text{RAIR} + \alpha_3 \ln \text{INF} + \alpha_4 \ln \text{GDP} + \alpha_5 \ln \text{EDB} + \alpha_6 \ln \text{OPE}$$

Where the coefficients  $\alpha_1, \alpha_2, \alpha_3 \dots \alpha_6$  are the parameters of the respective variables and  $\alpha_0$  the constant term,  $t$  denotes time and  $u_t$  is the error term.

### 3.4. Model Assumption test

Time series data needs different tests to be free from fake or false result; those tests are stationarity test, stability test, classical linear regression diagnostic test which includes Heteroskedasticity test, autocorrelation test, normality test and Multicollinearity test.

#### 3.4.1 Stationarity

A definition of a stationary series is a series whose data generating processes such as the mean, variance, and auto-covariance do not depend upon time.

Estimation of parameters and hypothesis testing using time series data requires an investigation of the data generating process of the variable under consideration. This investigation helps to avoid estimating spurious correlation between variables in a regression, where what actually exist is correlated time trend rather than meaningful economic relationship. Combination of variables that contain a time trend or non-stationary may amounts to spurious correlations. To avoid such problem of spurious correlation due to the presence of non-stationary variables in the regression model, the time series property of the variables used in the model are investigated. A series is referred as (covariance) stationary if it has constant mean, finite time invariant variance and a constant as well as a covariance between any two-time periods that depends only on the lag between them. On stationarity, a property common too many macroeconomic and financial time series, means that variable has no clear tendency to return to a constant mean or a linear trend.

The stationarity of each series was verified with the standard Augmented Dickey-Fuller (ADF) and the Phillips-Perron (PP) tests. Since the majority of economic theory built upon the assumption of stationarity, it is typically required to check that the various variables are stationary before applying standard estimation or testing procedures in a dynamic time series model. Otherwise, regression of a non-stationary variable upon a non-stationary variable may lead to the so-called spurious regression (correlated time trend rather than a meaningful economic relationship), in which estimators and test statistics are misleading. According to Davidson and Mackinnon (1999), to overcome this problem, it is necessary to identify whether the variables in the model are stationary and identify their orders of integration.

A time series is said to be integrated of order  $d$ , denoted  $I(d)$ , if it becomes stationary after being differenced a minimum of  $d$  times (Dickey and Fuller, 1981). The stationarity test results may be sensitive to whether a constant and/or a time trend are/is included in the regression. The appropriateness of including a constant and/or a trend were checked by formally testing whether they are statistically significant in the respective stationarity test of regression equations.

A widely popular approach to test for stationarity is the unit root test. Among different ways of testing for the presence of a unit root: this study employed ADF and Phillips-Peron tests to determine the existence of a unit root.

#### **3.4.1.1. Augmented Dickey-Fuller (ADF) Test**

Dickey (1976), and Dickey and Fuller (1981) developed a method for testing the stationarity of a time series variable by directly testing the null of the unit root (non-stationarity). The original Dickey- Fuller (DF) test is based on a simple autoregressive of order one, AR (1) process with a white-noise disturbance. However, because the DF test regression does not include values of variables beyond one lag, there may be the serial correlation among error terms. Results based on such tests may be biased and are not valid (Kirchgassner and Wolters, 2007). The ADF test avoids this problem because it corrects for serial correlation by adding lagged-difference terms (Greene, 2003). A test of stationarity (or non-stationarity) that has been become popular over the past several years is the unit root test. Gujarati, (2004) indicated that ADF test is the most usually used tests for unit root. Under ADF test null hypothesis say variable has unit root(non-stationary) while alternative hypothesis say there is stationary. So, if T-statistics of ADF is

greater than critical value at 5% and 10% more at the former level, it reject the HO which say unit root and assure the stationary.

The general form of the ADF Equation with

No constant and no trend Model ----- $\Delta Y_t = \beta Y_{t-1} + \sum_{p=1}^p \theta_i \Delta Y_{t-i} + \epsilon_t$  .....eq (1)

Constant and no trend model -----  $\Delta Y_t = \alpha_0 + \beta Y_{t-1} + \sum_{p=1}^p \theta_i \Delta Y_{t-i} + \epsilon_t$  .....eq (2)

Constant and trend model----- $\Delta Y_t = \alpha_0 + \alpha_2 t + \beta Y_{t-1} + \sum_{p=1}^p \theta_i \Delta Y_{t-i} + \epsilon_t$  .....eq (3)

Where

$\Delta Y_t = Y_t - Y_{t-1}$  ..... First difference of series  $Y_t$ .

$\Delta Y_{t-1} = Y_{t-1} - Y_{t-2}$ -----First difference of series  $Y_{t-1}$ .

$\epsilon_t$ .....stochastic disturbance term.

$\beta, \alpha, \theta$  .....parameters to be estimated.

Where  $Y_t$  is variable to be tested stationarity and in the above three equation the  $\Delta$  is the difference operator and the null hypothesis of  $\beta=0$  will be tested against the alternative  $\beta<0$  will be tested where a rejection of this hypothesis indicates that the time series is stationary and it does not contain a unit root (Enders 1995).

**3.4.1.2 Phillips-Perron Test**

According to Nandwa and Mohan (2007), the other test of stationarity with the same null as ADF is the Phillips-Perron (PP) test, which is argued to be more robust to serial correlation and time dependent Heteroskedasticity and is an improvement over the ADF test with respect to finite sample properties. In contrast to the ADF, the PP test does not add lagged difference terms to account for a potential serial correlation in the error terms; rather, it uses non-parametric statistical methods. This test statistic follows the same asymptotic distribution as the ADF test statistic (Gujarati, 2004). However, Kirchgassner and Wolters (2007) argued that both tests have low power if, under the alternative hypothesis, the first-order autocorrelation coefficient is close to one.

**3.5. Stability test**

**Ho= the parameter estimates are stable**

**H1= the parameter estimates are not stable**

Test of Ramsey (1969). Ramsey’s regression equation specification error test (RESET) test is a general specification test for linear regression.it is designed to detect if there are any neglected

non linearities in the model. It is a popular diagnostic for correctness of functional form. This stability test is appropriate in time series data.

### **3.6. Classical linear regression diagnostic testing**

Before going to further in to time series econometric procedure, the first issue is test of the assumption of classical linear regression model (CLRM). The ordinary least squares (OLS) techniques in which different between the observation and estimation are minimized in terms of sum of squares. The characteristics of the model and proposed variables stated in this research are not violating the classical assumptions underlying the OLS model. These are checked by testing each assumption.

#### **3.6.1. Heteroskedasticity**

**H<sub>0</sub> = Homoscedastic**

**H<sub>1</sub> = Heteroskedastic**

Among the OLS assumption, the first assumption (diagnostic test) which was conducted in this study is Heteroscedastic. This theoretically expressed as  $(U_t) = \alpha^2 < \infty$ : it has been assumed thus far that the variance of the error is constant,  $\alpha^2$  – this is known as the assumption of homoscedasticity. If the errors do not have constant variance, they are said to be Heteroscedastic.” White (1980) as cited by Brooks, (2008) is the most popular test of homoscedasticity.

#### **3.6.2. Autocorrelation**

**H<sub>0</sub> = No Autocorrelation**

**H<sub>1</sub> = Autocorrelation**

The second important diagnostic test which was performed in this research is the autocorrelation test. This assumption of OLS theoretically expressed by the number of writers among that Brooks (2008) started. It has been stated as  $cov(U_i, U_j) = 0$ , this is another assumption that made of the CLRMs disturbance terms is that the covariance between the error terms over time should be zero. That means the errors are uncorrelated with one another. If errors are not uncorrelated with one another, it would be stated that they are auto correlated or serially correlated. The most

common test of this assumption is using the Durbin-Watson test and the Breusch-Godfrey test to detect the problem of autocorrelation.

### **3.6.3 The Normality (Jarque -Bera) Test**

**H<sub>0</sub>= Error terms are normally distribute**

**H<sub>1</sub>= Error terms are not normally distribute**

It is the third assumption (diagnostic test) conducted in this study is the normality assumption (i.e. the normality distributed errors). The Brooks (2008) stated as normality assumption ( $U_t, N(0, \sigma^2)$ ) is required in order to conduct single or joint hypothesis test about the model parameters. One of the most commonly applied tests for normality is the Jarque -Bera (JB) test. The JB uses the property of normally distributed random variable that the entire distribution is characterized by the first two moments those are mean and variance. Having the superiority of JB than other for normality test, the researcher used it for the null hypothesis of normally distributed errors assumption.

### **3.6.4 Multi co-linearity Test**

The final test which was conducted in this study is the Multicollinearity test. This help to identify the correlation between explanatory variables and to avoid double effect of independent variable from the model. Simply we can test Multicollinearity by correlation matrix. Brooks (2008) indicated that, if the variables are highly correlated, the solution is ignoring, avoiding one variable that have Multicollinearity and transforming that variable to ratio.

## **3.9. Lag Length Determination**

Before estimating the MODEL, we have to decide the maximum lag length, to generate the white noise error terms. To determine the optimal lag length different information criteria can be used. The objective of the information criteria (IC) method is to select the number of parameters, which minimize the value of the information criteria. The most popular information criteria's are the Akaike information criterion (AIC), Schwarz's Bayesian information criterion (SBIC) and the Hannan-Quinn information criterion (HQIC). According to Kaputo (2011), the model having low AIC is better.

### **3.8. Definition and Measurement of Variables**

For the purpose of this study, the following definitions and a priori expectations will be used for the variables being examined.

#### **I. Private Investment**

Private sector's gross domestic investment is defined as all additions to the stocks of assets (purchases and own-account capital formation), less any sales of second-hand and scrapped assets

#### **II. Public Investment**

Public Investment: Public Investment expenditure is also another influential variable that determines affecting private investment. The role of public investment is seen from two aspects. On one hand public investment, in the form basic infrastructures, is a complement to private investment and hence promote private sector expansion and development. On the other hand, public expenditure is a competent of private sector and hence, reduces the amount of money available for them. As of Adugna (2013), Hailu and Debele (2015), Jalloh (2002), Ouattara (2004), and Molapo and Damane (2015), Public investment expenditure directly contributes for private investment. According to them public extensive investments on basic infrastructures-such as roads, energy and telecommunication - creates conducive environment for investment.

Public investment rate is measured as the ratio of domestic public investment expenditure to GDP. The effect of domestic public investment on private investment is ambiguous. It depends on the composition of public investment and whether it complements or substitutes for private investment. If public investment concentrates on activities that substitute directly for private investment, public investment crowds-out private investment. The higher the complementarity of public and private investment, the more likely that public investment will have a net positive effect on private investment. It follows that if domestic public investment is mainly on basic infrastructure such as electricity, transportation, education, health care services, water supply and sewage disposal, public investment may complement and foster private investment initiatives. Projects tend to reduce the cost of production, enhance private sector output, boost the expected rate of return and encourage more private investment. On the other hand, domestic public

investment has the ability to diminish or crowds-out private investment if it imposes excessive burdens on private sector through high and multiple taxes.

Public investment can also invade on private investment through high interest rates and reduction in loanable fund available for private sector borrowers caused by excessive domestic borrowing by the government to finance heavy government spending on public sector capital projects, especially when private entrepreneurs would want to raise some of their working capital from the domestic banking system. (Adugna, 2013).

According to Jalloh (2002), public investment may either crowd-out or crowd-in private investment. In case of the former public investment may adversely affect private investment by increasing the cost of capital through competition of scarce resources by both the government and the private investors. However, public investment may crowd in to act as a catalyst through the provision of key infrastructure to complement private investment. The expectation of public investment in this study is therefore ambiguous and will be determined in the model.

### **III. Real Annual Interest Rate**

Interest rate has a wide range of effects on the economy in general and private investment in particular. It affects saving rate, volume of bank credit and the ability of private sector to borrow for investment purposes. The real interest rate is the rate of interest an investor expects to receive after investment. It is proximate by the prime rate/bank rate. The Fisher equation, defined the real interest rate as the nominal interest rate minus the inflation rate. There are competing views about the effect of real interest rates on private investment. A high level of real interest rates raises the real cost of capital, and therefore dampens the level of private investment and vice-versa. According to Economists interest is the cost of investment. The results from the studies show that interest rate is inversely related private sector performance in Sierra Leone and Zambia. According to Jalloh (2002), an increase in the real rate of interest will raise the user cost of capital, thereby making investment less profitable. As of Kaputo (2011) real lending interest rate has a significant negative effect in the long-run. This is so because the high cost of investment capital discourages investment by local firms. On the other hand, Augustine (2015) found that real rate of return on bank deposits has a statistically significant positive effect on investment behavior in Nigeria. Reasonable level of interest rise saving and hence investment.

#### **IV. Inflation**

Until recently, there are several definitions and concepts given to inflation. Originally, the neoclassical economists' defined inflation as a galloping rise in prices due to excess money quantity, whereas for Keynesians inflation occur when money supply exceeds faster than the full employment level (Jhingan, 1997). Even though several alternative meanings and concepts have been given in different theoretical mainstreams, it has been widely accepted that inflation refers to a sustained increase in the general price level; alternatively it is meant to refer to a depreciation of the monetary unit or a fall in the purchasing power of money (Bron fenbrenner & Holzman 1963).

Inflation rate is an important determinant of private investment. Though moderate inflation is needed for business to strive profitably in a country, high and rising inflation rates is an indicator of macroeconomic instability and it affects private investment adversely. Oshikoya (1994) asserted that in developing countries, a high inflation rate has negative impact on private investment. By reducing the value of money, it discourages saving and lowers the economy's saving rate which accumulates investible funds for investment.

Inflation reflects a reduction in the purchasing power per unit of money. When there exists high inflation individuals have to spend more by using more money to buy fewer goods. High rates of inflation adversely affect private investment activity by increasing the riskiness of longer-term investment projects, reducing the average maturity of commercial loans, and distorting the information conveyed by prices in the economy. According to Jalloh (2002), Molapo and Damane (2015) and Kaputo (2011), inflation plays a contrary role in private investment promotion in Sierra Leone, Zambia and Lesotho, respectively. Inflation causes low levels of private investment since domestic investors foresee a low return on capital.

#### **V. Gross Domestic Product**

The gross domestic product (GDP) is one of the primary indicators used to gauge the health of a country's economy. It represents the total value of all goods and services produced over a specific time period and therefore play an important role in an economy. The growth and the level of the GDP provide an indication about the investment opportunities open to the economy.

If the economy exhibits an increasing real growth, there will be potential increase in profits which will drive investors to make more investments. (Kazeem et al, 2012).

## **VI. External Debt Service**

Total external debt is defined as debt owed to nonresidents repayable in foreign currency, goods, or services. It is the sum of public, publicly guaranteed, and private nonguaranteed long-term debt, short-term debt, and use of IMF credit. The data is in current U.S. dollars but is converted to real using the GDP deflator and then transformed into logarithm. External debt burden is measured by debt service ratio to export receipts, the ratio of external debt to export receipts and the ratio of external debt to GDP. According to Onoh (2013), the debt service ratio to export is the ratio of debt service payment due for a given year to the export earnings of the same year. Debt service payment of a given year is the sum of the matured principal plus the accrued interest due. For economy of the debtor country to be sustainable, the World Bank recommended a maximum debt-service ratio of 10% for public debt. Ethiopia's external debt is not simply unsustainable; even the most generous debt relief would not bring the country within reach of meeting its responsibility within the context of global poverty-reduction goals. In line with this, according to the World Bank classification of Highly Indebted Economies, the country is one of the severely indebted low-income countries. Ethiopia's external debt has changed significantly in magnitude, structure and composition over the last quarter of the 20<sup>th</sup> century. In 1975, it stood at about US\$ 343.7 million, equivalent to 14% of the GDP, and US\$ 9.1 billion (214% of GDP) in 1991. As at June 30, 1999 this figure had increased to an equivalent of US\$ 10.2 billion and very recently, as at 29 April 2004, following the debt relief granted in accordance with development initiatives designed to benefit the Heavily Indebted Poor Countries (HIPC), it had declined to US\$ 3 billion. Therefore, the problem is how economic growth will be affected by the accumulated external debt stock and the repayment of debt in the long run. (Melese Gizaw, 2005).

## **VII. International Trade(Openness)**

Trade openness is one of the explanatory variables included in the study to measure external openness and the impacts of trade liberalization on the private investment. It can be measured using the ratio of import, & export to GDP as follow:

$$\text{Openness} = \frac{\{\text{Exports} + \text{Imports}\}}{\text{GDP}}$$

Where exports of goods and services represent the value of all goods and other market services provided to the rest of the world and imports of goods and services represent the value of all goods and other market services received from the rest of the world. Trade openness is a measure of how a country is liberalized to the rest of the world. Theoretically, the effect of trade openness on private investment is ambiguous since reducing trade barriers through liberalization may boost exports thus increasing investments and increased imports of inputs to production increases productivity and competitiveness. However, liberalization exposes a country to external competition which may destroy some sectors of the economy thus creating a disincentive for investments. (Marbuah & Firimpong, 2010).

## UNIT FOUR

### RESULTS AND DISCUSSION

This chapter deals with the results of study which includes, descriptive statics, stationary test, correlation results for explanatory variables, diagnosis test for the regression models, and regression analysis for the variables. Prior to conducting the regression of the private sector investment determinants, it is essential to test the appropriateness of the time series data based on certain criteria and assumption of OLS diagnostic test.

#### 4.1 Introduction

This chapter is divided into three subsections. Section 4.2 presents the descriptive statistics; section 4.3 presents the diagnostic test results and finally section 4.4 present the regression analysis results.

#### 4.2 Descriptive Statistics

**Table 4.1** Descriptive statistics

The table that follows presents the descriptive statistics.

Variable	Mean	Std. Dev.	Min	Max	Obs
Private investment	11.27192	1.097659	9.7	13.36	26
Real gross domestic product	12.59086	.0559489	11.777	13.52214	26
Real interest rate	11.83288	2.072582	6.8	15.5	26
External debt service	7.440309	0.9139	6.234782	9.777663	26
Public investment	11.14	1.99	8.63	16.13	26
Trade Openness	27.55973	6.962468	11.02456	37.25703	26
Inflation	10.63043	15.17465	(10.7734)	55.24131	26

Source: Own computation using Eviews 6.

From Table 4.1, private investment in Ethiopia for the period understudy had a mean of 11.27 and a standard deviation of 1.09 with a minimum and maximum of 9.7 and 13.36 respectively. Real GDP had a mean of 12.60 and a standard deviation of .56 with a minimum value of 11.77 and a maximum value of 13.52 for the period under study. The openness ratio had a mean of 27.56 and a standard deviation of 6.96 with a minimum of 11.02 and a maximum of 37.26. Real interest rate had a mean of 11.83 and a standard deviation of 2.07 with a minimum and maximum value of 6.8 and 15.5 respectively while inflation had a mean of 10.63 and a standard deviation of 15.17 with a minimum and maximum value of (10.77) and 55.24 respectively. The external debt had a mean of 7.44 and a standard deviation of 0.91 with a minimum value of 6.23 and maximum value of 19.77. Finally, the mean of public investment was 11.14 and a standard deviation of 1.99 with a minimum and maximum value of 8.63 and 16.13 respectively for the period understudy.

### **4.3 Diagnostic Tests Results**

The study determined the lag length of each variable by specifying the longest lag and testing for the significance of each lagged value of that variable until the lags that are significant were found. For each variable it was found that the first lags were statistically significant. Therefore, the author choice maximum lags length of two, under this study.

#### **4.3.1 Heteroskedasticity Test**

**H0= Homoscedastic**

**H1= Heteroskedastic**

Among the OLS assumption, the first diagnostic test which was conducted in this study is Heteroscedastic test. This theoretically expressed as  $(U_t) = \alpha_2 < \infty$ : it has been assumed thus far that the variance of the error is constant,  $\alpha_2$  – this is known as the assumption of homoscedasticity. If the errors do not have a constant variance, they are said to be Heteroscedastic.’’ White (1980) as cited by Brooks, (2008 p. 134) is the most popular test of homoscedasticity

**Table 4.2** Heteroskedasticity test result

Heteroskedasticity Test: <b>White</b>			
Ho= Homoscedasticity , while H1= Heteroskedasticity			
F-statistic	0.868374	Prob. F(6,19)	0.5356
Obs*R-squared	5.595413	Prob. Chi-Square(6)	0.47
Scaled explained SS	1.734252	Prob. Chi-Square(6)	0.9424

Source: Own computation using Eviews 6.

The result from the White Test for Heteroskedasticity has F- statistic with a value of .868 and a P-value of 0.54 implying that the F- statistic is insignificant at 5 percent level of significance. In this case, the study fails to reject the null hypothesis of constant variance (homoscedasticity) and concluding that Heteroskedasticity is not present in the data.

#### **4.3.2 Autocorrelation Test**

**H0= No Autocorrelation**

**H1= Autocorrelation**

The second important diagnostic test which was performed in this research is the autocorrelation test. This assumption of OLS theoretically expressed by the number of writers among that Brooks (2008) started. It has been stated as  $cov(U_i, U_j) = 0$ , this is another assumption that made of the CLRMs disturbance terms is that the covariance between the error terms over time should be zero. That means the errors are uncorrelated with one another. If errors are not uncorrelated with one another, it would be stated that they are auto correlated or serially correlated. The most common test of this assumption is using the Durbin-Watson test and the Breusch-Godfrey test to detect the problem of autocorrelation. For this study both were used.

**Table 4.3** Autocorrelation test result

<b>Breusch-Godfrey Serial Correlation LM Test:</b>			
Ho= No Autocorrelation ,while H1=Autocorrelation			
F-statistic	0.637786	Prob. F(2,17)	0.5406
Obs*R-squared	1.814711	Prob. Chi-Square(2)	0.4036

Source: Own computation using Eviews 6.

The study tested for serial correlation using the Breusch-Godfrey test and the result is presented in table 4.4 which contains all the diagnostic tests of the study. The test reports the F-statistic with a value of .64 and a P-value of 0.54 implying that the study fails to reject the null hypothesis of no serial correlation at all conventional levels of significance. Hence, there is no serial correlation in the data.

### **4.3.3 Multi-collinearity Test**

The third important diagnostic test which was performed in this research is multi-collinearity test. This assumption of OLS theoretically expressed by the number of writers among that Brooks (2008) started. A correlation is number that explains the degree of relationship between two variables. In other explanation, Multicollinearity reveals the relation among the independent variables. As stated on correlation matrix, many of correlations that have occurred among independent variables are weak correlations which show non-existence of Multicollinearity. Even though some high correlation existed between some variables, researcher ignored those near Multicollinearity problems but, not without scholar's reason. Cooper and Schindler (2009) and Hailer et al. (2006) recommended that Multicollinearity problem would be corrected when correlation level to be above 80% and 90% respectively. As indicated on the correlation matrix, GDP has positive correlation with inflation (.20), international trade openness and external debt service (.74). External debt service, international trade openness and public investment are positively correlated with interest rate and negative correlation with inflation as per this study.

**Table 4.4** Multi-collinearity Test result

<b>Covariance Analysis: Ordinary</b>						
Date: 12/15/17 Time: 16:48						
Sample: 1991 2016						
Included observations: 26						
Correlation	AIR	INF	LNEDS	LNOPN	LNPUI	LNRGDP
AIR	1					
INF	-0.369006	1				
LNEDS	0.255282	-0.071164	1			
LNOPN	0.118071	-0.031798	0.257569	1		
LNPUI	0.041227	-0.074062	0.145109	0.189957	1	
LNRGDP	0.018832	0.204739	0.619485	0.741930	0.232863	1

Source: Own computation using Eviews 6.

Therefore, the result from correlation matrix test for multicollinearity fails to reject the null hypothesis which says there is no multicollinearity problem among independent variables. Since there is no correlation value greater than 76%, there is no multicollinearity problem in the study.

#### 4.3.4 Normality Test

**Ho= Error terms are normally distributed**

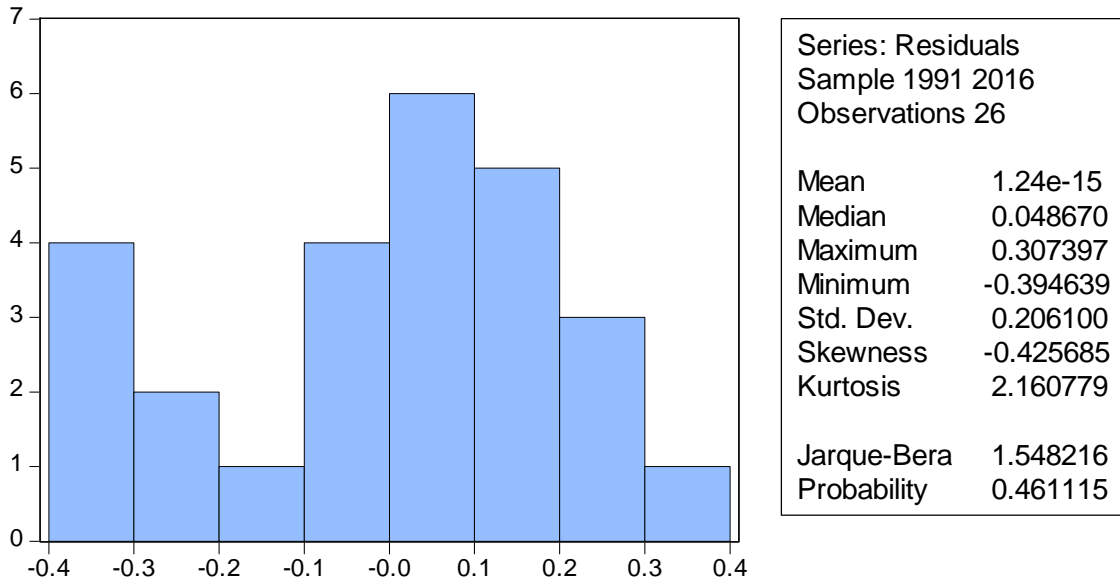
**H1= Error terms are not normally distributed**

Final diagnostic test conducted in this study is the normality assumption (i.e. the normality distributed errors).The Brooks (2008) stated as normality assumption is required in order to conduct single or joint hypothesis test about the model parameters. The most commonly applied test for normality is the Jarque- Bera (JB) test. The JB uses the property of normally distributed random variable that the entire distribution is characterized by the first two moments, those are mean and variance. Having the superiority of JB than other for normality test, the researcher used it for the null hypothesis of normally distributed errors assumption.

Since, the histogram is bell-shaped and JB statistic is not significant, which means P-value given at the bottom of the normality test should be > 10%, so it is bigger than it and normal. Therefore, the study fails to reject the null hypothesis that, error terms are normally distributed.

The following graph shows the normality output

**Figure 4.1:** Normality Test result



Source: Own computation using Eviews 6

### 4.3.5 Stability Test

**H<sub>0</sub>**= the model is stable at all conventional level

**H<sub>1</sub>**= the model is not stable at all conventional level

**Table 4.5** Stability test result.

Ramsey RESET Test:			
F-statistic	0.003186	Prob. F(1,18)	0.9556
Log likelihood ratio	0.004602	Prob. Chi-Square(1)	0.9459

Source: Own computation using Eviews 6.

The result from the Ramsey RESET Test for stability test and the result are presented in table 4.6 which contain all the diagnostic tests of the study? The test reports the F-statistic with a value of .003186 and a P-value of 0.95 implying that the study fails to reject the null hypothesis of stable at all conventional levels of significance. Therefore, the model is stable at all conventional levels of significance.

#### 4.3.6. Stationarity Test (Augmented Dickey Fuller/ADF/ Technique)

While working with time series data, testing for stationarity is needed. Working with non-stationary leads to spurious output. This means, it indicate a relationship between variable which does not existed. To have reliable result, we have to transform non-stationary to stationary by making it differencing. For OLS estimation in general to be valid, the error term must be time-invariant, that is, stationary. As Gujarati (2004) mentioned, a regression on non-stationary data may lead to a spurious regression if the variables are not co-integrated. And, according to Salvatore and Regale, (2002), continuous buildup of the errors create the problem that a non-stationary series will tend towards an infinite variance, and the model will have a spuriously (falsely) significant result and high  $R^2$ . Nevertheless, the problem of unit-root can be eliminated usually by taking the first differences of the variables under consideration. Hence, in estimating the short-run and long-run dynamic model, a unit root test was made both for the dependent and independent variables using the Augmented Dickey Fuller Technique /ADF/

Hence, the study conducted the unit root test using the Augmented Dickey Fuller test and the results are presented in table 4.2. Presence of unit root is tested for each variable both at levels and at first difference specifying the inclusion of intercept or intercept & trend, and none. From the results; inflation is stationary at zero level in all cases (constant, trend and none at 1% significance), public investment is stationary at level in two cases (constant and trend at 1% and 5% significance level respectively) and annual interest rate in only stationary at constant level at 5% significance). Real private investment, real gross domestic product, trade openness, and external debt service all had unit root at levels but became stationary after the first difference implying that they are all integrated of order one. Even the aforementioned variables which were stationary at level are stationary at first difference at 1% significance. Thus, to address the inbuilt problem of unit root component, the first difference is taken, and tested for unit-root. Accordingly, all variables of interest are found to be stationary at first difference (integrated of order one i.e.  $I(1)$  as shown in table 4.2 .Therefore, all the variables are integrated of order one making it possible for the study to employ OLS regression model .

**Table 4.6-ADF unit root test results**

**H<sub>0</sub>= unit root (Non Stationary)**

**H<sub>1</sub>= Stationary**

Variables	ADF test			Order of Integration.
	With Intercept	Intercept & trend	None	
lnRPRI	0.492587	-2.793623	3.101686	
D(lnRPRI)	-5.640158*	-5.66827*	-4.333966	I(1)
lnRGDP	0.689544	-1.410659	7.854172	
D(lnRGP)	-3.854243*	-4.047131*	-0.704555	I(1)
lnTO	-2.500835	-2.310593	1.123161	
D(lnTO)	-4.0301*S	-4.099695*	-3.752123*	I(1)
INF	-5.022133*	-5.547804*	-4.002147*	
D(INF)	-6.975976*	-6.787061*	-7.147392*	I(1)
lnEDS	1.042819	-1.235225	-0.59288	
D(lnEDS)	-4.732022*	-4.767951	-4.597737	I(1)
AIR	-3.470614*	-3.49278	0.115723	
D(AIR)	-5.329131*	-5.410938	-5.350562	I(1)
lnPUI	-3.875183*	-4.069213*	-0.562422	
D(lnPUI)	-4.77821*	-4.689099*	-4.905706	I(1)

Note: D shows the variable is differenced once. In addition \* shows rejection of null hypothesis at 5 %.( Source: Own computation using Eviews 6.)

The ADF test shows the stationary of the all variable at with intercept, trend, and none thus indicating as Cointegrated of at level and order I (1), means no stationarity problem.

#### 4.4 Regression analysis between private investment and explanatory variables

This part explained over all the empirical result of the regression and its effect on private investment. The following regression model was applied

$$\text{LNRPI} = -7.8766 - 0.0887 \cdot \text{AIR} - 0.0112 \cdot \text{INF} + 0.2165 \cdot \text{LNEDS} - 0.0621 \cdot \text{LNPIUI} + 1.4811 \cdot \text{LNRGDP} + 0.0260 \cdot \text{LNT0}$$

In the following table, coefficient, standard errors, t-values, and P-values explanatory variable and R2, adjusted R2, F-statistics, prob (F-st) for regression and number of observations included are presented.

**Table 4.7 Regression Equation**

Dependent Variable: LNRPI  
 Method: Least Squares  
 Date: 12/17/17 Time: 11:40  
 Sample: 1991 2016  
 Included observations: 26

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-7.876617	2.069537	-3.805980	0.0012
AIR	-0.088764	0.026330	-3.371180	0.0032
INF	-0.011050	0.003931	-2.810997	0.0112
LNEDS	0.216581	0.084459	2.564325	0.0190
LNPIUI	-0.062178	0.028891	-2.152106	0.0445
LNRGDP	1.481085	0.232550	6.368880	0.0000
LNT0	0.026013	0.013207	1.969660	0.0636
R-squared	0.964745	Mean dependent var	11.27192	
Adjusted R-squared	0.953612	S.D. dependent var	1.097659	
S.E. of regression	0.236413	Akaike info criterion	0.178329	
Sum squared resid	1.061929	Schwarz criterion	0.517047	
Log likelihood	4.681723	Hannan-Quinn criter.	0.275868	
F-statistic	86.65521	Durbin-Watson stat	2.026762	
Prob(F-statistic)	0.000000			

Source: Own computation using Eviews 6.0

#### 4.4.1 Coefficient of Determination ( $R^2$ ) and adjusted $R^2$

Coefficient of determination or  $R^2$  measures what percentage of a change in the dependent variable can be measured or explained by the change in the independent variables.

It also explains the level of the explanatory power

If  $R$ -squared = 0 (no explanatory power)

This means that none of the change in the dependent variable can be measured by the change in the independent variables. The estimated equation is useless.

If  $R$ -squared = 1 (full explanatory power)

This means 100% of the change in the dependent variable can be explained by the change in the independent variables. But, the adjusted  $R$ -squared is a modified version of  $R$ -squared that has been adjusted for the number of predictors in the model. The adjusted  $R$ -squared increases only if the new term improves the model more than would be expected by chance. It decreases when a predictor improves the model by less than expected by chance. On this study, both the  $R$ -squared and adjusted  $R$ -squared look better, Also the coefficient estimates are significant because their  $p$ - values are less than 0.05 except few. The results obtained shows that,  $R$ -squared is 0.964. This means that 96% change in the dependent variable can be explained by the change in independent variables. However, 4% can be explained by other variables. This means that the dependent variable is strongly explained by independent variables. Besides, it also has an accepted higher explanatory power by 96%. The adjusted  $R$ -squared shows 95% that can really explained by explanatory power. So it is good to show the effect of independent variable on dependent variable in sample taken , but to show total significance for population, it can explained by  $F$ - statistics corresponding  $P$ -value .

As the above regression table shows,  $F$ -statistics'  $p$ -value is less than 5% which are very significance for model and for the population inference. By and large the model of this study, looks good since it pass all regression assumption and diagnostic test.

#### **4.4.2 Result of Regression Model**

As it can be seen from the table above, GDP, and Annual interest rate are statistically significant at 1% while Public investment, inflation, and External debt service are significant at 5%. However, international trade openness is insignificant at 5% levels of significance.

##### **4.4.2.1. Real Gross Domestic Product**

The gross domestic product (GDP) is one of the primary indicators used to gauge the health of a country's economy. It represents the total value of all goods and services produced over a specific time period and therefore play an important role in an economy. The growth and the level of the GDP provide an indication about the investment opportunities open to the economy. If the economy exhibits an increasing real growth, there will be potential increase in profits which will drive investors to make more investments. As the regression result reveals, gross domestic product has strong positive relationship with private investment and opposing the sign of null hypothesis which say no significant and positive relationship. It shows that these variables have a positive significant relationship and consistent with the economic theory. As per this study reveals, GDP increase by 1 unit, private investment will increase 1.48 units. The reason is that economic growth (RGDP) is one of the most commonly used variables to measure its effect on the private investment. According to some literature such as Fielding (1997), Osmond (2014), Jenkins (1998), Lesotho (2006), explained that private investment is significantly and positively related with real GDP growth of one country. This is because countries with higher income level inclined to allocate more of their wealth to domestic savings which could be then used to help in financing private investment. Empirical results from Lawanson (2012) from Nigeria, Ouattara (2004) from Senegal and Asante (2000) from Ghana and others like Adugna (2013) from Ethiopia, Akpalu (2002) from Ghana, Ajide & Bello (2013) from Nigeria, Sakr (1993), Kazeem et al (2012), Serven and Solimano (1992), Riberio (2001) from Brazil, Seck El Nil(1993), evidenced the contribution of GDP to private investment. Thus economic growth is expected to have significant and positive sign. Hence, this result is in line with what was explained in the previous empirical studies.

#### **4.4.2.2. International Trade Openness**

Trade openness is one of the explanatory variables included in the study to measure external openness and the impacts of trade liberalization on the private investment. empirical evidence by argue the role of trade through promoting growth according to orthodox trade theory which argue the contribution of trade to growth through specialization , increase in productivity , division of labor and expansion of production capacity . This will lead to economic growth and in turn pave the way to private investment growth. Thus trade openness is expected to have positive sign. Ethiopia adopts Systems, Applications and Products (SAP) in 1992 as recommend by World Bank. From that adjustment, Trade liberalization is one policy, which the country adopts with the aim of expanding export, import and GDP of the country. Trade liberalization in Ethiopia can be classified in to export promotion and import substitution. Ethiopian government eliminated restriction on exporter to promote the export and have trade surplus. Theoretically, the effect of trade openness on private investment is positive, since reducing trade barriers through liberalization may boost exports thus increasing investments and increased imports of inputs to production increases productivity and competitiveness. Some previous empirical results such as: Marbuah & Firimpong (2010), Ajide & Bello (2013), Adugna (2013), Kazeem et al (2012), support the above theory. While, others contradict such as Asante (2000), Esubalew (2014), Oshikoya (1992), Mbanga (2002), Rong and Kimuyo (1997), Jenkins (1998) stated that openness has negative and significant effect on private investment. However, the study reveals that openness has positive but insignificant relationship with private investment in Ethiopia.

#### **4.4.2.3 Inflation**

Inflation rate is an important determinant of private investment. Though moderate inflation is needed for business to strive profitably in a country, high and rising inflation rates is an indicator of macroeconomic instability and it affects private investment adversely. Oshikoya (1994) asserted that in developing countries, a high inflation rate has negative impact on private investment. By reducing the value of money, it discourages saving and lowers the economy's saving rate which accumulates investible funds for investment. Inflation reflects a reduction in the purchasing power per unit of money. When there exists high inflation individuals have to spend more by using more money to buy fewer goods. High rates of

inflation adversely affect private investment activity by increasing the riskiness of longer-term investment projects, reducing the average maturity of commercial loans, and distorting the information conveyed by prices in the economy. Even though, the study result contradicts to some empirical results such as Oshikoya (1992), Akpalu(2002), Esubalew (2014), Erden(2005),Sisay(2010), Asante (2000), inflation affects significantly and positively private investment, according to Jalloh (2002) in Sierra Leone , Molapo in Zambia and Damane (2015) in Lesotho and others like, Kaputo (2011), Marbuah & Firimpong(2010), Chete & Akapokoji(1998), Asante (2000) from Ghana, Ajide & Bello(2013) from Nigeria, inflation plays a contrary role in private investment promotion. Inflation causes low levels of private investment since domestic investors foresee a low return on capital. In line with this, study also reveals that inflation has significant and negative relationship with private investment in Ethiopia. From the results obtained, it shows that when inflation increases by 1 unit, private investment will decrease by 0.011 units. Hence, this variable has a significant negative effect on private investment in Ethiopia.

#### **4.4.2.4. Annual interest rate**

The real interest rate is the rate of interest an investor expects to receive after investment. It is proximate by the prime rate/bank rate. The Fisher equation, defined the real interest rate as the nominal interest rate minus the inflation rate. There are competing views about the effect of real interest rates on private investment. A high level of real interest rates raises the real cost of capital, and therefore diminishes the level of private investment and vice-versa. According to economists interest is the cost of investment. The results from the studies show that interest rate is significant but inversely related with private sector performance. According to Jalloh (2002), an increase in the real rate of interest will raise the user cost of capital, thereby making investment less profitable. As of Kaputo (2011), Oshikoya(1992),Osmond(2014), Lesotho(2006), Marbuah & Firimpong(2010), Ariyo & Raheem(1991), Ajide & Bello(2013), Bello, Asante (2000), Seck El Nil(1993), & Lawanson(2012), real lending interest rate has a significant negative effect in the long-run. This is so because the high cost of investment capital discourages investment by local firms. But the result contradicts some empirical results such as Erden (2005), Esubalew (2014), and Akpalu (2002), stated that, interest rate significant but negatively affect private investment.

From the results obtained, it shows that when real interest rate increases by 1 unit, private investment will decrease by 0.0189 units. It revealed that this variable is in line with other expectation that has a significant but negative effect on private investment in Ethiopia.

#### **4.4.2.5. External Debt burden**

A sustainable external debt would be one that allowed the country to service its obligations in full without accumulating any arrears, having recourse to rescheduling or to debt cancellation, while allowing for an acceptable level of economic growth. To help low income countries like Sub Saharan African Countries particularly Ethiopia attain this goal, the IMF and the World Bank created the Debt Sustainability Framework in 2005 to periodically assess the situation and provide recommendations to address any potential risks. For economy of the debtor country to be sustainable, the World Bank recommended a maximum debt-service ratio of 10% for public debt. Ethiopia's external debt is not simply unsustainable; likewise, external debt, as long as it is used in productive investment (without creating serious debt servicing burden on the economy) has favorable effect on the private investment in countries like Ethiopia where there is serious shortage of finance. External debt burden is measured by debt service ratio to export receipts, the ratio of external debt to export receipts and the ratio of external debt to GDP. According to Onoh (2013), the debt service ratio to export is the ratio of debt service payment due for a given year to the export earnings of the same year. Debt service payment of a given year is the sum of the matured principal plus the accrued interest due. The study revealed that this variable is in line with other empirical results such as: Adugna (2013), Marbuah & Firimpong (2010), Bello & Lawanson (2012), Sakr (1993), Mbanga (2002) which says it has positive impact on investment. Hence, under this study external debt service has significant positive effect on private investment. However, the result contradicts other exception like; Oshikoya (1992), Jenkins (1998), Kazeem et.al (2012), implies that it has significant negative effect on private investment. So, the result implies that as 1 unit accelerate in external Debt Service private sector investment reinforce by 0.216 units.

#### **4.4.2.6. Public Investment**

Under the study, the impact of public investment on private investment is found to be negative and statically significant at 5%. Implies that, as 1 unit increase in public investment, private investment will decrease by 0.06 units. The result contradicts others empirical results; Oshikoya(1992), Riberio(2001), Erden(2005), Lesotho(2006), Siraj(2014), Akpalu(2002), Marbuah & Firimpong(2010), Ariyo & Raheem(1991), Chete & Akapokoji(1998), Asante (2000), Bello & Lawanson(2012), Sakr(1993), Quatrara(2004), Kazeem et al (2012), which says public investment has significant positive relationship with private investment. However, the study result is in line with Badawi (2004) in Cameroon, Akpalu (2002) in Ghana, Asante (2000) in Ghana, and Esubalew (2014) in Ethiopia implies that public investment has a negative effect on private investment. Hence, the value of public investment indicate that it has ‘crowding out’ effect on the private investment and thus, have competitive than complementary role. Shiferaw (2002) discussed the main reasons for crowding out effect of public investment on private capital formation in developing countries. Primarily, many developing countries are characterized by limited market size which indicates that public investment in productive sectors may displace private ventures. Secondly, financial crowding out effect may occur if the increase in public investment is paid by borrowing on the domestic financial markets, which leads to greater incidence of rationing of credit to the private sector for there is limited credit pool in most developing countries. And finally, the study notes that financing public investment through foreign borrowing could crowd out private investment through its effect on inflation and debt accumulation, which may result in the uncertain business environment.

#### **4.4.3. Summary of the findings**

From the above discussion, the author has stated the following summarized finding:

- ✚ Gross domestic product has a significant & positive relationship with private investment in Ethiopia and this lead to increment of private investment performance for the country. It has been supported by different scholars as it has such relationship.
- ✚ The finding also explained that public investment has negative relationship with private investment in Ethiopia, but this has many conflicting result among scholars, many stated statistically positive relationship (crowding in effect) which, it serves as complementary

for private sector investment and other negative relationship.

- ✚ External debt burden, as long as it is used in productive investment (without creating serious debt servicing burden on the economy) has favorable effect on the private investment in countries like Ethiopia where there is serious shortage of finance. Hence it has positive relationship with private investment in Ethiopia as the study explained. Implies that, private investment increased as external debt service at acceptable limit increase in Ethiopia.
- ✚ Annual interest rate has negative relationship with private investment in Ethiopian, as most scholars agreed that it is a cost of investment, it affect investors decision as it increases.
- ✚ The final finding of this study has been ended with explanation of inflation effect on private investment in Ethiopia. As the above finding revealed, private investment and inflation has statistically significant negative relationship in Ethiopia.

## **CHAPTER FIVE**

### **CONCLUSION AND RECOMENDATION**

#### **5.1 Introduction**

This chapter is divided into three sections, section 5.2 conclusion of the study, section 5.3 presents recommendation and finally section 5.4 presents the areas of further research.

#### **5.2 Conclusion**

The aim of this study is to investigate determinants' of privet sector investment in Ethiopia. Various specific economic indicators were the data type of interest. The study used secondary data, sourced from mainly National Bank of Ethiopia (NBE), and MoFEC. In this study quantitative research method has been used and Time series regression analysis has been used. To avoid spurious correlation between variables in a regression, data investigation methods have been done by using diagnostic testing and stationarity test. Because of Combination of variables that contain a time trend or non-stationary may amounts to spurious correlations. As this study explained all variables are stationary at first difference, so has no problem of non-stationarity. In this study, classical linear regression assumption test have done, as the result shows, there were no problem of heteroscedastic, autocorrelation, normality and Multicollinearity.

Generally, the study regression result revealed that GDP, international trade openness, and external debt, drive statistically positive changes on private sector investment in Ethiopia. Hence, when those variables accelerate private sector investment in the country also reinforce, and when all decelerate, private sector investment decline. While, public investment, inflation, and annual interest rate statistically but negatively affect private sector investment in Ethiopia under the study.

Accordingly, the results of OLS regression analysis show that rising real GDP per-capita income of the peoples has crucial positive effect on private investment. The rationale behind the positive and significant role in economic growth to the growth of private investment is because of the fact that economic growth boosts the demand for produced goods and services of private investment activities and with the increase in the purchasing power of the societies that resulted from the grown income and increase in the effective demand, which in turn trigger private investment. Likewise, external debt service, as long as it is used in productive investment

(without creating serious debt servicing burden on the economy) has favorable effect on the private investment in countries like Ethiopia where there is serious shortage of finance. On the other hand, trade openness is found to have the positive but insignificant contribution in the growth endeavor of private investment in the long run due to the fact that openness promote technological progress, increase productivity and division of labor that can serve as potential source of productivity, increasing in key markets, and rising competition which require, increasing trade openness as a useful channel to boost private sector development and economic growth.

The impact of inflation as measured by consumer price index has a negative role in promoting private investment. This implies that a private investor engages in business when there is stable macroeconomic environment created by the stable level of price. Thus, macroeconomic instability has a negative and significant impact on the growth of private investment in Ethiopia. Oshikoya (1994) asserted that in developing countries, a high inflation rate has negative impact on private investment. By reducing the value of money, it discourages saving and lowers the economy's saving rate which accumulates investible funds for investment. It reflects a reduction in the purchasing power per unit of money. When there exists high inflation individuals have to spend more by using more money to buy fewer goods. High rates of inflation adversely affect private investment activity by increasing the riskiness of longer-term investment projects, reducing the average maturity of commercial loans, and distorting the information conveyed by prices in the economy. Therefore, high and protracted inflation rate could undercut private investment by signaling macro-economic instability, and thereby weakening investors' desire and ability to invest.

Public investment is found significant factor but negatively affect private investment, implies that it has a 'crowding out' effect of Ethiopian private sector investment. Which means it plays a competitive role rather complementary role. The study revealed that, Public investment adversely affects private investment in Ethiopia. Because as per literature public investment may adversely affect private investment by increasing the cost of capital through competition of scarce resources by both the government and the private investors, public expenditure is a competent of private sector and hence, reduces the amount of money available for them.

The other factor , annual interest rate was sought to be significant but negatively affect private

sector investment in Ethiopia turned out not to be contrary to what most empirical studies suggested. According to Economists interest rate is the cost of investment. The results from the studies show that interest rate is inversely related with private sector performance. According to Jalloh (2002), an increase in the real rate of interest will raise the user cost of capital, thereby making investment less profitable. As of Kaputo (2011) real lending interest rate has a significant negative effect on private investment. This is so because the high cost of investment capital discourages investment. Hence, interest rate is usually known as a proxy for cost of investment, it adversely affects private sector investment in developing country. By and large the factors that significantly affect private investment are variable explained above as per this study.

### **5.3 Recommendation**

From the analysis of the determinants of private investment in Ethiopia, the study delivers the following recommendations;

- ✚ Enhance the real per-capita income of people by creating various employment opportunities and income generating means, Efficiently utilize external sources of finance (loan) for productive investment activities, Since gross domestic product is an important variable that determines private investment in the Ethiopia economy, it is necessary for policy makers to first seek to understand these factors that the study has found are important in the country. Since it is a granger cause for private investment it needs a special focus by policy developers.
- ✚ Ensure macro-economic stability by containing the inflationary trend persisted over a longer period. Inflation should be kept at a manageable level because with the uncertainties that it brings, it hurts private investment in Ethiopia. Since, having proper macroeconomic stability in the economy will undoubtedly improve private investment.
- ✚ Undertake public investment in a way that could remove bottlenecks that undermine private investment, with the adequate attention to its adverse effect of ‘crowding out’. Since, public expenditure is a competitor of private sector and hence, reduces the amount of money available for private sector investment.
- ✚ Enhancing external debt service as long as it is used in highly productive investment has a favorable effect on the private investment in counterforces like Ethiopia where there is a serious shortage of finance

- ✚ Reducing trade barriers through liberalization; promote technological progress, increase productivity and division of labor that can serve as potential source of productivity, key markets, and rising competition in turn boost private investment.
- ✚ Last, but not least, the researcher suggests the need to conduct a comprehensive study on private investment in Ethiopia by adequately accommodating the essential quantitative and qualitative factors/determinants/.

#### **5.4 Areas of further Research**

This study focused on the determinants of private investments in Ethiopia for the period 1991 to 2016. The author suggest that for future research on this work, other researchers can expand the study period and include other macroeconomic as well as non-macroeconomic factors such as corruption, institutional factors, red tape, social and poor public infrastructure, public awareness, other issues and so on should be seen by someone else that were not considered in this model. This can help improve private sector investment for national development.

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# Appendix

## Appendix- A1-Raw Data

year	lnRPRI	lnRGDP	INF	lnTO	LNEDS	AIR	LNPUI
1991	9.800000	11.777000	44.996348	11.024561	6.666320	6.800000	9.418987
1992	10.000000	11.890000	2.052897	13.356859	6.730302	6.800000	9.746892
1993	9.800000	11.907000	4.714303	17.011832	7.043509	14.900000	10.090050
1994	9.700000	11.959000	6.293459	22.071726	7.513436	14.000000	10.135799
1995	10.190000	12.060000	14.835348	21.772791	7.473063	14.580000	10.407470
1996	10.400000	12.106000	-8.998745	23.309920	7.446589	15.080000	10.317582
1997	10.490000	12.091000	-2.652520	24.234097	7.908149	15.500000	10.050756
1998	10.200000	12.149000	0.104496	25.335558	6.434694	11.600000	14.684059
1999	10.040000	12.200000	10.393734	23.332841	7.144963	11.750000	14.539568
2000	10.980000	12.280000	1.894248	24.024238	7.708747	12.000000	9.430102
2001	11.180000	12.295000	10.773386	27.846549	7.426909	12.750000	10.003681
2002	11.240000	12.273000	-1.221905	27.797733	7.070686	10.750000	10.485197
2003	11.280000	12.402000	17.773383	32.019020	7.225185	10.750000	12.148099
2004	11.580000	12.513000	2.382991	36.774109	7.367950	10.750000	8.631568
2005	11.400000	12.615000	10.747298	37.257026	7.358856	10.500000	9.326344
2006	11.760000	12.723000	10.819858	32.642663	6.889001	10.500000	11.444769
2007	11.800000	12.825000	15.102676	31.238793	6.261072	10.500000	11.184574
2008	11.040000	12.909000	55.241315	30.083392	6.616468	11.500000	11.542484
2009	11.340000	13.029000	2.706865	35.626272	6.234782	12.250000	16.131890
2010	12.100000	13.134000	7.321393	33.823763	7.130923	12.250000	12.867594
2011	12.180000	13.229000	38.044084	32.928300	8.178042	11.880000	9.755567
2012	12.300000	13.330000	20.812192	29.246350	8.817700	11.875000	9.932117
2013	12.700000	13.348000	7.390356	29.911464	9.376016	11.880000	14.731801
2014	13.000000	13.348665	8.464137	31.228321	9.429467	11.880000	11.610052
2015	13.210000	13.447662	10.446411	30.852076	9.777663	11.880000	11.936316
2016	13.360000	13.522136	7.500000	34.802647	9.729134	12.750000	8.974745

## Appendix A2: Stationary Test

*Null Hypothesis: AIR has a unit root*

*Exogenous: Constant*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

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	<i>t-</i>	
	<i>Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>	-3.4706	<u>0.0177</u>
<i>Test critical values:</i>		
1% level	-3.7241	
5% level	-2.9862	
10% level	-2.9862	<u>        </u>

*Null Hypothesis: AIR has a unit root*

*Exogenous: Constant, Linear Trend*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

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	<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>	-3.4928	<u>0.062</u>
<i>Test critical values:</i>		
1% level	-4.3743	
5% level	-3.6032	
10% level	-3.2381	<u>        </u>

*Null Hypothesis: AIR has a unit root*

*Exogenous: None*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

	<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>	<u>0.11572</u>	<u>0.7103</u>
<i>Test critical values:</i>		
1% level	-2.66072	
5% level	-1.95502	
10% level	-1.60907	

*Null Hypothesis: D(AIR) has a unit root*

*Exogenous: Constant*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

	<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>	<u>-5.32913</u>	<u>0.0002</u>
<i>Test critical values:</i>		
1% level	-3.73785	
5% level	-2.99188	
10% level	-2.63554	

*Null Hypothesis: D(AIR) has a unit root*

*Exogenous: Constant, Linear Trend*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

	<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>	<u>-5.41094</u>	<u>0.0011</u>
5% level	-3.6122	
10% level	-3.24308	

*Null Hypothesis: D(AIR) has a unit root*

*Exogenous: None*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

	<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>	<u>-5.35056</u>	<u>0</u>
<i>Test critical values:</i>		
1% level	-2.66485	
5% level	-1.95568	
10% level	-1.60879	

*Null Hypothesis: LNRGDP has a unit root*

*Exogenous: Constant*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=5)*

	<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>	<u>0.68954</u>	<u>0.9894</u>
<i>Test critical values:</i>		
1% level	-3.7241	
5% level	-2.9862	
10% level	<u>-2.6326</u>	

*Null Hypothesis: LNRGDP has a unit root*

*Exogenous: Constant, Linear Trend*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

	<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>	<u>-1.4107</u>	<u>0.8324</u>
<i>Test critical values:</i>		
1% level	-4.3743	
5% level	-3.6032	
10% level	<u>-3.2381</u>	

*Null Hypothesis: LNRGDP has a unit root*

*Exogenous: None*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

	<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>	<u>7.85417</u>	<u>1</u>
<i>Test critical values:</i>		
1% level	-2.6607	
5% level	-1.955	
10% level	<u>-1.6091</u>	

*Null Hypothesis: D(LNRGDP) has a unit root*

*Exogenous: Constant*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

	<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>	<u>-3.8542</u>	<u>0.0077</u>
5% level	-2.9919	
10% level	<u>-2.6355</u>	

*Null Hypothesis: D(LNRGDP) has a unit root*

*Exogenous: Constant, Linear Trend*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

	<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>	<u>-4.0471</u>	<u>0.0208</u>
5% level	<u>-3.6122</u>	

*Null Hypothesis: D(LNRGDP) has a unit root*

*Exogenous: None*

*Lag Length: 2 (Automatic based on SIC, MAXLAG=2)*

	<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>	<u>-0.7046</u>	<u>0.4</u>
<i>Test critical values:</i>		
1% level	-2.6743	
5% level	-1.9572	
10% level	<u>-1.6082</u>	

*Null Hypothesis: LNEDS has a unit root*

*Exogenous: None*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

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	<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>	<u>1.04282</u>	<u>0.9172</u>
<i>Test critical values:</i>		
1% level	-2.6607	
5% level	-1.955	
10% level	-1.6091	

*Null Hypothesis: LNEDS has a unit root*

*Exogenous: Constant, Linear Trend*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

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	<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>	<u>-1.2352</u>	<u>0.8805</u>
<i>Test critical values:</i>		
1% level	-4.3743	
5% level	-3.6032	
10% level	-3.2381	

*Null Hypothesis: LNEDS has a unit root*

*Exogenous: Constant*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

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<i>Augmented Dickey-Fuller test statistic</i>	<u>-0.5929</u>	<u>0.8553</u>
<i>Test critical values:</i>		
5% level	-2.9862	
10% level	-2.6326	

*Null Hypothesis: D(LNEDS) has a unit root*

*Exogenous: Constant*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=5)*

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	<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>	<u>-4.732</u>	<u>0.001</u>
<i>Test critical values:</i>		
5% level	-2.9919	

*Null Hypothesis: D(LNEDS) has a unit root*

*Exogenous: Constant, Linear Trend*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=5)*

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	<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>	<u>-4.76795</u>	<u>0.0045</u>
<i>Test critical values:</i>		
1% level	-4.39431	
5% level	-3.6122	
10% level	-3.24308	

*Null Hypothesis: D(LNEDS) has a unit root*

*Exogenous: None*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

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	<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>	<u>-4.59774</u>	<u>0.0001</u>
<i>Test critical values:</i>		
1% level	-2.66485	
5% level	-1.95568	
10% level	-1.60879	

*Null Hypothesis: D(LNOPN) has a unit root*

*Exogenous: Constant*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

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		<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>		<u>-4.0301</u>	<u>0.0051</u>
<i>Test critical values:</i>	<i>1% level</i>	-3.7379	
	<i>5% level</i>	-2.9919	
	<i>10% level</i>	-2.6355	

*Null Hypothesis: D(LNOPN) has a unit root*

*Exogenous: Constant, Linear Trend*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

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		<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>		<u>-4.0997</u>	<u>0.0187</u>
<i>Test critical values:</i>	<i>1% level</i>	-4.3943	
	<i>5% level</i>	-3.6122	
	<i>10% level</i>	-3.2431	

*Null Hypothesis: LNTO has a unit root*

*Exogenous: Constant*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

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		<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>		<u>-2.5008</u>	<u>0.1272</u>
<i>Test critical values:</i>	<i>1% level</i>	-3.7241	
	<i>5% level</i>	-2.9862	
	<i>10% level</i>	-2.6326	

*Null Hypothesis: D(LNOPN) has a unit root*

*Exogenous: None*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

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		<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>		<u>-3.75212</u>	<u>0.0006</u>
<i>Test critical values:</i>	<i>1% level</i>	-2.66485	
	<i>5% level</i>	-1.95568	
	<i>10% level</i>	-1.60879	

Null Hypothesis: LNT0 has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.50084	0.1272
Test critical values:	1% level	-3.72407	
	5% level	-2.98623	
	10% level	-2.6326	

Null Hypothesis: LNT0 has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic based on SIC, MAXLAG=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.31059	0.4135
Test critical values:	1% level	-4.37431	
	5% level	-3.6032	
	10% level	-3.23805	

Null Hypothesis: LNCPI has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic based on SIC, MAXLAG=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.0221	0.0005
Test critical values:	1% level	-3.7241	
	5% level	-2.9862	
	10% level	-2.6326	

Null Hypothesis: LNCPI has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic based on SIC, MAXLAG=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.5478	0.0007
Test critical values:	1% level	-4.3743	
	5% level	-3.6032	
	10% level	-3.2381	

Null Hypothesis: LNCPI has a unit root

Exogenous: None

Lag Length: 0 (Automatic based on SIC, MAXLAG=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.0022	0.0003
Test critical values:	1% level	-2.6607	
	5% level	-1.955	
	10% level	-1.60907	

*Null Hypothesis: D(LNCPI) has a unit root*

*Exogenous: Constant*

*Lag Length: 1 (Automatic based on SIC, MAXLAG=2)*

		<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>		-6.97598	0
<i>Test critical values:</i>	<i>1% level</i>	-3.75295	
	<i>5% level</i>	-2.99806	
	<i>10% level</i>	-2.63875	

*Null Hypothesis: D(LNCPI) has a unit root*

*Exogenous: Constant, Linear Trend*

*Lag Length: 1 (Automatic based on SIC, MAXLAG=2)*

		<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>		-6.78706	0.0001
<i>Test critical values:</i>	<i>1% level</i>	-4.41635	
	<i>5% level</i>	-3.62203	
	<i>10% level</i>	-3.24859	

*Null Hypothesis: D(LNCPI) has a unit root*

*Exogenous: None*

*Lag Length: 1 (Automatic based on SIC, MAXLAG=2)*

		<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>		-7.14739	0
<i>Test critical values:</i>	<i>1% level</i>	-2.66936	
	<i>5% level</i>	-1.95641	
	<i>10% level</i>	-1.6085	

*Null Hypothesis: LNPUI has a unit root*

*Exogenous: Constant*

*Lag Length: 0 (Automatic based on SIC, MAXLAG=2)*

		<i>t-Statistic</i>	<i>Prob.*</i>
<i>Augmented Dickey-Fuller test statistic</i>		-3.8752	0.0071
<i>Test critical values:</i>	<i>1% level</i>	-3.7241	
	<i>5% level</i>	-2.9862	

*Exogenous: Constant, Linear Trend*

Null Hypothesis: D(LNPUI) has a unit root

Exogenous: None

Lag Length: 2 (Automatic based on SIC, MAXLAG=2)

		<u>t-Statistic</u>	<u>Prob.*</u>
Augmented Dickey-Fuller test statistic		-4.90571	0
Test critical values:	1% level	-2.67429	
	5% level	-1.9572	
	10% level	-1.60818	

Lag Length: 1 (Automatic based on SIC, MAXLAG=2)

		<u>t-Statistic</u>	<u>Prob.*</u>
Augmented Dickey-Fuller test statistic		-4.0692	0.0199
Test critical values:	1% level	-4.3943	
	5% level	-3.6122	
	10% level	-3.2431	

Null Hypothesis: D(LNPUI) has a unit root

Exogenous: Constant

Lag Length: 2 (Automatic based on SIC, MAXLAG=2)

		<u>t-Statistic</u>	<u>Prob.*</u>
Augmented Dickey-Fuller test statistic		-4.77821	0.001
Test critical values:	1% level	-3.7696	
	5% level	-3.00486	
	10% level	-2.64224	

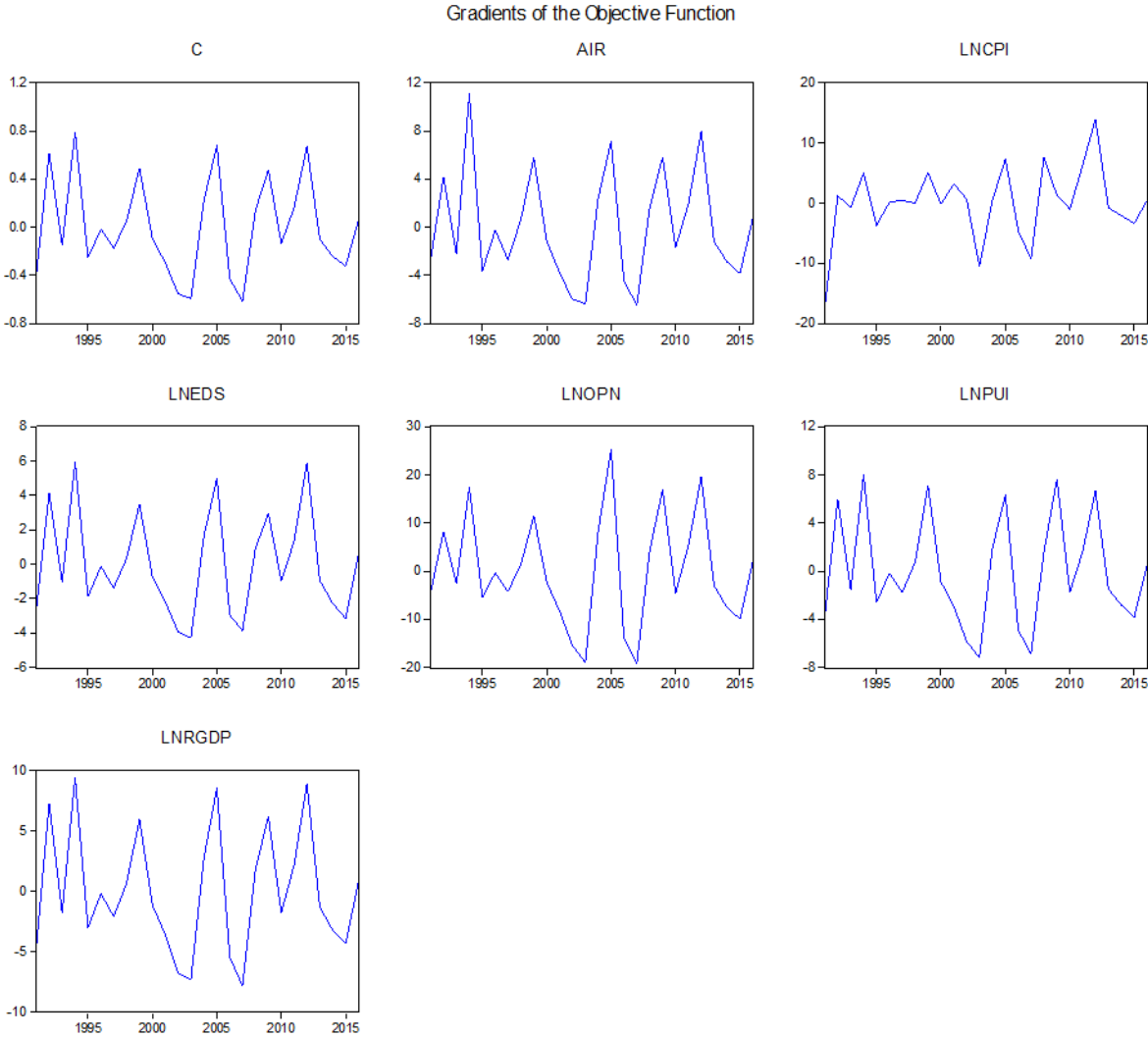
Null Hypothesis: D(LNPUI) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 2 (Automatic based on SIC, MAXLAG=2)

		<u>t-Statistic</u>	<u>Prob.*</u>
Augmented Dickey-Fuller test statistic		-4.6891	0.006
Test critical values:	1% level	-4.44074	
	5% level	-3.6329	
	10% level	-3.25467	

**Appendix A3: Gradient of objective function**



## Appendix A4: Ramsey RESET Test

Ramsey RESET Test:

F-statistic	0.003186	Prob. F(1,18)	0.9556
Log likelihood ratio	0.004601	Prob. Chi-Square(1)	0.9459

Test Equation:

Dependent Variable: LNRPRI

Method: Least Squares

Date: 01/10/18 Time: 20:24

Sample: 1991 2016

Included observations: 26

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-9.155995	22.76625	-0.402174	0.6923
AIR	-0.096837	0.145576	-0.665199	0.5144
INF	-0.012039	0.017987	-0.669322	0.5118
LNEDS	0.239161	0.409362	0.584229	0.5663
LNPIU	-0.067860	0.104969	-0.646481	0.5261
LNRGDP	1.619569	2.465119	0.656994	0.5195
LNT0	0.027943	0.036802	0.759299	0.4575
FITTED^2	-0.004052	0.071796	-0.056443	0.9556

R-squared	0.964751	Mean dependent var	11.27192
Adjusted R-squared	0.951043	S.D. dependent var	1.097659
S.E. of regression	0.242870	Akaike info criterion	0.255075
Sum squared resid	1.061741	Schwarz criterion	0.642182
Log likelihood	4.684023	Hannan-Quinn criter.	0.366548
F-statistic	70.37954	Durbin-Watson stat	2.033090
Prob(F-statistic)	0.000000		

## Appendix A5: Serial Correlation LM Test:

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.637786	Prob. F(2,17)	0.5406
Obs*R-squared	1.814711	Prob. Chi-Square(2)	0.4036

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 01/10/18 Time: 20:25

Sample: 1991 2016

Included observations: 26

Pre sample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.809607	2.248051	0.360137	0.7232
AIR	-0.005899	0.028191	-0.209269	0.8367
INF	0.001263	0.004167	0.303144	0.7655
LNEDS	0.014544	0.087097	0.166980	0.8694
LNPIU	0.004509	0.030058	0.149997	0.8825
LNRGDP	-0.086713	0.250020	-0.346826	0.7330
LNT0	0.006389	0.014807	0.431495	0.6715
RESID(-1)	-0.078280	0.258459	-0.302872	0.7657
RESID(-2)	-0.291036	0.259804	-1.120213	0.2782
R-squared	0.069797	Mean dependent var		-2.74E-15
Adjusted R-squared	-0.367946	S.D. dependent var		0.206100
S.E. of regression	0.241053	Akaike info criterion		0.259823
Sum squared resid	0.987810	Schwarz criterion		0.695318
Log likelihood	5.622298	Hannan-Quinn criter.		0.385230
F-statistic	0.159447	Durbin-Watson stat		2.136804
Prob(F-statistic)	0.993711			

## Appendix A6: Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.568162	Prob. F(6,19)	0.7506
Obs*R-squared	3.955261	Prob. Chi-Square(6)	0.6827
Scaled explained SS	1.225900	Prob. Chi-Square(6)	0.9756

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 01/10/18 Time: 20:27

Sample: 1991 2016

Included observations: 26

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.405391	0.414930	0.977010	0.3408
AIR	-0.007347	0.005279	-1.391798	0.1801
INF	-0.000138	0.000788	-0.175550	0.8625
LNEDS	-0.000917	0.016934	-0.054137	0.9574
LNPIU	-0.001302	0.005793	-0.224703	0.8246
LNRGDP	-0.023728	0.046625	-0.508920	0.6167
LNT0	0.001592	0.002648	0.601300	0.5547

R-squared	0.152125	Mean dependent var	0.040843
Adjusted R-squared	-0.115624	S.D. dependent var	0.044876
S.E. of regression	0.047399	Akaike info criterion	-3.035612
Sum squared resid	0.042687	Schwarz criterion	-2.696894
Log likelihood	46.46295	Hannan-Quinn criter.	-2.938073
F-statistic	0.568162	Durbin-Watson stat	2.603153
Prob(F-statistic)	0.750553		

**Appendix A7: Trends of Real GDP in Ethiopia.**

