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Private Investment and Economic growth Evidence from Ethiopia

By

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Declaration

I, the undersigned, declare that this thesis is my original work,has not been presented for a degree in any other university. All the resources of materials used in the thesis have been duly Acknowledged.

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Certification

This is to certify that this thesis entitled **"Private Investment and Economic growth evidence from Ethiopia"** submitted in partial fulfillment of the requirements for the Degree of Master of Science in Economics (Economic Policy Analysis) to the College of Business and Economics, Mekelle university, through the Department of Economics, done by Mr. Siraj Mustefa is an authentic work carried out by him under our guidance. The matter embodied in this work has not been submitted earlier for the award of any degree or diploma to the best of our knowledge and belief.

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Abstract

This study attempts to evaluate the inter-relationship among two macro variables, namely private investment and GDP growth both in the long and short run with reference to Ethiopian economy using a data set of 1970-2011. I try to pinpoint the important determinants of each variable, using the standard econometric techniques. Long run relationship between variables is specified by using method proposed by Johansen and Juselious (1990).Based on the results of the long-run co-integration tests parameters short correction model is used to estimate the short run relationship between the variables. As expected, growth has a strong positive relationship with public and private investment; there is evidence of uni directional causality between real GDP, and private investment. A general negative theoretical relationship between public and private investment is confirmed in the context of Ethiopian economy, i.e. public investment has a "crowding-out" effect on private investment at large. This is because public investment has primarily been financed in the past through internal and external borrowing. The government revenues collected through taxation has little contribution in promoting public investment.

Overall, the major policy implication of this study is that, given the long run positive impact private investment and public investment on economic growth, it will be natural to think of supplementary reforms.

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Acronmys

ADF: Augmented Dickey-Fuller

AIC: Akaiki Information Criteria

AR: Auto Regressive

AR: Auto regression

DUM: A dummy variable for inward looking and outward looking regime

EU: European Union

FPE: Final Prediction Error

GDP: Gross Domestic Product

GNP: Gross National Product

HCA: Human capital

HQ: Hannan-Quinn Information Criteria

IGE: Imperial Government of Ethiopia

IMF: International Monetary Fund

IS: Import Substitution

JB: Jarque-Berra

LAB: Active Labour force

LDCs: Less Developing Countries

LM: Lagrange Multiplier

NBE: National Bank of Ethiopia

OLS: Ordinary Least Square

PP: Phillips-Perron

PPP: Purchasing Power Parity

R&D: Research and Development

RGDP: Real gross domestic product

RIG: Real public investment

RIP: Real private investment

SFDP: Second Five Year Development Plan

SIC: Schwarz (Bayesian) Information Criteria

SSA: Sub-Saharan Africa countries

TGE: Transitional Government of Ethiopia

TGE: Transitional Government of Ethiopia

U.S: United States

UN : United Nation

VAR: Vector Auto regression

VECM: Vector Error Correction Model

WB: World Bank

WDR: World Development Report

WTO: World Trade Organization

CHAPTER ONE

1. INTRODUCTION

1.1 Background of the Study

The theory of investment has remained to be one of the unsettled issues in economics. Different approaches have been used to explain the investment behavior mostly based on the experience of developed countries. Consequently, the term investment has been defined differently by different economists. Coen and Eisher (1992), for instance, defined it as follows:

"*Investment is capital formation-the acquisition or creation of resources to be used in production. In capitalist Economies much attention is focused on business investment in physical capital building, equipment and inventories. But investment is also undertaken by government, non-profit institutions and households, and it includes the acquisition of human and intangible capital as well as physical capital (Coen and Eisher, 1992; 508).*"

Investment is an important component of aggregate demand and a leading source of economic growth. Change in investment not only affect aggregate demand but also enhance the productive capacity of an economy. The investment plays an essential and vital role in expanding the productive capacity of the economy and promoting long term economic growth (Jongwanich and Kohpaiboon, 2008). Higher investment rate triggers the fast economic growth. Levine and Renelt (1992) have argued that investment in capital goods is the most robust and vital determinant of economic growth. Gross domestic investment boosts economic growth by increasing physical capital directly and indirectly through technological spillovers (De Long and Summers, 1995).

According to Maqbool, Maaida and Sofia (2010), in the process of investigating the economic performance of a country, one of the key determinants of economic growth is investment. Moreover, most of the countries that grow rapidly invest a considerable fraction of their Gross Domestic Product (GDP). In contrast, countries that develop slowly are those that invest slowly in their economies and remain poor (Solow, 1956).

According to the United Nation (UN, 2005), investment climate can be explained as access to basic physical infrastructure such as electricity, telephone, water and roads; access to information and advisory services; higher labor productivity; efficient tax administration and tax rates; access to finance; availability and affordability of urban land; business regulations and trade facilitation services, among other elements.

A good investment climate provides opportunities and incentives for investors to invest profitably, create jobs, and expand national output thereby increasing private investment and economic growth (World Bank, 2004). In the 2005 World Development Report (WDR), Bernal *et al*. (2004) note that improvements in the investment climate in developing countries are key to increasing the flow of investments and, consequently, a higher level of economic growth and development. However, in the poorest developing countries, such as Ethiopia, businesses frequently operate in investment climates that undermine their incentive to invest and grow. In line with this environment, Ethiopian investors complain about poor infrastructure, particularly power shortages; poor transport; poor telecom connectivity of business locations and lack of efficient tax administration (Mima and David, 2012; World Bank, 2004).

Regarding public investment, Keynes (1936), believes that there is a need for government intervention to activate and regulate the economy. Therefore, both past and current governments of Ethiopia have made significant capital

expenditures aimed at creating the social and economic infrastructures that expand opportunities for better economic growth (Tanzi, 1997).

Similarly, the role of public investment in Ethiopia is one of the central issues with respect to the private investment and economic growth of the country. Actually, both public and private investments across the three regimes were unpredictable in performance, because each government that came into power started afresh and followed a different political ideology.

In addition to the aforementioned aspects of the country under consideration, there is no clear consensus on empirical evidence from both developed and developing countries with regard to whether public or private investment has a superior effect on economic growth. Most researchers claim that the contribution of private investment to economic growth is larger than that of public investment. This notion is based on the contention that the marginal productivity of the former is greater than that of the latter (Khan and Reinhart, 1990; Serven and Solimano, 1992), although some studies have shown a possibly larger contribution of public capital to economic growth (Ram, 1996).

1.2 Statement of the problem

For less developed Countries (LDCs) like Ethiopia the fundamental challenge in their economy is how to achieve a large increase in output over a long period of time and improve the standard of living of their people so that there will be dramatic change in their economic, political and social conditions. To achieve this target, various tools are considered. Among these tools promoting investment is the most common one. Though investment is the primary engine of growth, all investments undertaken in an economy cannot be taken as productive and crucial to economic growth.

Investment in an economy is composed of public and private sector investment. Public investment refers to investment by the government sector primarily, not exclusively in the area of social and economic infrastructure.

Private investment refers to investment by private business for the purpose of profit generation (Kumo, 2006). There have been theoretical and empirical studies that show the relationship between investment and economic growth. these studies can be classified into two categories; the neoclassical as first described by Solow (1956) and New Growth Theory also known as endogenous Growth Theory formulated by Romer (1986 and 1990) and Lucas (1988).

The neoclassical model originally focused on investment in tangible assets and resulting accumulation of physical assets to help explain economic growth. For the last two decades after Romer (1986) and Lucas (1988) the concept of investment has been broadened to include human capital, R&D expenditure and investment in public infrastructure. The new growth theory moves away from the neoclassical model and uncovers alternate productivity channels through which investment affects growth. This model attaches greater significance to certain types of investment that create externalities and generate an additional productivity increment through production spillover of associated diffusion of technology.

These two models are similar in their recognition of the central importance of investment/capital accumulation to economic growth. Whether the investment is done by the public sector or the private sector or by both, each type of investment has its own contribution to the growth process of an economy. Empirical studies in developing countries showed that economies led by the private sector achieved better economic performance than the one led by the state. This does not mean that all investments run by the state play an insignificant role hence that the state should leave the economy to the private sector. Public investment in social infrastructure like road, telecommunication and power generation contributes positively to economic growth through enhancing the productivity of private investment.

Studies that focused on the role of private investment in economic growth show that it makes a positive and significant contribution of economic growth.

To gain all possible benefit from private investment sound macroeconomic policy, liberalization of goods and factors market, greater fled in the financial system, the political stability, the availability of skilled force and institutions are important.

In Ethiopia, during the imperial years, the economic system was guided by the principle of the market economy. In this period, the government encouraged private investors by providing various incentives and the government was engaged in infrastructural development, which is a tool to attract investment. Hence, the share of private investment in the economy was more than the public investment. After overthrowing the imperial in 1974 the military government took socialism as a guiding philosophy for economy and the private enterprises were nationalized. In addition to this there was a restriction on the number of businesses a private investor could participate and on the capitalization of this business. Due to these and other related reasons, private investment was marginalized in the economy for almost half decades. During this period, the share of private investment dropped to 20% of the total investment in the economy. At the end of its regime the government adopted a mixed economy strategy to consider private investment as a partner to public investment. However, this new policy could not maintain to show its impact on the overall performance of investment in the economy.

Since the liberalization of the economy in 1992, the current government was providing various incentive packages to attract domestic and foreign investors. The role of private investment in various sectors of the economy was increasing except for certain economic activities, which are exclusively reserved to the government. At this time the role of private investment in the economy is clearly noticed especially in employment generation and GDP contribution.

Studies conducted in Ethiopia using famous growth models to relate growth of output to the role of capital formation, among other factors such as labor force growth, imported inputs, and technical progress did not distinguish between the

private and public component of investment. Hence it is not possible to determine if policies designed to encourage private investment at the expense of public investment will necessarily improve the growth rate. Whether private sector investment is more productive and efficient, the judgment has to be based on empirical evidence. Despite the importance of this relationship, there is little empirical evidence that can be mentioned to support or disprove the notion that, private investment is better than public investment as far as the long run economic growth of Ethiopia is concerned.

1.3 Objectives of the Study

This study aims to examine the contribution of private investment to economic growth in Ethiopia over the past 40 years (1971-2011) and hence to evaluate a priori whether policies aimed at promoting private investment will be successful in raising the long run growth rate.

The specific objectives of the study include:

1. To assess the contribution of private investment to economic growth and robustness in explaining the growth performance of Ethiopia using a time series framework.
2. To evaluate the investment policies under various regimes with their contribution to economic growth,
3. To recommend some possible policy measures based on the analysis.

1.4 Significance of the Study

A number of studies on investment especially in developing countries have been carried out. Nevertheless, empirical evidences on the role of private investment on growth have been limited (Khan and Kumar, 1997). 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.

Moreover, analysis of the role of private investment in Ethiopia is of interest both from a policy and academic point of view. Thus in due course, as policy is

concerned, if private investment does have a markedly stronger impact on growth, it would further underscore the need to rationalize public investment, as well as provide additional support for the privatization of state-owned activities.

The study is also an important addition to the existing literature on the effects of private investment on economic growth.

1.5 Organization of the Thesis

The remaining part of the study is organized as follows. Chapter two reviews the related theoretical and empirical literatures in the area of study. In chapter three model specification and data type and source would be discussed. The estimation procedure employed and findings are discussed in chapter four. And finally, conclusion and recommendation are given in chapter five.

CHAPTER TWO

LITERATURE REVIEW

2.1. Theoretical Literature

The long history of ideas on economic growth started from the classical economists like Adam Smith, Robert Malthus, Ricardo and Marx. For more than three decades the Neoclassical and the endogenous growth theories were exploring the flow of economic growth from different point of view.

The objectives of these growth theories are identifying a nation's sources of economic growth. The 20th century economist Keynes who transformed modern macroeconomics radically has also his own contribution in identifying sources of a nation's growth (James Cypher and Dietz 1998). From this time onwards, various studies were conducted to assess sources of economic growth and the role of various social, economic and political scenarios in the economic growth process. Though the history of economic growth can be traced back to the distant past, this study considers the recent models and studies on economic growth as a base for the analysis of growth condition in Ethiopia and its determinants.

The study of growth generally concerns the medium or long run. it is about the accumulation of physical capital, the progress of skills, ideas and innovation, the growth of population, how factors are used, combined and managed and so on (stern 1991). Economic growth can be defined as the growth rate of per capital GDP over some period. The trend of growth of real GDP can be considered as sustainable economic growth, while the short-run fluctuation of growth over the trend can be thought of as business cycles. Economic development includes economic growth, distribution of income, unemployment and poverty. Nowadays, development is being defined as transformation of societies (Stiglitz, 1994).

To achieve the above goals of economic growth, various factors determining economic growth are assessed. Modern literature for analyzing the determinants of growth in a cross sectional, panel or time series data framework. Though there are various theories, as mentioned above, regarding economic growth, in this section we will address the most commonly applied models: the Neoclassical and Endogenous Growth Models.

2.1.1 The Neoclassical Growth Model

The Solow (1956) and Swan (1956) models of economic growth, which commonly represent the Neoclassical model are based on an aggregate production function (Cobb-Douglas) and a capital accumulation equation. These models do not account for technological progress and predict that the level of per capital income is determined by the population growth rate and the investment rate. Accordingly, economic growth can happen only temporarily and lasts only until capital per capita reached its steady state level. The second model introduced by Solow in 1957 incorporates an exogenous technology.

The important implications of the neoclassical growth model are the level of per capita output is determined by the level of technology, investment rate and population growth rate. While sustained growth rate of per capita output overtime is determined by technological changes. Other temporary shocks such as policy changes can affect growth only temporarily just until a new steady state level is reached. Hence, according to Solow's model, per capita output differences across countries and overtime are explained by the country's population growth, investment rate and technology (Jones 1998, Romer 1996).

The other implication of the dynamic analysis of the Neoclassical model is that the initial capital stock is far below the steady state rate of accumulation (until a new steady state is restored) is fast and accordingly output grows fast but at a lower rate as it approaches steady state level where growth ceases. This implies that poor economies with a lower stock of capital and output tend to catch up with the initially rich ones. The prediction, hence, is that poor economies grow faster than rich ones (Barro, 1997).

In this model, in the absence of technological progress, steady state per capita output does not grow and it depends on exogenous factors (that is technological progress and population growth). In this framework, in the short run, an increase in the savings rate raises per capita economic growth. However, due to diminishing returns to capital, per capita output in the long run grows at the rate of exogenously given technological progress. Although economic policies can affect the level of output (growth rate) when the economy is in transition from one steady state to another, they do not affect steady state economic growth.

One might object to the neoclassical mode on the grounds that it does not, in the end, shed light on economic growth. In the steady state of the neoclassical model, all growth is due to advances in technology, but model unravels the mystery of economic growth simply by assuming that there is economic growth (Mankiw 1995). In other words, the neoclassical growth model is criticized on the grounds that it leaves technological growth as an exogenous factor and without technological growth, the model asserts that economic growth will, ultimately, ceases.

2.1.2 Endogenous Growth Model

The failure of the Neoclassical Growth Model to be consistent with empirical evidence in predicting that the output level of countries with similar technologies should converge to a given level in steady state and the inability of the model to show the mechanisms through which government policies can potentially influence the growth process, led to the development of endogenous growth theory that avoids the assumption of exogenous advance in technology. This new growth model addresses the limitations of the neoclassical model by proposing a variety of channels through which steady-state growth arises endogenously.

Two broad approaches have been followed in the New Growth literature to relax the assumption of diminishing returns to capital imposed in the basic neoclassical model. The first consists of viewing all production inputs as some

form of reproducible capital including physical capital and human capital (Lucas 1988) or the state of knowledge (Romer 1986). The second approach to generate growth endogenously consists of introducing spillover effects or externalities in the growth process.

Romer (1986) models technology growth (he termed it knowledge growth) as the outcome of competitive firms that invest in knowledge generation. The central idea that allowed this was that while individual firms face diminishing returns to invest in knowledge, at the social level returns to knowledge can be increasing that is knowledge is a function of the entire capital stock of the economy. The fact that knowledge can have positive externalities is at the center of the growth process. Romer (1986) develops these ideas into a competitive equilibrium model which yields long-run positive growth. The model also suggests that the competitive growth rate is below the socially optimal level due to the presence of knowledge externalities; large countries may grow faster and shocks to a country's growth may have permanent effects.

One particular source of externalities that has been emphasized in the growth literature is the accumulation of human capital and its effect on the productivity of the economy. Lucas (1988) provides one of the best known tempts to incorporate the spillover impacts of human capital accumulation, in a model built upon the idea that individual workers are pre productive, regardless of their skill level, if other workers have more human capital. The important implication of the external effect captured in the model presented by Lucas's (1988) is that under a purely competitive equilibrium its presence leads to an under investment in human capital because private agents do not take into account the external benefits of human capital accumulation. The equilibrium growth rate is thus lower than the optimal growth rate due to the existence of this externalities. Equilibrium growth rate depends on the rate of investment in human capital the externality implies that growth would be higher with more investment in human capital. This leads to the conclusion that government policies (subsidies) are necessary to increase the equilibrium growth rate up to the level of the optimal growth rate. A government subsidy to human capital

formation or schooling could potentially result in a substantial increase in the rate of economic growth.

Various variables that are considered as determinants of a country's economic growth along with private and public investment are addressed in different studies. The main determinants that are emphasized by researchers are human capital, research and development, innovation and other macroeconomic an institutional factor with respect to the focus of the study concerned.

In analyzing the capital accumulation in a growth framework, the relative effect of private and public investment is useful from the policy and theoretical perspective. From the policy angle, if private investment has a stronger impact than public investment, it will help to rationalize policies related to public investment and privatization. From a theoretical perspective, most studies analyze the relationship between investment and economic growth by taking the aggregate role of investment for determination of steady state growth path and convergence rate.

Studies related to capital formation and economic growth focus on separating gross capital formation into public and private components. These studies have shown the impact of private and public investment on the performance of a given country's economy, or a group of countries. Hence, differences in economic growth even in developing regions in terms of levels and rate of per capita income seem to be associated more with differences in private than public investment rate

Public investment can have either a crowding in or a crowding out impact on private investment, which may lead to a growth enhancing or growth deepening path. This depends on the availability of funds to undertake investments and the area to which the fund is devoted. According to Khan and Reinhart (1990), public sector investment can cause crowding out if it utilizes scare physical and financial resources that would otherwise be available to the private sector, or if it produces marketable output that competes with private output. Furthermore, the financing of public sector investment, whether

through taxes, issuance of debt, or inflation will lower the resources available to the private sector and thus depress private investment activity. Such crowding out would work in favor of strategies aimed at cutting back public sector investment as they would create a commensurate increase in private investment. On the other hand, public investment that is related to the development of infrastructure and the provision of public goods can clearly be complementary to private investment. Public investment of this type can enhance the possibilities for private output and ancillary services, and augment overall resource availability by expanding aggregate output and savings.

In empirical studies government investment has been approximated by the government's contribution to capital accumulation. The complementarily and the substitutability between public and private investment depends on the government's fiscal policy and its involvement in the economy. A large budget deficit will crowed out the private sector as a result of lower access to bank credit, higher real interest rates and a more appreciated real exchange rate.

Many endogenous growth models have stressed the role of private firms in driving the growth process. This idea is linked to the often held view that too much interference from the government may be detrimental to efficient production and (high) rates of accumulation. This type of thinking hassled economists to empirically analyze the relationship between size of the public sector (e.g. government expenditure to GDP) and economic growth (Rogers 2003).

In economic growth studies, human capital is one part of the analysis. Nelso and Phelps (1966) stated that human capital can be thought of as affecting economic growth in two ways. First, if human capital is a factor of production, that is changes in Human capital will be correlated with changes in growth. For example, workers with higher levels of education of skills should, ceteris paribus, be more productive. Second, the level of human capital may affect the rate of accumulation of other factors. For example Romer (1990) assumes that the growth of knowledge or technology depends on the level of human capital.

This appeal to the idea that more educated and skilled people are more inventive and innovative. A higher level of human capital may also encourage capital accumulation, or may raise the rate of technological catch-up for the country.

Terms of trade are also one of the most important macroeconomic variables as an indicator of external shocks to the economy. Adverse movement in the terms of trade will increase the cost of import relative to income and will also reduce the purchasing power of exports. Unfavorable terms of trade, therefore, may worsen the ratio of current account deficit to GDP. An increase in the price of imported goods with large weight in the national import value will have a direct impact on consumers' prices. Depressed export price in the agricultural sub-sector, which is the main stay of the economy, will draw resources away from the sector, reducing export earnings and discouraging investment in the sector (Oshikoyo 1994).

2.2. Empirical Literature

Most growth studies began their framework of analysis with the most influential works of Solow (1956 and 1957) in economic growth theory, which ignored the role of any capital formation to economic growth and took technical productivity as the only source of economic growth. In this analysis technical progress was explained outside the model and considered as manna from heaven. Following this work there have been various studies by different researchers that attempted to trace the possible source of a growth of nation. In these studies, a variable that is taken as a determinant of growth in one study is considered as a controlling variable in another study.

Most of these growth analyses tried to show the relative contribution of various factors of production to the growth process. Cross country analysis and time series were used in all attempts to show possible sources of growth. Usually, growth related analyses are undertaken by using cross section and panel data evidence. Such data sets are criticized for taking samples of varies countries

differing widely in social, political and institutional characteristics on a common surface.

Since the reappearance of growth theory in economic literature following Solow's pioneering work, various, empirical and theoretical studies relating investment to economic growth have been conducted. These studies show the different role of aggregate investment in the long run growth and convergence across countries (Morgan, 1969), Barro, 1991, Barro and Sala-i-Martin, 1992, Mankiw, Romer and weill, 1992, De Long and Summer, 1991, Levine and Renelt, 1992, Collier and Gunning, 1997 and Barro and Lee, 1994) are some to mention. De Long and Summer (1991), Levine and Renelt (1992), Collier and Gunning (1997) and Barro and Lee (1994) found that investment to GDP ratio has a strong influence of income growth.

The good performance of economies, which were governed by the state led economics in post war Europe and other socialist countries motivated most LDCs in Africa and Latin America to implement similar types of policy to public sector investment in 1950s. These LDCs invested scarce capital of their economy in large and medium scale industries, farming, mining, trade etc. However, excessive involvement of the public sector in every sector of the economy caused great crisis to these economies. Consequently, there have been frequent calls towards private investment especially since late 1970s. Following the structural Adjustment Program of the International Monetary fund and the world bank for newly liberalized market economies of LDCs most of these countries adopted privatization and private sector led growth as an alternative development strategy to boost economic growth. In this regard, the role of the state is limited to the formulation of policies and infrastructure investments like road, communication and energy whose service are essential since they tend to generate positive externalities for the private sector.

It is now widely accepted that the expansion of private investment should be the main impetus for economic growth, allowing public investment resources

gradually to focus on social areas including alleviation of poverty and the upgrading of social capital and services (Chiber and Dailami, 1990).

Empirical studies addressing the impact of private investment on economic growth in developing countries started to appear in economic literature following the 1980s and 1990s structural adjustment program. The robustness of investment to GDP ratio in explaining economic growth and economic policy through investment variables led most studies to focus their analysis from economic policy towards explaining cross-country differences in investment level Mankiw et al (1992) using the augmented Solow model, which includes accumulation of human as well as physical capital in the growth regression found that 80% of the cross country growth variation in the model is explained by these variables. That is international variation in per capita income can well be explained using just these three variables.

In addressing the role of private and public investment in the economic growth process for 24 Latin American and Asian countries using a cross section sample, Khan and Reinhart (1990) found that private investment and public investment have a different effect on the long run rates of economic growth. Furthermore, they identified that private investment plays a much larger and more important role in the growth process than does public investment. In contrast, public investment has no statistically significant effect on growth. However, the problem in this analysis was the quality of the methodology employed. The causal correlation between dependent variables and the independent variables was not addressed properly. The causality runs directly from private investment to economic growth. The correlation between private and public investment may cause public investment to contribute indirectly to GDP growth by providing the necessary infrastructure like roads, electricity, telecommunication and schools.

Although Coutinho and Gallo (1991), Serven and Solimano (1989) came to a similar conclusion, they have used a relatively small sample size and limited time period. Ram (1996) extended Khan and Reinhart's (1990) work by

estimating their growth models to cover a considerably larger cross sectional sample and by including data for the 1970's and 1980's.

For the 1970's, like Khan and Reinhart (1990), private investment appears vastly more productive than public investment. For the 1980's however, public investment seems more productive than private investment in most cases. In this study considering the overall (average) picture for the two decades, productivity of some component of investment seems fairly similar, but the public investment parameter is slightly larger.

Another similar study, which tried to show the role of the private investment in economic growth, is that of Ghura (1997) for Cameroon. He used more than three decade's data to test the hypothesis and employed modern econometric tools of time series to avoid any spurious correlation. He found that private investment plays a crucial role in output expansion. The analysis established a significant robust causal linkage between private investment and economic growth implying that increases in private investment ratio boost economic growth. An increase in the private investment ratio by one percentage point raises economic growth by about 1.4 percentage points; this impact is larger than that of an increase in government investment.

Ghali (1998) also attempted to adders this issue in the neoclassical growth framework. He employed a Co-integrated Vector Autoregressive model to account for potential endogeneity and nonstationarity problems. Results suggest that private investment contrary to public investment has stimulated economic growth in Tunisia over the period from 1963-93.

Badawi (2003) by using the same methodology as Ghali (1998) for Sudan found a positive contribution of private and public investment to economic growth. The impact of private investment was found to be more pronounced than that of public sector investment.

Khan and Kumar (1997) using pooled time series cross section data, which has a relatively larger number of country coverage (95 developing countries

including Ethiopia) and a long time period (1970-1990) came up with similar positive contribution of private investment to economic growth. Their result reveals that there is a substantial difference in impact of private and public investment on economic growth. Private investment had a much larger impact compared to public investment especially during the 1980s. This relationship holds even when other determinants of per capita growth are taken into account such as population and technical change, human capital enrollment ratio (secondary) and fiscal balance. Button and Sumlinshi (2000) confirmed Khan and Kumar's (1997) results and found and even larger coefficient for private investment and smaller coefficient for public investment.

Ramirez and Nazmi (2003) also suggested that both public and private investment positively contribute to economic growth for nine major Latin American countries. Ashipala and Haimbodi (2003) observed that private investment plays a crucial role in long-term stabilization policies in South African countries.

Calamitsis, Basu and Ghura (1999) using data for 1981-1997 for Sub-Saharan Africa found that private investment is large and statistically significant compared to government investment in growth analysis. This result underscores the crucial role played by private investment in boosting growth. Although the magnitude of the impact of private investment declines once other factors influencing growth are taken into account, the coefficient remains statistically significant. The effect of government investment in not robust. In most of the above studies except Ghura (1997), Ghali (1998) and Badawi (2003), the relationship between private investment and growth relationship is analyzed by using a cross section sample.

There are also studies conducted in Ethiopia, which show various determinants of economic growth. Most of them, like others, focused on investigating the macro economic factors of growth.

Another study by Easterly (2002), which used a growth accounting framework, supports the statistically insignificant contribution of capital to economic

growth. However, Alemayehu and Befekadu (2002) in their analysis of factors characterizing the Ethiopia economy using a growth accounting framework found that capital has contributed positively to economic growth.

The contrast between the findings of Alemayehu and Befekadu (2002), and Esterly (2002) arose from the authors' assumption for the factor share of human and physical capital (0.65 and 0.35 respectively) based on cross country regression results as a benchmark instead of estimating them empirically (Seid and Berhnu, 2003).

Paterson (2003) used data from 1981 to 2000 to analyses the relationship between growth in real GDP and investment in a simple Harrod-Domar growth model and found a positive connection between investment and GDP growth rate in Ethiopia. The result also suggests that investment from exports and capital inflow is a viable way to promote growth. However, the analysis and the conclusion are based on three explanatory variables (the ratio of investment to GDP, the ratio of export to GDP and the ratio of capital inflow to GDP) for a short period, which exposes the analysis to econometric problem like multicollinearity and endogeneity. Furthermore, the Harrod-Domar model is criticized for its assumption of a fixed coefficient production function, which does not allow for factor substitution and the saving ratio is assumed to be fixed.

Though there exist a vast economic literature, which demonstrates the relationship between private investment and economic growth for groups of developing countries, country specific studies lack in most of these countries including Ethiopia. It is obvious for countries like Ethiopia private investment is good for sustained economic growth. Given this fact, it is useful to investigate the contribution of private investment to economic growth using long time series data and suggest what has to be done for this sector to enhance the country's development endeavor.

CHAPTER 3

MODEL SPECIFICATION, METHODOLGY AND DATA DESCRIPTOION

3.1The Model

To find out the impact of private investment on economic growth, this paper utilizes a Solow-Swan type aggregate production function as applied in Ghura (1997) and Beddies (1999). The production function is modified to account for three types of capital private and public physical capital stocks and the human capital stock. The production function is given by

$$Y_{t=A_t(K_t^p)^{\alpha}(K_t^g)^{\beta}(Z_t)^{\gamma} \quad Z_t=L_t \ and \ HL_t} \qquad (3.1)$$

Where Y is real output, A is technological progress, K^P and K^g denote the private and public physical capital stock respectively; Z is labor force (L) augmented by human capital development HL and t is the time index. The parameters $\alpha,\ \beta\ and\ \gamma$ denote the elasticities of output with respect to private, government, labor force and human capital stocks respectively.

Expressing equation (3.1) in growth rate terms by multiplying both sides in log form (with lower case letters denoting growth rate) gives:

$$y = a + \alpha k^p + \beta k^g + \gamma \, Z \qquad (3.2)$$

Equation (3.2) represents a long run growth relationship, which can be estimated provided that data are available for capital stock. However, such data are typically unavailable for developing economies including Ethiopia, thus making it difficult to estimate a specification like (3.2).In the absence of data on capital stock, equation (3.2) can be transformed in to an estimable form by making some simplifying assumptions regarding physical capital stock. Following Ghura (1997), data construction for the

private and public investment can be undertaken by a simple transformation of the perpetual inventory accumulation equation as:

$$\frac{\Delta K_t^p}{K_{t-1}^p} = \frac{I_t^p}{K_{t-t}^p} - \delta_p \quad (3.3)$$

$$\frac{\Delta K_t^g}{K_{t-1}^g} = \frac{I_t^g}{K_{t-t}^g} - \delta_g \quad (3.4)$$

Where Ip and I^g denote real private and public investment respectively$\delta_p \ and \ \delta_g$are the respective rate of depreciation of the private and government capital stocks. Assuming that both private and government capital stocks are a constant share of real GDP, that is

$K^p = \mu^p Y$ (3.5)

$K^g = \mu^g Y$ (3.6)

Where$\mu^p$and $\mu^g$are the respective fixed coefficients for private and government capital. Now we can rewrite equation (3.2) to obtain;

$$Y = a' + \alpha' \left[\frac{I_t^p}{Y_{t-1}}\right] + \beta' \left[\frac{I_t^g}{Y_{t-1}}\right] + \gamma Z \quad (3.7)$$

Where a' = $(a - \alpha\delta^p - \beta\delta^g)$, $\alpha' = \frac{\alpha}{\mu^p} and \beta' = \frac{\beta}{\mu^g}$

Equation (3.7) can be estimated with available data for Ethiopia. This equation can be transformed in to an empirically specification as follows,

$Y = a' + \alpha' PIY_t + \beta' GIY_t + \gamma HL_t + \lhd \Psi L_t + \varepsilon_t$ (3.8)

Where Y is real output growth, PIY_t denotes real private investment as a share of lagged real GDP, GIY_t is the ratio of real government investment to lagged real GDP, HL_t is labor growth augmented by the human capital stock (HL), (L_t) labor growth rate and finally $\varepsilon_t$is stochastic error term.

The main motivations underlying the specification of the model is equation (3.8) are first, following Barro's (1990) growth model, the possibility of the differential impact of private and public investment on economic growth is considered. Second, another strand of growth models stress that human capital accumulation by enhancing labor productivity can boost growth in the steady state (Lucas, 1998).

One additional relevant variable which is common in explaining the growth process in most developing countries is added in equation (3.8) that is the Percentage change in export (X) as a share of real GDP. When we include this variable into the equation the final estimable model will be

$$y = a' + \alpha PIY_t + \beta GIY_t + \Upsilon HL_t + \Psi L_t + \varpi X_t + \varepsilon_t \qquad (3.9)$$

Variables, which are included in the final model, are conducive to faster growth because they promote competition, encourage learning by doing, improve access to trade opportunities, raise the efficiency of resource allocation and enhance positive externalities resulting from access to improved technology (Romer, 1986 and 1990).

3.2 Estimation Procedure

Most empirical literature, which estimates the impact of private investment on economic growth generally employ the cross sectional data. This data assumes the existence of an identical aggregate production function for all countries, although differences may actually exist across countries. Therefore, the application of time series analysis helps to better understand the specific historical progress in perspective.

Estimation of parameters and hypothesis testing using time series data requires an investigation of the data generating process underlying variables at work. This investigation helps to avoid estimating a spurious correlation between variables in a regression, where what actually exist is a correlated time trend rather than a meaningful economic relationship (Granger and Newblod, 1986). A combination of variables that contain a time trend or are non - stationary may lead to spurious correlation. To avoid the problem of spurious correlation due to the presence of non-stationary variables in the

regression model, the time series properties of the variables used in the model will be investigated.

3.3 Unit Root Test

If the data generating series follow the first order autoregressive process, the simplest form of the Dickey-Fuller (DF) test amounts to testing.

$Y_1 = \mu + \rho y_{t-1} + u_t$ (3.10a)

Or

$\Delta Y_1 = \mu + \gamma y_{t-1} + u_t$ Where $\gamma = \rho - 1$ $u_t \sim IID(0, \sigma^2)$ (3.10b)

Then the test of hypothesis to be tested is

H_0; ρ=1 (i.e. y_t series is non-stationery)

H_1; ρ< 1(i.e. y_t series is integrated of order zero or stationary)

Since there is a determinist component (intercept, trend, dummies) in the data generating process, we must allow a time trend to enter in the regression model to be expressed as

$\Delta y_t = \mu + \gamma t + \gamma y_{t-1} + u_t u_t \sim IID(0, \sigma^2)$ (3.11)

In this specification, the hypothesis is similar to the one applied to equation (3.10)

The DF test assumes the data generating process to be autoregressive (AR) of order one (AR (1)), and residuals as 'white noise'. However, if the data generating process is AR(ρ), where ρ> 1, the error term will be auto correlated Due to misspecification of the dynamic structure of the concerned variable. In this case the DF test is no longer valid, and large differences of dependent variable should be added or augmented to the model in order to mitigate the autocorrelation problem, in the disturbances term. This is incorporated in the augmented Dickey –Fuller test (ADF).

The ADF test can be captured by the following specification of an equation

$$\Delta y_t = \mu + \gamma t + \beta y_{t-1} + \sum_{i=1} \lambda_i \Delta y_{t-i} + u_t \quad (3.12)$$

Where y_t is the variable interest ,t is a time trend, k is a lag length, which is determined by a general to specific method whereby a generous lag structure will be allowed and insignificant lags will be eliminated sequentially based on Akaike information criterion (AIC) and U_t is a random variable assumed to be 'white noise '.

The set of hypothesis to be tested is:

H_o; β=0 (i.e. Y_t series is integrated of order one or unit root)

H_a; β< 0 (i.e. y_t series is integrated of order zero or non-unit root)

Where, H_o and H_a are the null and alternative hypothesis respectively

With regard to non-stationary, one remedy for the short run dynamic is to estimate by differencing variables, if those differences are stationary. However, this method will lead to considerable loss of long run properties of the data. Alternatively, economic variables may be combined together in levels provided that they are co-integrated

Non-stationary economic series are said to be co-integrated if they can be transformed in to a single series that exhibits stationary (Engle and Granger 1987). There are two important ways to test for the existence of co-integration, Namely the Engle and Granger methodology and the Johannes (1988) maximum likelihood estimation procedure. In the Engle and Granger methodology, variables to be included in the cointegration analysis have to be integrated of same order that is order (1). Then the long run equilibrium relationship is estimated between the variables and the residual is obtained. If this residual form the long run equilibrium is found to be stationary, the two variables are co-integrated of order (1.1).That is they do have long run relationship. If the variables are co-integrated, the next step is to estimate the Error Correlation Model (ECM).

However, this procedure has its own defects; first, it assumes one variable as endogenous and uses others as regressors with a problem of imposing restriction. Moreover, using

three or more variables, there may be more than one co- integrating vector; the method has no systematic procedure for separate estimation of the multiple co-integrations.

Fortunately, the Johansen (1988) maximum likelihood estimators can be used to replace the use of two separate estimators and can test for the presence of multiple co- integrating vectors. This study uses the Johansen maximum likelihood for the analysis.

3.4 Co-integration Analysis using the Johansen Approach

In the Johannes procedure of co-integration, there is no priory separation of variables into endogenous and exogenous variables. Given the variable in equation (3.9) and specifying them as Vector Z, the model can be re-specified as a vector of autoregressive (VAR) involving up to K lags.

$$Z_t=A_0D_t+A_1Z_{t-1}+A_tZ_{t-2}+\ldots+A_kZ_{t-k}+\varepsilon_t \quad (3.13)$$

$$\varepsilon_t \sim IN(0, \Sigma)$$

Where Z_t is nx1 vector containing all n variables in the system, D is a vector containing deterministic terms (intercept, trend, dummies…etc.) and ε is an n dimensional vector of multivariate random error with mean zero and covariance matrix Σ.

The VAR system in the equation (3.13) can also be represented in the form

$$\Delta Z_t=A_0D_t+\pi Z_{t-k}+P_1\Delta Z_{t-1}+P_2\Delta Z_{t-2}+\ldots+P_{t-k}\Delta Z_{t-k+1}+v_t \quad (3.14)$$

This is simply an error term correction representation, which describes the interaction between the short run and the long run impacts in a given relationships. The estimates $\widehat{P_t}$ represent short run adjustments while $\hat{\pi}$ contains long run information, D_t represents a vector of dummies, and intercepts. Equation (3.14) shows how levels of the variable in the Z enter short term dynamics. The main concern of co- integration is to determine the rank of the long run matrix that is the determination of the maximum number of linearly independent columns in the matrix π. In determining the rank r of a matrix π of order, nxn the maximum possible rank is n and the minimum rank is zero. If there is a full rank i.e. r = n where n is the number of variables entering the co-integration space, this implies that all endogenous variable in Z are I(0). If there is reduced rank the statistical hypothesis

under co-integration is H(ρ):rank(π) $\leq r$,where r is the rank of the long run matrix. In this case, matrix π can be decomposed in to a product of two non-null matrixes such that $\pi = \alpha\beta'$. Matrix β is (nxr) vector of long run parameters and the (nxr)α matrix represents speed of adjustment to disequilibrium. Therefore πz_{t-k} in equation (3.14) is equivalent to $\alpha\beta' z_{t-k}$ and $\beta' Z_{t-k}$ represents up to (n-1) linear combinations that ensure the convergence of the vector Z_t to their long run steady-state solution (Harris 1995)

When there is a reduced rank, that is, if there are r $\leq (n-r)$ co-integrating vectors in β,$\pi Z_{t-k} (= \alpha\beta' Z_{t-k})$ should be stationary, (I(0) so that ε_t becomes white noise. Once the number of linear combinations in the long run matrix π is known through rank determination, the next step is to conduct exogeniety and causality analysis to provide an economically meaningful linear relation.

Hence, this study employs a method of co integration analysis combined with the VAR technique (which is called co integrated VAR) in order to estimate relevant coefficients and parameters that describes short and long run relationship of growth and private investment.

3.5 The Data

This study conducts the empirical analysis by employing data sets for the period 1971-2011 for all variables for Ethiopia. The data set is restricted to this period due to the availability of consistent information especially about the private sector.

The data sources of the study are the national income accounts as prepared by the Ministry of Finance and Economic Development (MOFED), Statistical Bulletins of Ministry of Education, the data base of the National Bank of Ethiopia, Statistical Abstracts of the Central Statistical Agency, the data base of the Ethiopia investment agency and the data base of the World Bank

Data for real private and real public investment is obtained from the National Bank of Ethiopia at 2000 constant price. Human capital stock (HL) is measured by average years of schooling of the lobar force based on Barro and Lee's (2000) method and data from

Ministry of Education and Central Statistics Agency. Lobar force (L) is approximated by economically active population which is at the age of between 15 and 65. Data on export (X) which is measured by export is available from the National of Ethiopia.

CHAPTER -4

EMPIRICAL ANALYSIS

4.1 Unit Root Tests

Before directly estimating equation (3.9) of chapter 3, the order of the integration of each variable has to be tested i.e. there is a need to test the unit root. The unit root test is a common practice in macro-level data analysis to accommodate non-stationary. If this behavior of macro-variables is left uncorrected, it would lead to the problem of spurious regression when there is a need to model relationships among variables. As explained in the methodology, formal testing for stationary and the order of integration of each variable are primarily undertaken using different methods (mostly ADF). The test with the ADF is performed with different trend assumptions (without trend, with trend and constant and trend).The results indicate that all variables are non-stationary by not rejecting the null for variables in level and rejecting the null for change in variables at 1% and 5% level of significance.

Table 1: Unit root test using ADF procedure

variable	DF test statistics without trend/intercept	DF test statistics with trend and intercept	DF test with no trend and intercept	Inference	Order of integration
LRGDP	-0.078	-1.436	1.264	Unit root	I(1)
DLRGDP	-4.483***	-5.131***	-4.383 ***	Stationary	
LRIG	-1.174	-2.633	2.588	Unit root	I(1)
DLRIG	-5.754 ***	-5.699 ***	-4.689***	Stationary	
LRIP	-1.808	-2.786	0.391	Unit root	I(1)
DLRIP	-4.479 ***	-4.553***	-4.465***	Stationary	
LLF	-1.700	-2.411	1.908	Unit root	I(1)
DLLF	-3.430***	-4.252 ***	-3.497***	Stationary	
LRE	-1.136	-1.994	2.061	Unit root	I(1)
DLRE	-5.599***	-5.492 ***	-5.001 ***	Stationary	
LHC	-1.769	-1.813	3.617	Unit root	I(1)
DLHC	-6.268***	-6.409 ***	-4.239 ***	Stationary	

Critical value used for ADF statistics are 5%=-2.959 and 1%=-3.657(values are produced by pcgive in Dicky and Fuller (1979)). (***) shows rejects the hypothesis is of unit root at (5%) and (1%) significance level respectively

4.2 Results for Cointegration Test and Vector Error Correction Model

4.2.1 Co-integration test Result

4.2.1.1 Lag order Selection for endogenous variables

The determination of lag length in the VAR system is a crucial issue since the cointegration rank and resulting outputs are sensitive to the dynamic structure of the system. The Johansen co-integration test results could be highly sensitive to the

number of lags included for the endogenous variables in the estimation of the VAR, which necessitates the determination of an optimal lag order prior to the test of co-integration. To set the lag length, the study followed general to specific approach in which a VAR system is run with a reasonably high lag length of four to reach a suitable lag length of two.

The optimal lag order is determined with the sequential modified Likelihood Ratio test statistics [LR], the Final Prediction Error [FPE], the Akaiki Information Criterion [AIC] the Schwarz Information Criterion [SIC] . As Table 2 indicates out of the four criteria's LR, AIC and FPE recommend to use two lags but SC criteria recommends to use one lag, so it is better to use two lags in the system equation model that is in the Johansson test of cointegration and vector error correction model since out of four criteria the three criteria advise to use two lags.

Table 2: Lag order selection

Order	LR	FPE	AIC	SC
0	NA	.000761	-4.34523	-4.084*
1	.21717	.0008	-4.29705	-3.99228
2	**4.0888***	**.000758***	**-4.3535***	-4.0052
3	1.1452	.000778	-4.3304	-3.93856
4	.23967	.000819	-4.28282	-3.84744 |

The second step in Johansson's procedure is to test the presence and the number of co-integrating vectors among the series in the model. The rank of the co-integration, that is, the number of the co-integrating vectors is selected using the Maximal Eigen values and the Trace values test statistics.

On the basis of the results of Maximal Eigen Values test statistics Table 3, the hypothesis of no co-integration was rejected and the study accepted the alternative hypothesis of existence of co-integration among the series. This suggests that there exist precisely one co-integrating vector in the estimated model. Hence, we can conclude that there is long-run relationship between the variables which is explained by a linear combination of I (1) variables

Table 3: Numbers of Co-Integration Vector Based On Maximal Eigen Values

Rank	Null Hypothesis	Alternative Hypothesis	Eigen value	Max-Eigen Statistic	5% critical value
0**	H0: $r \leq 0$	HA: $r > 0$	0.68414	47.2502	39.37
1	H0: $r \leq 1$	HA: $r > 1$	**0.48028**	**26.8330*****	**33.46*****
2	H0: $r \leq 2$	HA: $r > 2$	0.40746	21.4565	27.07
3	H0: $r \leq 3$	HA: $r > 3$	0.26324	12.5251	20.97
4	H0: $r \leq 4$	HA: $r > 4$	0.18349	8.3116	14.07

***** denotes rejection of null hypothesis at 5% significance level***

Results of the Trace test confirmed the results obtained through Maximal Eigen values test and gave us one co-integrating vector because test showed that values were significant at 5% level. In both these tests the result rejects the possibility of zero co-integrating vectors so finally one co-integrating vector was assumed between the series.

Table 4: **Numbers of Co-Integration Vector Based on Trace value**

Rank	Null Hypothesis	Alternative Hypothesis	Eigen value	Trace statistic	5% critical value
0**	**H0**: r ≤ 0	HA: r > 0	0.9038	127.6	109.8
1	H0: r ≤ 1	HA: r > 1	**0.7111**	**86.785**	**94.2**
2	H0: r ≤ 2	HA: r > 2	0.5978	56.728	62.5
3	H0: r ≤ 3	HA: r > 3	0.5705	28.839	36.4
4	H0: r ≤ 4	HA: r > 4	0.1268	10.473	25.7

***** denotes rejection of null hypothesis at 5% significance level***

4.3 Estimates of Long run and Error Correction Model

Co-integration analysis offers an improved method to estimate the long-run dynamic relationship among time series economic variables. The Johansen method is a form of an Error Correction Model (ECM) and in the p resence or existence of one co-integrating vector, its parameters can be interprete as estimates of the long-run co-integrating relationship among the series (Hallam and Zanoli).

The concepts of co-integration and error correction modeling are closely correlated as the method brings together short-run and long run information in modeling time series data through an error correction model (ECM)(Ericsson, 1992). The co-integration, once established among the variables included in the present study, the dynamic ECM structure was then considered for analysis as it saved from the estimation of counterfeit regression among the variables and also provided in formation about the adjustment speed to long-run equilibrium (Engle and Granger, 1987).

As explained previously, there is one co-integrating relationships based on the Johansen cointegratio test. The study aimed to examine the impact of public investment, priva investment, human capital, labor force and real export on economic growth. The Johansen test was used to confirm the appropriateness of the cointegration, which confirmed valid selecting the relationship by providing more weight for it.

Table 5: Estimation of Long Run Elasticity/RGDP or economic growth/

Variable	**LRPI**	**LRGI**	**LHC**	**LLF**	**LRX**	**CONST**
Coefficient	0.2926	0.2716	0.0859	-1.281359	0.19971	5.404033
	(0.003)**	(0.000)**	(0.028)*	(0.2699)	(0.005)**	(0.000)**

(*), (**), show the null hypothesis is rejected at 5% and 1% significance level respectively. The figures in parenthesis are p-values

The results shows both private and public sector investment have a positive significant long run impact on real output. The coefficient for RPI and RGI can also be interpreted as long run elasticity of real output with respect to both type of investment.

The long-run impact of real public investment on economic growth is found to be positive, which means that a 10-percentage-point increase in real public investment will raise the real GDP by 2.7 percentage points in the long run. This finding is in line with

the theoretical prediction of the endogenous growth models which states that fiscal policy (including public investment policy) can determine the national level of output. And particularly the model indicates that public investment policies on the rate of capital accumulation could affect the rate of accumulation of both physical and human capital along with the level of research and development expenditures which can directly reduce economic growth of the country.

Furthermore, this finding is consistent with studies by (Aschauer, 1989a; Eberts, 1986; Munnell, 1990; Tatom, 1991) in which a significant positive relationship between public investment and economic growth was observed. Similarly, more recent studies of the effects of public investment on growth have included(Hussen Musa,2007):(Abdulkerim Hussen,2005):(Alemnesh Tadess,2011) (Nazima and Kiani,2011; Mansouri, 2008; Muhammed, 2006; Milbourneet al.,2003; Aschauer,2000; Pereira,2000, 2001a and 2001b; Mittnik and Neumann,2001) and have revealed that public investment has a positive and statistically significant impact on economic growth. This finding is not unique to the Ethiopian case as suggested by Muhammed (2006), (HussenMusa,2007):(Abdulkerim Hussen,2005):(Alemnesh Tadess,2011) who argues that public investment has an important positive impact on the country's economic growth.

With respect to private investment, real private investment has positive and significant impact on real GDP in Ethiopia, both in the short run and in the long run. The result here suggests that a 10-percentage-point increase in real private investment in the long run raises real GDP by 2.9 percentage points in the long run. This result is sound and consistent with the theoretical prediction of the classical growth models and the endogenous growth model, as well as the World Bank gap model.

With regard to the relative contribution of public investment and private investment to economic growth, this paper found that private investment is a greater contributor than public investment to the country's growth; a 10% increase in private investment leads to an approximately 2.9% increase in output, while a similar increase in government investment leads to a 2.7% increase. This is consistent with studies by Khan and Reinhart

(1990) and Kumar (1997), who found that for developing countries, although public investment contributes to the productive performance of the economies, private investment has a greater influence on economic growth, due to efficiency gained through privatization.

The long-run impact of export on economic growth is found to be positive and statistically significant. This finding indicates that international integration is a beneficial strategy for growth in the long term, which is in line with what is predicted by Orthodox trade growth theory. According to the current Orthodox view, the positive contribution of countries export to growth stemmed from the notion that liberalization increases specialization and the division of labor, thus improving productivity and export capability, as well as economic performance.

The estimate of the human capital variable bears a positive sign. This finding confirms the predictions of the endogenous growth theory on the importance of human capital for economic growth. Also, this finding is consistent with studies by Babatunde and Adefabi (2005), Leoning (2004), Young (1995) and Barro and Salai-Martin (1995), who found that the human capital variable has a significant positive impact on economic growth.

4.4 Granger Causality/Block Exogeneity Test

For causality tests VAR representation in level may raise some doubts concerning its results because it contains non-stationary 1(I) variables. Hence we employ VAR representation in differenced variables with only the intercept in the deterministic part. Granger test result based on the stationary VAR model is reported in table 6. Results indicate that there is no feedback effect of economic growth on private investment , the null hypothesis that LRPI does not granger cause LRGDP/Y/ is rejected at 5% significance level where as the hypothesis from LRGDP/Y/ is not rejected justifying the fact that private investment can explain the growth process in Ethiopia.

Table 6:.**Granger Causality/Block Exogeneity Test**

NULL HYPOTHEIS	F-STATISTIC	PROBABILTY
LRPI DOES NOT GRANGER CAUSE LRGDP	9.73	0.0206**
LRGDP DOES NOT GRANGER CAUSE LRPI	2.85	0.1616

***** shows rejection of null hypothesis at 5% level of significant***

4.5 Short Term Dynamic Analysis

One the existence of long term relationship and appropriate parameters are determined, to make the analysis complete under the Johanessen frame-work. The coefficients of the short term dynamic have to be estimated. The coefficients of the one-period lagged differences in the table can be interpreted as the short-run parameters representing the short-run impact of private and public investment on economic growth (real GDP). The result shows that public investment and private investment have significant impacts on real income (real GDP). In addition, such variables as labor force and human capital are found to have no significant role in the short run.

The short-run impact of public investment on economic growth is found to be negative and statistically significant, which means that a 10-percentage-point increase in public investment decreases economic growth by 0.8 percentage points in the short run. The negative sign of public investment is indicative of a "crowding out" effect on growth in the short run. This result may be observed because public spending has a long gestation period; we look for the impact after a long period but consume resources in the interim that can be used for private resources.

Short Run Coefficients of Real GDP as a dependent variable

Table 7: Short Run Coefficients of D(LRGDP)-

ERROR CORRECTION		DEPENDENT VARIABLE
	COEFFICENT	**T-VALUE**
EC/ADJUSTMENT	-0.5502	[-4.39626]
DLRPI-1	0.000239	[-3.00621]
DLRGI-1	-0.036806	[-2.36021]
DLHC-1	0.765472	[1.24679]
DLLF-1	-2.427895	[0.33692]
DLRE-1	0.358629	[-2.04053]
DV	-0.137649	[-3.13919]

The coefficient of the error correction term for the output equation possesses the expected negative sign, indicating that it is error-correcting. This guarantees that although the actual real GDP may temporarily deviate from its long-run equilibrium value, it would gradually converge to its equilibrium. The error correction term of-0.5502 shows that 55% percent of the deviation of the actual real GDP from its equilibrium value is eliminated every year.

In estimating the error-correction model, a dummy for inward-looking economic systems (dum) is introduced to capture the effect of inward-looking behavior. The negative and significant coefficient of dummy for inward-looking (dum) indicates that the prolonged inward-looking behavior by both the imperial and Derg regimes has negatively affected the growth of the economy

Short Run Coefficients of D (LRIP) as a dependent variable

Table 8 Short Run Coefficients of D (LRIP)-

ERROR CORRECTION		DEPENDENT VARIABLE
	COEFFICENT	**T-VALUE**
ECT/ADJUSTMENT	-0.283678	[-5.99626]
DLRGDP-1	1.164600	[2.28192]
DLRGI-1	-0.257572	[-2.36021]
DLHC-1	0.279126	[1.41928]
DLLF-1	0.50552	[1.18829]
DLRE-1	0.767264	[4.06110]
DV	-0.072088	[-0.36729]

Most studies conducted in different developing countries including Ethiopia suggest the positive contribution of private investment to economic growth and show a positive or negative relationship between private and public investment (Ghali,2003: Badawi,2003 :Naqvi,2003: Abdulkerim 2005:Abdulkadir, 2007:Alemnesh.2011:tadesse,2013)

There is also evidence to support the theory of a short-run "crowding-out" effect of public investment (an increase of 10% reduces private investment by 2.5%). Public investment can crowd out private investment through different channels.

First, government investment can crowd out private investment through increased borrowing. For example, if public-sector investments are financed by borrowing, this leads to an increase in the market interest rate and thus raises the cost of capital for the private sector, crowding out the private sector. In the case of tax financing of public-

sector investment, the tax may distort the resource allocation decisions of private investors in the economy by changing relative prices.

Second, public investment can exert a negative influence on private investment. If both the private and public sectors compete for a limited amount of resources in the economy, the costs of financing private investment increase, while the availability of credit to the private sector declines, this could crowd out investment in the private sector. Furthermore, investments undertaken by highly subsidized state economic enterprises are often financed through the printing of money, external debts and deficit spending.

Finally, public investment may substitute for private investment when they both produce goods and services that are in direct competition in a marketplace, particularly if public production is subsidized by the government. This suggests that there is a kind of competition for resources between the public and the private sectors, at least in the short run.

The coefficient of the ECM model for the private investment equation possesses the expected negative sign, indicating that it is error-correcting. In other words, any deviation from the long-run equilibrium is corrected back to equilibrium, although at a slow pace of approximately 28% in each subsequent period. The relatively low speed of adjustment may be attributed to structural rigidities common in developing countries that slow down the adjustment process.

4.6 Post-Estimation Diagnostics

In the study, different post-estimation diagnostic tests were performed to guarantee that the residuals from the model are Gaussian that the assumptions are not violated and the estimation results and inferences are trustworthy.

Residual Vector Serial Correlation LM Test-Table 9 shows that there is no evidence that reveals the presence of autocorrelation at the first and second lags. The large p-values imply that the chi-squared statistics at all lags are not large enough to help reject the null

of no autocorrelation at any of the usual critical values. Thus, the study could not find any evidence of autocorrelation problem in the residuals.

Residual Vector Normality Test-Normality is checked mainly by using the Jarque-Bera test.The study used the Jarque-Bera statistic to test the null of whether the standardized residuals are normally distributed. If the standardized residuals are normally distributed, the Jarque-Bera statistic should not be significant. The null-hypothesis that the residuals are norma lis fail to rejected because the probability of Jarque-Bera statics of the study is 0.23 which is greater than 0.05

Residual Vector Heteroskedasticity Test-The result in table 9 suggests that there is no enough evidence to help reject the null of no heteroskedasticity. Therefore, the residuals of the model are found to be homoskedastic. This, together with the results of the other pre and post estimation diagnostic tests, suggests the validity and robustness of the estimated results.

Table 9 Post-Estimation Diagnostics

Test	Statistic		p-value
Residual Vector Serial Correlation LM	**Lags**	**Chi-square**	
	1	**35.3217**	**0.08254**
	2	**26.4859**	**0.38205**
Residual Vector Normality (Jarque-Bera)	**15.412**		**0.21968**
Residual Vector Heteroskedasticity	**296.7158**		**0.6034**

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS/ POLICY IMPLICATIONS

5.1 Conclusion

Based on the findings of the study both from the descriptive and econometric results, the following conclusions are derived.

A strong private sector is an important engine for stimulating economic growth. The greater the share of private investment in the gross domestic product of a country, the higher the average growth rate of the economy. This is reflected by the creation of more employment opportunities, higher output and good standard of living of people. Attainment of higher growth through private investment depends among other factors on the past policy of the country towards the sector.

In Ethiopia, private sector investment passed good and poorly designed policy regimes. During the imperial regime, the investment policy followed by the government was favorable in terms of providing a better working environment. In addition, the relatively stable economic and political condition of the period helped to establish a secure working environment for the private sector.

However, in the socialist regime, the state as a dominant actor in the economy was heavily involved in production of products ranging from household commodities to large machinery and construction materials. As a result, private investment was discouraged by imposing a ceiling on permissible fixed asset licensing and high rates of personal taxation in credit allocation. Public sector investment was favored in terms of incentive provision though its return was inefficient and ineffective.

The current government since it took power in 1991 is providing various incentives and tries to promote private sector investment. However, there is still a debate to further liberalize the market and to make it more conducive to the sector. The current government has enacted more than five investment laws over the past 16 years to create a better environment for private investment. However, the frequent changes in the law by itself appear to be an obstacle to the growth of stable private investment in the country. In general, when we compare the policies in the three regimes the current governments provided a relative better condition for investment business

This study has measured the relationship between private investment and economic growth using Co-integration and Vector Error Correction approaches. And further this study found evidence on the relationship between public investment, private investment and economic growth in the long run.

Public and private investments have significant long run impact on economic growth of the country. Public investment affects economic growth differently both in the short run and in the long run. In the short run the impact of public investment is crowding out economic growth but in the long run it has complementarity effect. Such short run result may be due to the fact that public spending has long gestation period and the productive outcome of public investment is only visible in the long run and thus, in between consume resources that can be used by private resources.

Given the long run and short run positive impact of private investment. An increase in private investment ratio to real GDP is estimated to raise growth ceteris paribus by about 29 percentage points in the long run. In addition to the two investment categories, the country's export was found to contribute positively to economic growth in the long as well as in the short term. The human capital component has shown to be an important determinant of the Ethiopian growth performance in the long run.

The pairwise Granger causality test between private investment and economic growth using a lag structure suggested that changes in private investment precede changes in economic growth.

5.2 Policy Implications

Given the relative significance and importance of the private sector investment in stimulating economic growth, policies designed to attract private investment should be deep enough to stimulate sustainable growth.

First, Realizing the long run positive effect of real private investment the government of Ethiopia should take supplementary reforms that will improve the country's poor investment climate,(for example : poor infrastructure, particularly, Power shortage; poor transport; poor telecom connectivity of business locations and lack of efficient tax administration), that promotes private sector development, in supportive of entrepreneurial endeavor and with a bias towards expansion of business activities. In particular, the government has roles to play at different levels of the economy to encourage the private sector and to attain sustainable development. These include supply of efficient infrastructure facilities such as electricity, telephone, water and road; improving the tax administration system for example minimizing the random imposition of taxes and increasing access to information and advisory services. In the absence of some or all of these prerequisites, private investment expansion which is a means for accumulation of physical capital and increment of national output may not result at the projected level.

Second, the long run positive effect of real public investment on growth and loss of sufficient statistical evidence of crowding out effect on private investment calls the responsible authority, first to identify which sectors of public investment are crowding in and which sectors are crowding out private investment, before expansion of state participation. The guiding principle for public investment should be complimentary rather than compete with private investment.

Finally, in support of these efforts, the Ethiopian government should formulate Investment policies to encourage private sector development. These policies include the provision of the necessary infrastructure at a manageable economic cost as well as to

creation of an overall conducive environment to sound investment and the promotion of human resources. Policies designed to attract private investment should be deep enough to stimulate sustainable growth. The public service provided by the government offices need to be less bureaucratic, i.e. government need to build efficient civil service. Thus close follow up of private investors should be made. In addition to this, bottlenecks that investors have faced should be identified and corrective measures should be taken. Without these, the private sector is unlikely to make its full contribution to development

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