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Acronyms

CSA: Central Statistics Agency

EIA: Ethiopian Investment Agency

FDI: foreign Direct Investment

GDP: Gross Domestic Product

GTP-I: The First Growth and Transformational Plan

GTP-II: The First Growth and Transformational Plan

ICOR: Incremental Capital-Output Ratio

IMF: International Monitory Fund

IPR: Intellectual Property Rights

IT: Information Technology

MoFED: Ministry of Finance and Economic Development

MPC: Marginal Propensity to Consume

NBE: National Bank of Ethiopia

NEAS: National Economic Accounts Statistics

NPC: National Planning Commission

OECD: Organization for Economic Corporation and Development

PASDEP: Plan for Accelerated and Sustained Development to End Poverty

SDGs: Sustainable Development Goals

SDPRP: Sustainable Development and Poverty Reduction Program

UN: United Nations

UNCTAD: United Nations Conference for Trade and Development

UNIDO: United Nations Industrial Development Organization

Abstract

The aim of this paper is to examine the trend, relationship and prospect of investment, incremental capital output-ration and economic growth in Ethiopia using time series data from 2000/2001 to 2014/15. The paper applied documentary and administrative report reviews to analyze the trends and prospects. And undertake the simple regression to see the relationship between investment and economic growth and incremental capital output ration and economic growth and multiple-regression to see the combined impact of investment and incremental capital output-ratio on economic growth. The movement of investment and economic growth expresses increasing trend for most of the years. Their prospect is also expected to be the same. Though for most of the period the investment is efficient, but currently it demonstrates increasing trend. The future trend is expected to be more efficient. The regression result reveals significant impact of investment and insignificant impact of incremental capital output-ratio on economic growth. The regression analysis also discloses investment and incremental capital output ration together have significant impact on output or economy.

Chapter One:

1. Introduction

Since the political alteration in 1991, the Ethiopian economy has sustained a continuous growth for most of the years. The country is among the fastest growing countries in Africa (http://www.blog.kpmgafrica.com/africas-top-10-fastest-growing-economies/). It has been continuously recorded more than 10% growth rate (GTP-I MoFED, 2010). With the aim of to be middle income country by year of 2025, it has been running through the lines of various development plans and economic policies. And the outcomes of these plans and policies are resulted in economic growth associated with increasing level of investment.

The Gross Domestic Product (GDP) of a country in expenditure approach is consists of consumption (private and government consumption expenditure), investment, and net export (export less import). The country's current GDP is much higher than years before. This can be easily notified from the movements of it components.

The percentage share of consumption expenditure (private and government) ascends from 76.2 for the year 2001/02 to 107.3 at 2007/08, and the net export section fall in absolute term. From 2000 – 2014, the shares of export and import out of GDP show 10.6% and 23.9% at lower level and 17% and 36.9% at their hill. The net export 11.8% for the year 2000/01 is move to 22.9% at 2005/06. For the succeeding years the share is lower than 20%. The investment share shows lower share of 8% for the year 2007/08 and higher share of 41.6% for the year 2001/02, and for most years the share is higher than 30%. In short, with the ups and down moves of the share of GDP components, the economy of a country grows an averagely more than 9% for the period (NEAS of Ethiopia, MoFED, 2013).

With this growth rate, different question will be raised, like the does the growth ruthless (growth that only benefits the rich, and leaves the poor in their poverty) or all inscribed? Does the growth concerns the coming generation or it is Futureless? But leaving these questions and other related issues, for the time being we are going to look the questions of, how the investment trend looks like? "Does the economy has been achieved a relatively efficient?" That is, how is the investment flow to GDP growth rate? Or how much will an additional amount of capital increase output? Thus, in this

thesis, investment, its efficiency and economic growth trend, prospect and relationship in Ethiopia studied.

1.1 Statement of the problem

Investment is among the components of gross domestic products of a country. While measuring a country's economy performance, it is included by classifying between public and private investments. It has both quantitative and qualitative parts. The quantitative part which is indicated by the amount of investment made in a given year and the qualitative part that measures the efficiency of the invested capital. As such it affects the economy move over time dually.

Therefore, this research study is examines the movements of investment, its efficiency and economic growth over the last fifteen years (2000-2015) (How is the movement of investment, its efficiency and economic growth for the last fifteen years?) and shows the forecast for the future trends of investment, its efficiency and economic growth (What will be their prospect trend?). Moreover, the study identified how far investment and its efficiency affect economic growth (How far investment and its efficiency (individual as well as jointly) affect economic growth?).

1.2 Objective of the Study

The main objective of this study is to see the past and future movements as well the relationship between investment, its efficiency and economic growth. Accordingly, the Study has the following specific objectives:

1. Examining the movements of investment, its efficiency and economic growth over the last fifteen years (2000-2015),
2. Forecasting the future trends of investment, its efficiency and economic growth and
3. Identifying how far investment and its efficiency (individual as well as jointly) affect economic growth.

1.3 Hypothesis

The Hypothesises of this study are:

H_o: Investment has significant impact on economic growth.

H_A: Investment have no significant impact on economic growth.

H_o: Investment efficiency has significant impact on economic growth.

H_A: Investment efficiency have no significant impact on economic growth.

H_o: Investment and its efficiency have significant impact on economic growth.

H_A: Investment and its efficiency have no significant impact on economic growth.

1.4. Methodology of the Study

1.4.1 The kind of data or information to be required

The kind of data for this study is both quantitative and qualitative

1.4.2 Source of data

The source of data for this study is secondary source such as literatures, books, office publications and different official documents.

The data collected are those which show investment, its efficiency and economic growth progress over years, their future movements as well as relationships. To have these data, research reports, literatures, books, different offices publication (especial the publications of MoFED, CSA, NPC, NBE and EIA) will be reviewed.

1.4.3 Data Collection methods

The data collection technique conducted in the Study is document review.

1.4.4 Methods of Data Analysis

The statistical techniques used to analyze the data are:

1. Descriptive analysis
   1.1 Measures of central tendency: in order to present average and median of data's for the period,
   1.2 Measure of dispersion.
2. Inferential analysis
   2.1 Simple and Multiple Regression Analysis: to show the interdependence between:
   - Investment and economic growth,

     GDP = α + βI
   - Investment efficiency and economic growth, and

     GDP = α + γICOR
   - Investment, its efficiency and economic growth.

     GDP = α + βI + γICOR

2.2 Correlation

2.3 Test of Regression assumptions:

- Normality test.
- Multicolinerity test and
- Heteroscedasticity test.

1.5 Expected Outcomes of the Study

From the findings of the Study: It is possible to know the past and future trends of investment, its efficiency and economic growth. Moreover, the output of this research work provides opportunity to see how far economic growth is affect by investment and investment efficiency (by individual as well as jointly).

1.6 Outline of the Study

The structure of the thesis is organized as follows, in to four chapters. Chapter one shows overall introduction of the paper. The second chapter will deal with literature review and the third contain data presentation and analysis. The final one is about conclusion and policy recommendation.

Chapter Two: Literature Review

Theoretical Literature Review

2.1 Investment, Its efficiency and Economic Growth Concepts

2.1.1 Defining Investment

According to Jhon Maynard Keynes investment is a function of marginal efficiency of capital and complex of rates of interest on loans of various maturities and rises. Investment is also the placing of money so that it will increase in value and produces an income (either in an asset, such as a building, or by purchasing shares, placing money on deposits, etc.) (Dictionary of Economics). Agreement between the government of Japan and the government of The Republic of Korea for the liberalization, promotion and protection of investment defined investments as the amounts yielded by an investment, in particular, profit, interest, capital gains, dividends, royalties and fees.

The Belgium's Model Bilateral Investment Treaty define investment on asset-based approach, which provides coverage to "any kind of asset", followed by a non-exhaustive list of the forms such assets may take. The list commonly includes a wide range of assets and interests, such as movable and immovable property, shares or stock in a company, futures, options, derivatives, contract rights, and intellectual property rights including trademarks and copyrights. Investment is transactions that increase the magnitude of real aggregate wealth in the economy. This includes mainly the purchase (or production) of new real durable assets such as factories and machines (Jeffrey Parker 2009).

Above all, the United Nations Conference on Trade and Development on the International Investment Agreements document define investment on two bases. It uses both a broad asset-based and narrower definitions for investment. It states that investment includes "every kind of asset" typically:

- Movable and immovable property and any other property rights such as mortgages, liens and pledges;
- Shares, stocks and debentures of companies or interests in the property of such companies;
- Claims to money or to any performance under contract having a financial value;

- Intellectual property rights and goodwill; and
- Business concessions conferred by law or under contract, including concessions to search for, cultivate, extract or exploit natural resources.

These categories are a limited include within the definition of investment and according to this definition other assets are also count as investment even if they don't fall under the above categories.

A narrower definition indicates: Excluding specific types of assets such as portfolio investments, certain commercial contracts, certain loans and debt securities, etc. This definition limits investment to those made in accordance with host country law, depending on the time of their establishment and limiting to certain industry sectors; and intellectual property rights (IPRs) (UNCTAD 2011).

2.1.2 Theories of investment

There are a number of theories in economics field of study. Among them the one is theory on investment. Too, we have different types of investment theories; such as the Modigliani-Miller theory, Keynesian theory of investment, Neoclassical theory of investment, Marginal productivity theory of investment and IS-LM approach, Accelerator principle and multiplier accelerator theory of investment, Tobin's q-theory, Investment in a simple dynamic general equilibrium model, etc. Among various theories in this paper we will discuss the four one.

Neoclassical investment theory

This theory of investment is based on three assumptions. The objective functions of the enterprise, neoclassical risk or Keynesian uncertainty and physical capital as a liquid asset. The objective function of the enterprise is observed from both the owner and managers prespective. In neoclassical theory, management concerns itself only with the expected value of the distributions of expected future returns on prospective investment projects, not with other moments. The owner (the suppliers of financial capital) to the firm exercise sovereignty over the accumulation process. They evaluate expected corporate cash flows with different risk characteristics, decide on optimal leverage ratios, diversify portfolios so as to maximize expected utility and achieve risk-return efficiency, and determine the cost of capital to the enterprise. The enterprise then passively implements the investment strategy its owners have chosen. The assumption of liquid physical capital or reversible investment makes the central conclusions of

neoclassical investment theory insensitive to the moderate relaxation of the other assumptions. With liquid capital, it would make little difference to the character of investment theory if the firm itself were risk-averse, because investment would not be very risky. And it would not matter much if the firm had less than complete information about future states of the economy, because with reversible investment and reversible debt, mistakes would be relatively costless. In Keynesian uncertainty, investment is sensitive to changes in expectations and in the degree of confidence management placed. Instability in the expectations and confidence formation process would bring instability in investment spending in its wake (James R. Crotty 1993).

Accelerator principle and multiplier accelerator theory of investment

This theory is among the earliest theories of investment developed by Keynes. The theory is based on an assumption of desired capital-output ratio is roughly constant. The accelerator is a simple theory that incorporates the current output to investment. According to this theory, the desired capital stock for any period is proportional to the level of output. That means, investment is proportional to the increase in output in the next period. The theory is based on mathematical technique of $Kt^* = \sigma Yt$, where K stands for capital, t for time, σ is the desired capital-output ratio and Y for level of output. "This is simply the well-known accelerator principle where the desired capital stock is assumed to be proportional to output. Investment in any period will therefore depend on the growth in output" (Johan E Eklund 2013).

According to Jeffrey Parker (2009) the accelerator theory and Keynes's theory of consumption multiplier combined to form a model of cyclical behavior. When there is increasing in investment this will rise aggregate spending and cause output to rise. When output rise income will rise. Based on Keynes's fundamental psychological law, people spend part of the income and this leads to an increase in aggregate demand for the second time, and raises the incomes of the producer of the second products. When the incomes of the second group of producers increase, they will in turn increase consumption. Thus, "an increase in investment sets off a never-ending sequence of ever-smaller increases in consumption demand that augments the effect of investment on income. By simple algebra, the sum of these effects, or the Keynesian multiplier, can be shown to converge in the limit to $1/(1 - \text{MPC})$" (Jeffrey Parker, 2009).

Tobin's q-theory

James Tobin developed an investment theory based on financial markets. He maintained that investment depends on the present value of installed capital and the replacement cost of capital. The ratio of the present value of installed capital to the replacement cost of capital is Tobin's q. Algebraically,

$$Q = \frac{\text{Market Value of Firm Capital}}{\text{Replacement Cost of Capital}}$$

"The q theory of investment argues that firms will want to increase their capital when q > 1 and decrease their capital stock when q <1. If q > 1, a firm can buy one dollar's worth of capital (at replacement cost) and earn profits that have present value in excess of one dollar. Under those conditions, firms increase profits by investing in more capital, so we expect investment to be high. If q < 1, then the present value of the profits earned by installing new capital is less than the cost of the capital, thus, more investment lowers profit. We expect investment to be near zero if q < 1" (Jeffrey Parker, 2009).

2.1.3 Investment Typology and Its Determinant

Types of Investment

Investment is various types. It may be business fixed investment, residential fixed investment, and inventory investment. Business fixed investment is the purchase of new plant and equipment by firms (Mankiw, 2001). Inventory investment is the increase in firms' inventories of goods. "This kind of investment is quite different from business fixed investment because inventory capital normally has a very short life span. When inventories decrease from one period to the next, as sometimes happens even at an aggregate level, inventory investment is negative". Residential investment is the purchase of new housing by households and landlords (Jeffrey Parker 2009).

The Investment Law Reform hand book for development practitioners divide investment in to public investment verses private investment, direct investment verses portfolio investment and foreign investment verses domestic investment. Public and Private investments jurisdiction is on account source of the investment. If the source is from government side the investment is termed as public and if it is from the private sector the investment named private.

Direct investment is "a long-term investment in a new business or a preexisting one that is accompanied by a measure of effective management control by the investor. The investor exercises a dominant influence on business operations, and remains responsible for the development of the enterprise. Direct investment is a lasting interest in an enterprise and is typically illustrated by ownership of physical assets such as buildings, machines, and other lasting interests that are not easily liquidated (Investmentn Law Reform 2010)".

Portfolio investment (indirect investment): this category of investment is characterized by shorter-term objective, applies financial flows and more of speculative nature than direct investments. This form of investment can shift from less profitable sector to more profitable sector easily.

Investment may be **Domestic Investment v. Foreign Investment.** This form of classification of investment is according to investment nationality and residence. The former one is investment raised by a resident or a national of a country. The latter is an investment made by foreigner. Thus, investment made by a resident of a nation is domestic and an investment by foreign national is termed foreign investments.

2.1.4 Determinants of Investment

Since the early time of the beginning of economics field of study numerous economists identified different determinants for investment. From past up to today's globalized world different determining factories are identified for investment. Such as, profit, saving, tax, credit, interest rate, market size, wage, income, etc. These factors affect investment in a given country in different ways.

For Marx it is the profite determine the investment. "Changes in the rate of profit will result in changes in investment spending, and this volatility of investment spending as the major cause of fluctuations in the total level of economic activity".

Richard Cantillon, identifed the relationship between money supply & interest rate and investemnt amount. He shows the increase in money supply will leads to increase or decrease in investment. "If the increase in the money supply went first to savers, the interest rate would fall. But if it went to spenders, the interest rate would rise, because the increased spending would cause increased investments by businessmen and a consequent increase in the demand for loan-

able funds". Fisher in his theory of interest shows the demand curve for investment as a function of the interest rate. The lower the interest rates, the higher will the quantity of investment demanded.

Keynes also discuss about the existing relation among interest rate and investment in his discussion on topic of theory of money and theory of central banking. In his discussions, he showed how the central bank controls the investment through regulating interest rate. He presented the way central bank uses to influence investment through creation of money for the purpose of speculation. Accordingly, "the focus is on the rate of interest or the price of fixed-interest-bearing securities and, consequently, the variation of this part of the money supply by open market operations of the central bank. This relationship creates the opportunity for a monetary policy capable to regulate investment by the rate of interest". Additional he found the idea that the central bank could control the reserves of commercial banks by the aim of controlling the reserves in order to stabilize the economy's net investments by regulating the rate of interest.

Investment is also depends on return and cost. If the return is more than the cost the project is profitable. The revenue from increased future production of goods and services must exceed the payments for borrowed funds for profitable investment. In come also affected investment. An increase in income or decrease in income raises or reduces the demand in the market and the sales income for investor. Thus, lower income by reducing the demand for products discourage investment and higher income encourage it. "If the interest rate rises, fewer investment projects are profitable, and the quantity of investment goods demanded falls" (Melville J.Ulmer).

Investment Law Reform, a handbook for development practitioners, investment climate advisory services of the World Bank group (2010), distinguished the macroeconomic policy framework, trade policy, taxation, foreign exchange, land and labor; political risk and governance; government administration and management of the regulatory process related to commercial activities; legal and judicial frameworks and their ability to protect property, settle disputes, and enforce contracts; and the quality of both the physical infrastructure (power, transportation, and water) and institutional infrastructure (educational and banking systems and civil society institutions) as a determinant of investment.

UNCTAD (2014), while studying "economic development in Africa, catalyzing investment for transformative growth in Africa" identified the following five determinants of investment in the continent. These are poor access to credit and the cost of finance, low domestic savings, risk and uncertainty, inequality and the level of aggregate demand and the policy and investment environment. In wordings of the report: "the degree of financial intermediation, risk and uncertainty arising from political instability, macroeconomic volatility and policy reversal. Uncertainty raises the transaction and adjustment cost associated with investment. The distribution of income in an economy can affect investment, since high inequality often leads to social and political conflicts which create insecurity over property rights thereby increase uncertainty and undermining investment. The domestic policy and investment environment affects the competitiveness of firms and hence is an important determinant of investment".

Thus, profit, saving, tax, credit, interest rate, market size, wage, income, macroeconomic policy framework, trade policy, foreign exchange, political risk and governance; government administration and management, legal and judicial frameworks and their ability to protect property, settle disputes, and enforce contracts; quality of physical and institutional infrastructure, inequality and the level of aggregate demand etc. can determine the investment amount.

2.2 Investment Efficiency

Efficiency is a measure of how economically resources/inputs (funds, expertise, time, etc.) are converted to results OECD (2002). According to United Nations Industrial Development Organization, efficieny referes to the performance given a potential. For instance a country at a lower level of technology that uses its techniques to the full potential is reputed to be more efficient than one that employs more advanced techniques but does not make the best use of them (UNIDO 2005). Following this definition investment efficiency is how investment is best used to produce the required output given its potential. The efficiency of a given investment is measured by using incremental output ratio.

2.2.1 Incremental Capital Output Ratio (ICOR)

Incremental Capital Output Ratio refers to the number of additional units of capital that are needed to produce an additional unit of output (C.S.Nagpal 2004). It is a metric that assesses the

marginal amount of investment capital necessary for an entity to generate the next unit of production. This measure is used predominantly in determining a country's level of production efficiency (Investopedia). It also refers to ratio of the change in capital investment (net of gross investment minus capital consumption allowance) to the change in output. It named incremental because the ratio deal with changes (Donald W.Moffat 1976).

Incremental capital-output ratio is used in Harrod-Domar model of growth to show how investment fosters economic growth. In this model growth is emanates from saving and capital-output ratio. i.e growth rate of the economy related directly with net savings rate and inversely with capital-output ratio.

Mathimatical derivation:

Saving (S) = S = sY

Investment (I) is defined as the change in the capital stock, K.

I = ΔK

total capital stock, K, bears a direct relationship to total output, Y, and represent the capital-output ratio, c.

$$c = \frac{K}{Y} \rightleftarrows c = \frac{\Delta K}{\Delta Y} \Longrightarrow \Delta K = c\Delta Y$$

Finally, because net national savings, S, must equal net investment, I, we can write this equality as

S=I

sY=ΔK

sY=$\Delta K = c\Delta Y$

sY=$c\Delta Y$

Dividing both sides of Equation first by Y and then by c, gives us:

$\frac{\Delta Y}{Y} = \frac{s}{c}$ where $\frac{\Delta Y}{Y}$ is change in the economy over time or GDP growth rate

GDP=$\frac{S}{c} \rightleftarrows c = \frac{S}{GDP}$ net saving represent investment made per the period the equation becomes

$c=\frac{I}{GDP}$ where c represent capital-output ratio, I for Investment and GDP for growth rate of the economy.

Incremental Capital Output Ratio$=\frac{\boldsymbol{\Delta K}}{\boldsymbol{\Delta Y}}=\frac{\frac{\boldsymbol{\Delta K}}{\boldsymbol{Y}}}{\frac{\boldsymbol{\Delta Y}}{\boldsymbol{Y}}}=\frac{\frac{\boldsymbol{I}}{\boldsymbol{Y}}}{\frac{\boldsymbol{\Delta Y}}{\boldsymbol{Y}}}=\frac{\boldsymbol{I}}{\boldsymbol{\Delta Y}}=\frac{\boldsymbol{I}}{\boldsymbol{\Delta GDP}}$

K: capital stock

Y: output (GDP)

I: net investment

According to this formula the incremental capital output ratio can be computed by **dividing the investment share of GDP** by **the rate of growth of GDP.** A determinant of the ICOR is the technology used, where technology is defined as a combination of factors of production (for example, a certain ratio of capital to labour, labour to land). Countries that use technology efficiently and use capital-saving technology have lower ICOR's than countries that invest in capital-intensive industries. Overall, a higher ICOR value is not preferred because it indicates that the entity's production is inefficient (Wikipedia free encyclopaedia).[1]

The higher the ICOR mean, the lower the productivity of capital (indicates the low efficiency of investment). Low ICOR values imply that investment is more efficient: Producing one unit of incremental output requires less incremental capital (Janvier D. Nkurunziza 2014).

Duo Qin, Marine Anne Cagas, Pilipinas Quising and Xin-Hua He (2005) "rising capital output ratio indicates the problem of overinvestment, a problem impinging on the issues of investment efficiency loss at a macro level. Specifically, the investment growth to output growth ratio is significantly higher when the random shock originates from investment than when the shock originates from output; a random increase of investment leads to further rise in capital output ratio over a long period. Overinvestment in the sense of increasing investment irrespective of output expectations would give rise to more efficiency loss and structural imbalance in the economy that to more economic growth, especially when there is surplus capital capacity".

[1]Suppose that, country X has an ICOR of 10. This implies that $10 worth of capital investment is necessary to generate $1 of extra production. Additional, if the last year ICOR for the country X was 12, this implies that currently the country has become more efficient in its use of capital.

2.3 Economic Growth: Definition, Theories, Bases for growth and Measuring Tool of growth

2.3.1 Defining Economic growth

Economic growth is the increase in the inflation-adjusted market value of the goods and services produced by an economy over time. It is conventionally measured as the percentage rate of increase in real gross domestic product, or real GDP. In economics, "economic growth" or "economic growth theory" typically refers to growth of potential output, i.e., production at "full employment". Growth is usually calculated in real terms – i.e., inflation-adjusted terms – to eliminate the distorting effect of inflation on the price of goods produced (Wikipedeia, Free encyclopedia).

WALT WHITMAN ROSTOW (1960) defined economic growth as a process successive transformation of the society from one stage to the next one. In his wording it is

> "the result of an interacting process involving the economic, social, and political sectors of a society, including the emergence of a corps of entrepreneurs who are psychologically motivated and technically prepared regularly to lead the way in introducing new production functions into the economy".

He divides the process in to five stages. The traditional society, the preconditions for take-off into self-sustaining growth, the take-off, the drive to maturity, and the age of high mass consumption.

Dornbusch and Fischer (1978) stated that, economic growth is about the increase in productive capacity over time. Growth occurs as a result of the accumulation of factors of production and the improvement of resource utilization or increase in factor productivity. Growth in the stock of knowledge, along with growth in labor input was the most important source of growth.

John Black (1997) Economic Growth is an increase in an economic variable, normally persisting over successive period. The variable concerned may be real or nominal and may be measured in absolute or in per capita terms. Growth in real economic variables such as GDP for short periods or at low rates may occur by simply having similar activities conducted on a larger scale. Rapid or persistent growth is likely to involve changes in the nature of economic activity, with new products or processes and new types of labour skills, capital goods and economic institutions.

M.L.Jhingan (1997), defined economic growth as a quantitative sustained increase in the country's per capita output or income accompanied by expansion in its labour force, consumption, capital and volume of trade.

For Karnatl Lingaiah (2001) Economic growth is related to a quantitative sustained increase in the country's per capita output or income accompanied by expansion on its labour force, consumption, capital and volume of trade.

For Melville J.Ulmer Economic growth is the rate of expansion in economic welfare. Succinctly put, economic welfare means simple the level at which the material wants of a community are satisfied, including both its present and its anticipated future needs. Since we use flow of physical goods and services rather than mere values, economic growth is measured by deflated per capita national income.

2.3.2 Theories of Economic growth

It is during post world war II the study development economic get more emphasis among economists. It is the study of how economies are transformed from stagnation to growth and from low income to high-income status, and overcome problems of absolute poverty (Michael P. Todaro and Stephen C. Smith). Though it is a current issue in the field of economics but have numerous growth theories. In this section we are going to look three theories from them. These are: (1) the Harod-Domar growth model, (2) Rostow's stages of growth theory (3) Endogenous Growth Model

The Harrod-Domar growth model

The Harod-Domar model of growth is a classic theory of economic growth which is developed by two economists, R.F. Harrod and E.D. Domar and based on the assumptions of: full employment level of income i.e. full capacity and full employment growth, absent of government intervention, closed economy (no export and import (interaction with the remaining part of the globe), average and marginal propensity to save are equal to each other, there is fixed proportion in capital and labour i.e., they are complementary, the production exhibits constant return, and saving and investment are equal.

The model is developed as follows:

Suppose time is divided in to 1, 2, 3…

Y(t)=C(t)+S(t)----------eq(1)

the output produced at a given year is either consumed or saved.

Y(t)=C(t)+I(t)----------eq(2)

from equation 1 and 2 we have

S(t)=I(t)----------eq(3)

This is macroeconomic equilibrium.

Capital accumulation equation is

K(t+1)= K(t) - δK(t) + I(t)----------eq(4)

Equation three tells us about the current capital is the sum of the capital left from past and the newly invested capital.

Saving equation is

S(t)=sY(t)----------eq(5)

The capital-output ratio function is

$\boldsymbol{\theta=\frac{K(t)}{Y(t)} \Longrightarrow K(t) = \theta Y(t)}$**----------eq(6)**

Substituting eq(3) into eq(4) we obtain:

K(t+1)= K(t) - δK(t) + S(t)----------eq(7)

Substituting eq(5) into eq(7) we obtain:

K(t+1)= K(t) - δK(t) + sY(t)----------eq(8)

Substituting eq(6) into eq(8) we obtain:

θY(t+1)= θY(t)- δ θY(t)+ sY(t)----------eq(9)

Dividing both side by $\theta Y(t), we\ can\ get$

$$\frac{\mathbf{Y(t+1)}}{\mathbf{Y(t)}} = \mathbf{1} - \boldsymbol{\delta} + \frac{\mathbf{s}}{\boldsymbol{\theta}}$$

$$\frac{\mathbf{Y(t+1)}}{\mathbf{Y(t)}} - \mathbf{1} = \frac{\mathbf{s}}{\boldsymbol{\theta}} - \boldsymbol{\delta}$$

The left side of the equation indicates the growth rate, thus we replace it with g (growth rate)

$\mathbf{g=\frac{S}{\theta}-\delta}$,this is the Harrod-Domar growth model equation.

The final equation tells us about the direct relationship between growth and saving and inverse relationship between growth and capital-output ratio. To accelerate economic growth pushing saving and increasing the rate at which capital produce output (lowering capital-output ratio)

Rostow's stages of growth theory

Rostow's growth is also termed as stage growth theory, in which the society passes five distinct stages to join the advanced group. These stages are discussed below.

The traditional society

The initial identity of this section of the society is having limited production function. According to Rostow (1959), the traditional societies is a story of endless change, reflected in the scale and patterns of trade, the level of agricultural output and productivity, the scale of manufactures, fluctuation in population and real income. This group of society has inventiveness and innovations but technological backwardness becomes the bottleneck for them. They are characterized by: over 75% and above population leads their life by employing in agriculture and the income over and above the minimum dietary consumption is spent on nonproductive or low productive outlays.

The per-condition to take-off

The distinct identification of this stage is gradual evolution of science and modern scientific attitudes develop and innovation that comes with discover of new lands and discovery of old, covering with the impulse to create new technology at certain strategic points. Technically per condition for the industrialization has generally requires building up on social overhead capital, a technological revolution in agriculture, and expansion in import.

The take off stage

In this stage there have been seen limited achievements in some group of economy sectors. Such as cotton textile, rail roads, agricultural processing, ship building and repaid expansion in military outputs. In the takeoff stage in addition of building up on social overhead capital, agriculture technological revolution and expansion of import, increasing of entrepreneurs and technicians and institutionalizing the source of capital is necessary.

The drive to maturity

Rostow, defined the economic maturity as a period in which the society uses modern technologies in bulk. Here the leading sector is determined by the nature of resource endowments and government policies. In this stage the structure and quality of work force is change and the proportion of rural population reduce and the urban population rise.

The age of high mass consumption

The age of high mass consumption is characterized by three important aspects. 1) Increase security, welfare and leisure of the working class, 2) enlarged private consumption including single family home and durable consumer goods and services on mass basis and 3) Seeking for more economic and political power in world.

Endogenous growth theory

The theory holds that economic growth is primarily the result of endogenous and not external forces. Investment in human capital, innovation, and knowledge are significant contributors to economic growth. It also focuses on positive externalities and spillover effects of a knowledge-based economy which will lead to economic development. The endogenous growth theory primarily holds that the long run growth rate of an economy depends on policy measures. For example, subsidies for research and development or education increase the growth rate in some endogenous growth models by increasing the incentive for innovation (Wikipedia, Free Encyclopidia). Among the endogenous growth models the simplest and straight forward one is the AK model. The model is based on the assumption of constant returns to scale and constant returns to capital. Additional, the model assumes the only input, capital as factor of production. Algebraically:

$Y_t = f(k) = AK$---------- (1)

where; A is an exogenous constant, and K is capital.

If we assume capital accumulation over time the model can be rearranged to:

The capital accumulation is represented by, $\dot{K}=sK-\delta K$---------- (2)

Where; sK is investment and δK is depreciation

From equation (1), we have $A=\frac{Y}{K}$

From equation (2), $\frac{\dot{K}}{K}=s\frac{Y}{K}-\delta$

$\frac{\dot{K}}{K}=sA-\delta$---------- (3)

The key implications of the model are the economic growth rate positively associated to investment and negatively with depreciation, and no convergence among countries.

2.3.3 Economic Growth: Bases for Growth and Measuring Tools

Since economic growth is long lasting and complex process, different factors affects it. M.L.Jhingan (2007) identified economic and non-economic factors as determinant for economic growth. Under economic factors he listed natural resources, human resources, capital, enterprise, technology and under non-economic factors social institutions, political conditions and moral values.

Norman Loayza and Raimundo Soto (2002) when studying "the sources of economic growth" for Chile; identified the determinants of sustained growth from both macro and microeconomic aspect. In macroeconomic aspect the recognized source for growth are such as stabilization and basic structural reforms and microeconomic and regulatory policies. Additional they also fined technological adoption, market formation, and governance institutions as a source of growth.

On the Origin and Causes of Economic Growth Nicolas Roys and Ananth Seshadri Department of Economics, University of Wisconsin-Madison (2014), showed initial levels of human capital as a source of growth and large influence on development paths. According to them economies that began with a lower stock of human capital develop almost a century later than the economy that is begin with higher human capital. And they draw a conclusion that human capital can serve as both an origin as well as a cause of economic growth. In their wording,

> "Consider two children who possess the same years of schooling but have different parental human capital levels. Children with more highly educated parents earn substantially more than their counterparts who are raised by less educated parents even after controlling for schooling levels. The level differences in log earnings between these two children exactly identifies the spillover term."

Andrea Bassanini and Stefano Scarpetta (200I/II) by using econometric technique, they identified high speed with which countries seem to converge to their steady state growth path and the observed cross-country differences in GDP per capita levels may be largely the result of differences in steady-state levels rather than different positions of countries along similar transitional paths. In line with differences in investment rates and human capital as well as in R&D, trade exposure, financial structures and macroeconomic conditions and policy settings seem to play an important role for observed GDP per capita patterns across countries. “Changes in these factors can be rapidly translated into changes of living standards”.

Melville J.Ulmer, sees natural resource, capital accumulation, technology and population as the limits for economic growth. He also said, they establish at any time the maximum output a nation may achieve. “And as capital, technology and population grow, the over-all level of production is enabled to expand. Natural resource, capital accumulation, technology and population have been termed the real factors which determine the pace of economic growth simply because, in a physical sense, they establish its limit”. Additional he also identified financial organization as an essential key to economic achievements or progress over an extended period of time. He generalized the limits to a nation’s growth are established by the size and quality of its population, its accumulation of capital, technology knowledge and natural resources.

For W.Arthur Lewis (1957) the growth of output depends up on available natural resource and human behavior. The shortage of natural resources hinders the growth of output. The human actions are other important causes of growth. In his word human resources are the approximate causes of growth and contain three dimensions. The first one is the effort to economize by reducing the cost of production and or by increasing the yield (output) from any given input. “If the effort is not made, either because the desire to economize does not exist, or else because either custom or institutions discourage its expression, then economic growth will not occur”. Secondly, the source of growth is the increase of knowledge and its application. To Lewis learning process has long lasting history in human life, but its importance and influence on growth of output high in recent time. Higher output (economic) growth is gained from having more rapid accumulation and application of knowledge in production system. The third approximate cause for growth is increasing capital or other resources. Concluding his idea, the determining factors for growth are: the desire for goods and the cost of effort, economic

institutions (the right to reward, trade and specialization, and economic freedom), knowledge (the growth of knowledge, the application of new idea, and training programs), capital (capital requirement, saving and investment), population and resources including population and output and international relation and finally, government (the framework of enterprises, the public sector, power and politics).

Concluding the bases for an economy to grow are: human capital, investment rates in R&D, trade exposure, financial structures and macroeconomic conditions and policy, natural resource, capital accumulation, technology, population, financial institution, social institutions, political conditions and moral values etc.

2.3.4 Economic Growth: Measuring Tools

Economic growth is commonly measured as the annual rate of increase in a country's g GDP Philippe Aghion and Peter Howitt (2009). GDP can be nominal or real. "The value of goods and services measured at current prices nominal GDP. Real GDP is the value of goods and services, measured using a constant set of prices. That is, real GDP shows what would have happened to expenditure on output if quantities had changed but prices had not" Mankiw (2001). The difference between nominal and real GDP is no adjustment in price and adjustment in price. Per capita growth is the increase in per capita income of the country. It is obtained by dividing the total output of the country by total population. If the successive years GDP or per capita income of a country rise for long period, then we conclude that the economy of the country is grown. Thus, we can measure economic growth with GDP (in nominal as well as in real terms) and per capita income.

Empirical Literature Review

2.4 Investment, Its Efficiency and Economic Growth R/ship (Empirical Evidence)

While measuring national income in expenditure approach, investment is among the determining components. The investment made by government and or private sector is/are used during calculating GDP.

The investment rate has also effect on future growth rate of GDP. The higher or lower investment rate will makes the GDP to grow at higher or lower rate. The relationship between investment and GDP is not limited to level effect. The share of investment out of GDP also determines the amount of GDP. The ratio of the share of investment to GDP growth rate provides us incremental capital output ratio. Thus, the higher the share of investment and the lower the incremental capital output ratio mean the higher the GDP growth rate (Wikipedia free encyclopedia). Hence, the GDP growth rate depends on the efficiency of investment and the efficiency of investment depends up on the incremental capital output ratio. Overall, investment size and its efficiency can affect in one way or another way the GDP. Let us look some empirical evidences.

Wolassa L. Kumo (2012) in his study of "Infrastructure Investment and Economic Growth in South Africa" found relationships between economic infrastructure investment and GDP growth for the period 1960-2009. According to Kumo, economic infrastructure investment drives economic growth while the latter feeds back into enhanced investment in the former. He also found a causal relationship between economic infrastructure investment and public sector employment reflecting the role of such investments on job creation future investments.

Michael Greenstone and Adam Looney (2011) while studying the topic of "Investing in the Future: An Economic Strategy for State and Local Governments in a Period of Tight Budgets" for American economy tried in showing States and local governments prioritizing spending, making economically sound investments and implementing, required for future economic growth and prosperity.

Sumru Altug and Ünal Zenginobuz also found for Turkey economy, the ability to attain high and sustainable growth rates depend on ability to promote productivity enhancing investment. To this

end they recommend tax incentives. Comprehensive tax reform is needed to encourage investment, risk-taking and entrepreneurship. Additional, "…..substantial simplification of the overall structure and major across-the-board reductions in tax rates appear to be essential also for attracting foreign direct investment".

Abdul Khaliq and IlanNoy (2007) concluded that, leaving aside the sectorial level, at aggregate level, FDI have a positive effect on economic growth for Indonesian economy.

Maaida Hussain Hashmi, Waqar Akram and Amara Amjad Hashmi (2012), while studying "Investment role in the Course of Economic Growth of Pakistan", distinguished between public and private investments effect on economic growth. They found in long run public as well as private investments have a positive impact on economic growth. They also showed the higher impact of private investment in growth than the public one. In short-run the private investment positively influences the growth but there was negative and insignificant effect of the public investment and government consumption expenditure on the growth.

Duo Qin, Marine Anne Cagas, Pilipinas Quising and Xin-Hua He (2005) in there question of "How much does investment drive economic growth in china?" found long-run positive relationship between investment and economic growth.

Teshome Ketema (2006) while by studying the impact of government spending on economic growth of Ethiopia found the complementarity of investment and economic growth. He also differentiates between public and private investment and showed more productivity of private investment over public one.

Siraj Mustefa (2014) "Public and private investments have significant long run impact on economic growth of the country. 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".

Tefera Fekadu (2015), studied the impacte of foreign capital inflow on economic growth in ethiopian case for period of 23 years applying cointgeration method and by using Eviews5 and

STATA12 econometric tools, resulted in foreign direct investment has significant and positive impact on economic growth.

Kanu, Success Ikechi & Ozurumba, Benedict Anayochukwu (2014), tried to explore the assocation between capital formation and economic growth in Nigeria economy for the period of 1981-2011 and found a number of results by applying econometric techniques such as Phillip Perr on unit root test, Johansen co-integration test and ordinary regression analysis. Among the results the first one is significant positive relationship between economic growth and gross fixed capital formation both in short and long runs andrecommend the government of Nigeria to reprioritize the needs and spend more on capital expenditures as against the current trend of 68% recurrent and 32% capital expenditures allocations. “Efforts must be made to mobilize the desired level of gross national savings that could be big enough to attract foreign direct investments, this is very vital as FDI will help to complement our domestic savings”.

Sylvanus I. Ikhide (1992), studied Financial Deepening, Credit Availability and the Efficiency of Investment for Selected African Countries with objective to examine the role of deposit interest rates in the process of financial deepening, the supply of loanable funds and the enhancement of the efficiency of investment and found a result of positive real interest rates do enhance the efficiency of investment.

Hualun Zhang, Wei Song, Xiaobao Peng and Xiaoyan Song (2012), evaluate the investment efficiency in China by Using Data Envelopment Analysis in order to provide a detailed regional analysis of investment inefficiency. They used five variables (Fixed- asset investment, Net fixed asset of industry, Number of employee of industry, GDP and Value-added of industry) and provincial-panel data for the period 2003-2008 in their study. Based on the empirical results, they found investment and its efficiency are a driving force for growth of some east province such as Jiangsu and Guangdong, while the over-investment does exist in some west provinces such as Guizhou, Qinghai, Ningxia and Xinjiang. That is in there wording “in east provinces there is significant positive correlation between the decrease of investment and efficiency and in west negative correlation between the investment decreasing and performance improving”.

Ugwuegbe S. Ugochukwu and Uruakpa Peter Chinyere (2013) when studying the impact of capital formation on the growth of Nigerian economy identified the short run as well as long run

positive effect of capital formation in economic growth and recommended effort to be under taken to increase the level of capital formation for future growth.

Hiroyuki Taguchi and Suphannada Lowhachai in their work of “A Revisit to the Incremental Capital-Output Ratio: The Case of Asian Economies and Thailand” examined the trend in the incremental capital-output ratio (ICOR) and its relationship with per capita GDP and GDP growth rate. They utilize the panel and time-series data and identified the association between ICOR and GDP per capita and GDP growth rate. In their conclusion we obtain the following sentences. “The panel data analysis confirmed that the gross ICOR had a positive correlation with per capita GDP and a negative association with GDP growth rate as expected in a theoretical model. The time-series analysis verified that the net ICOR was positively correlated with per capita GDP”.

2.5 Investment, its Efficiency and Economic Growth current trend in developing countries

Developing countries were considered to be either traditional societies or working towards pre-take off stage. In order to take off, these countries needed sufficient investment which could take place only with the help of domestic and foreign saving Rostow (1959).

Africa has not been able to reduce its high rate of poverty substantially, partly because it has not been able to increase its stock of capital as quickly as other regions. Slow capital accumulation implied low rates of economic growth and low income per capita, limiting the effect of economic growth on poverty reduction Janvier D. Nkurunziza (2014). The previous statements reflect the importance of investment to reduce poverty. Arguing with this Cory Booker quoted: “For an economy built to last we must invest in what will fuel us for generations to come. This is our history - from the Transcontinental Railroad to the Hoover Dam, to the dredging of our ports and building of our most historic bridges - our American ancestors prioritized growth and investment in our nation's infrastructure”.

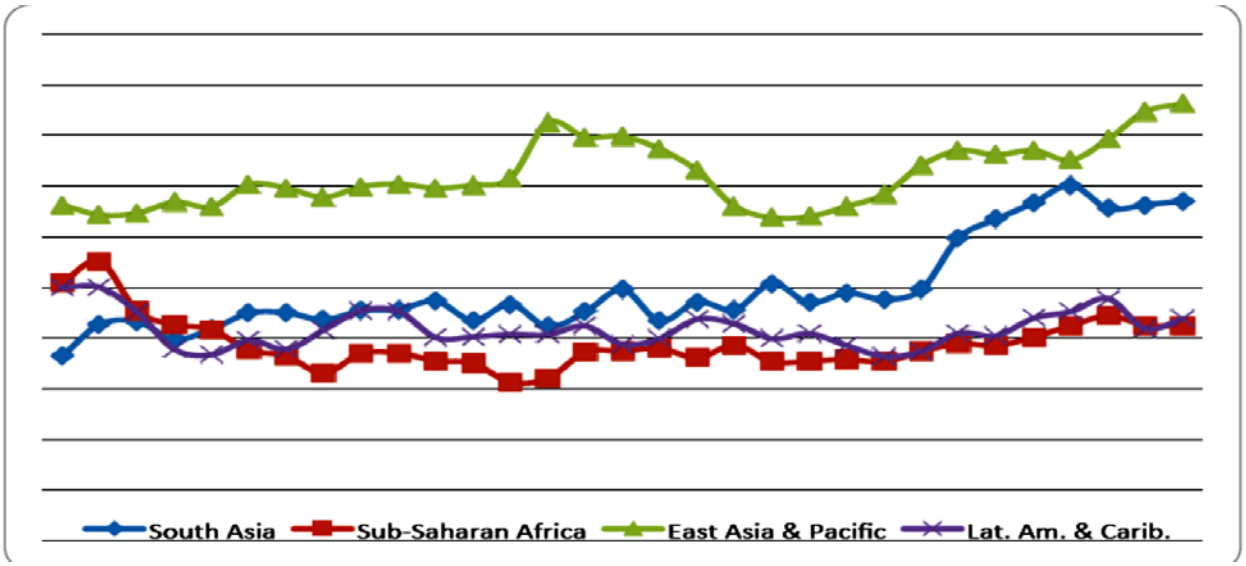
In economics literatures especial in issues related to economics of growth and development, we have many economic growth and development models. Among these, a model named “the Two Gap Model” which is developed by Hollis Chenery and Michael Bruno is an analysis about

capital requirements for economic growth. The gaps are: (1) **The Savings Gap** where savings fall short of what can be effectively and productively invested. (2) **The Foreign Exchange Gap** where earnings of foreign exchange fall short of the amounts needed to purchase the necessary foreign materials, components, etc.

William Easterly (1999) explained two important features of this model: (A) investment requirements to achieve a given growth rate are proportional to the growth rate by a constant known as ICOR. (B) Aid requirements are given by the "Financing Gap" between the investment requirements and the financing available from the sum of private financing and domestic saving.

Thus increasing investment through up lifting domestic saving and attracting FDI is primary requirement to bust growth. According to Janvier D. Nkurunziza (2014), in developing countries the ratio of investment to GDP increased from about 16 percent in 2000 to 22 percent in 2009 before falling to 20 percent of GDP in 2010.

Figure 2.1: Investment trends in developing regions (1980-2010)

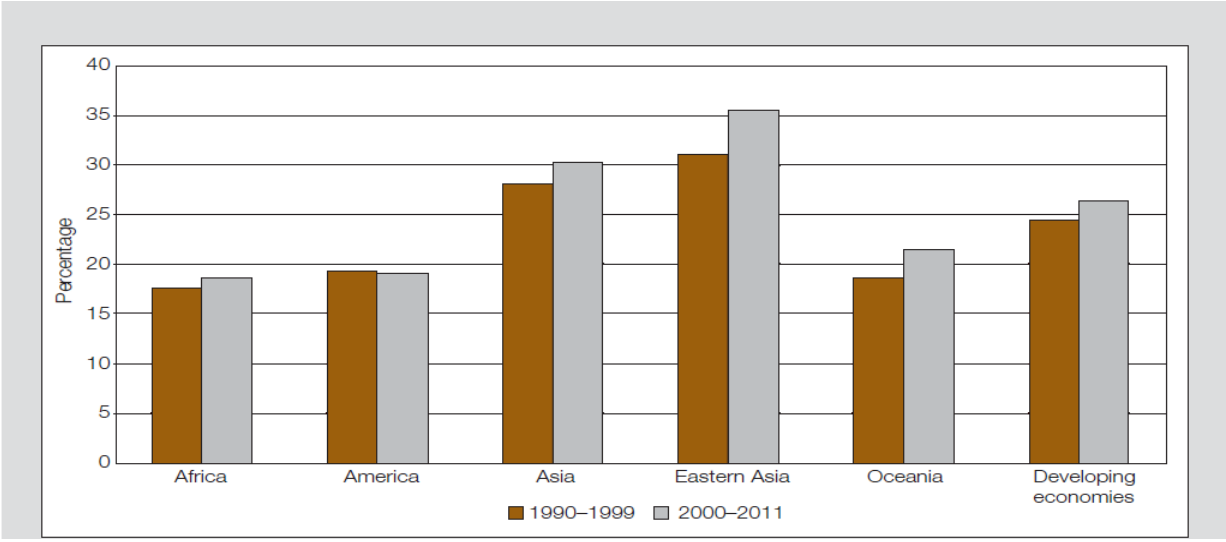


Source: Capital Flight and Poverty Reduction in Africa Janvier D. Nkurunziza

The current world investment report by UNCTAD also shows increasing of investment (especial FDI) in the regions. The FDI flow to developing economies reached a new high at $778 billion, accounting for 54 per cent of global inflows. While looking Africa, FDI inflows to Africa rose by 4 per cent to $57 billion, driven by international and regional market-seeking and infrastructure

investments. Expectations for sustained growth of an emerging middle class attracted FDI in consumer oriented industries, including food, IT, tourism, finance and retail UNCTAD (2014).

Figure 2.2: Investment rate across developing regions



Source: UNCTAD

Another issue found by Ricardo Gottschalk (2000) is, increasing investment efficiency. To remain consistent with much higher growth rate and halving poverty by 2015 the developing countries requires changes in efficiency of capital. This shows that increasing trend of investment is the beginning for fostering growth but is not the end. To make the economy move continuous and reduce poverty the focus should not be only the quantity of investment, its quality or efficiency is also to be considered.

In line with this, UNCTAD (2014) in its report of Economic Development in Africa reemphasis this idea by saying:

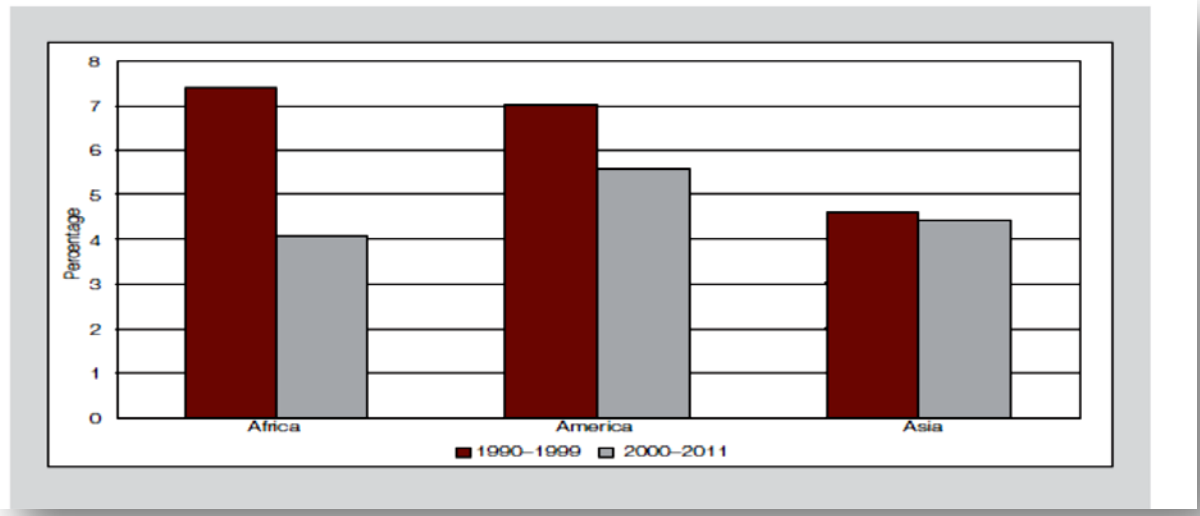
> *While investment is important to the development process, it should be noted that it is a necessary and not a sufficient condition for economic transformation and sustained growth. In this regard, if African Governments want investment to play an effective role in supporting economic transformation and development, the focus should not be solely on boosting the quantity of investment to levels deemed necessary to meet national development goals. They also have to address two related issues. The first is how to ensure that* ***investment is allocated to strategic or priority sectors,*** *particularly*

infrastructure, agribusiness and manufacturing. Increasing investment and not allocating it to sectors crucial to achieving Africa's economic transformation agenda will be counterproductive. The second issue African Governments have to address is how to improve the ***quality or productivity of investment****. Therefore, improving the productivity of investment should be part of efforts to boost investment and use it in support of economic transformation in Africa.*

Thus, to take off the economy of developing countries from its traditional set up increasing efficiency of investment is another issue.

The current tendency of ICOR (the measurement of efficiency) for both developing countries and Africa is show declining trend (i.e. increasing efficiency of capital) (see the graph below). A study by UNCTAD found ICOR value for developing countries more than 6 for the 1990 - 1999 and this value fall to around 4.5 in the period of 2000-2011. For Africa the value is around 7.4 and 4.1 for period between 1990-1999 and 2000-2011 respectively.[2]

Figure 2.3: ICOR across developing countries



Source: UNCTAD

[2] The values of ICOR for developing countries are presented in graph form and I converted the graphical values to their respective assumed approximate value for purpose of numeric comparison.

The economic growth trend of developing countries is more or less improving trend at current time. A report from UN, World Bank, IMF, and other international and intercontinental organizations confirms the improved economic situation of this region. The 2015 world economic situation and prospects report reported the increase of economies of developing countries. According to this report “Growth rates in developing countries and economies in transition have become more divergent during 2014, as a sharp deceleration occurred in a number of large emerging economies, particularly in Latin America and the Commonwealth of Independent States” UN (2015). African Economic Outlook 2013 “Structural Transformation and Natural Resources” shows how African economy is continuously rising against when the global economy is in tricky, African Economic Outlook (2013).

Chapter Three:
Data Presentation and Analysis

3.1 Investment, Its Efficiency and Economic Growth Trend (2000-2014)

A brief note

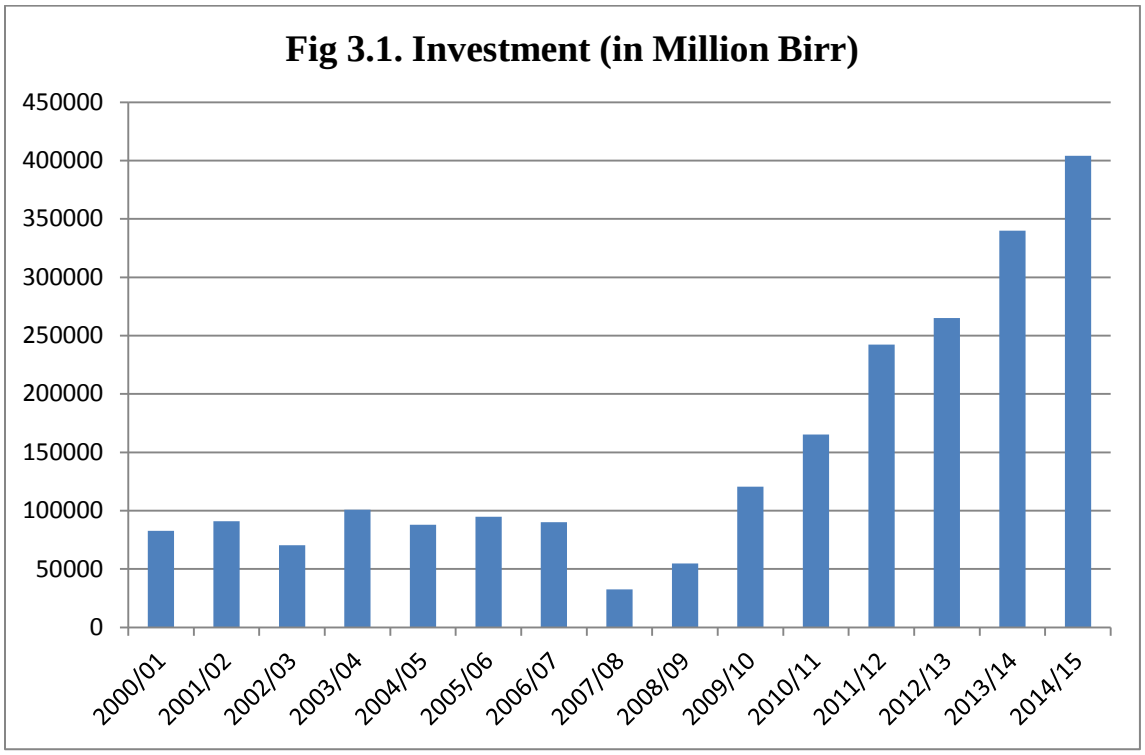
One can divide the post over through of the Durg government (after the 1991/92 political alteration) into three sub-periods: the transitional era, from 1991/92 until 1999/00; the period of Ethio-Eretria war and economy reform from 2000/01 until 2001/02; and finally, the period of structural adjustment and reforms from 2002/3 until the present (or 2014/15). Again the period of structural adjustment and reforms may be classified to three, based of economics program adopted. The period of Sustainable Development and Poverty Reduction Program (SDPRP) (2002/03 -2004/05), The period of Plan for Accelerated and Sustained Development to End Poverty (PASDEP) (2005/06-2009/10) and The period of the first five year Growth and Transformational Plan (GTP) (2010/11-2014/15).[3]

As presented in literature section investment efficiency is measured by incremental capital output ratio, which is the ration of investment share to GDP growth rate. The ICOR is calculated based on the data of both real GDP and percentage of gross value of capital formation (Annual share of investment in GDP) at constant market price index. In Ethiopia the publication of GDP data by MoFED was started in 2000/01. Thus, the coming discussions are based on the official data of GDP and investment at constant market starting from 2000/01.

The quantitative part of investment (gross capital formation) shows improvement as years goes. The trend is increasing for majority of the period. The investment amount at the beginning SDPRP (2002/03) is Birr 70,402.1 million and increased to Birr 94,724.9 million by 2005/06 (when PASDEP implementation is began). The amount is reached Birr 165,380.0 million by 2010/11. As presented in chart 1, the investment amounted Birr 82,703.5 million by 2000/01 becomes more than four times by 2014/15; the amount is lifted to Birr 404,220.1 million. The higher amount of investment in period between 2000/01 and 2014/15 is due to the creation of an enabling environment for the participation of the private sector and increase of government

[3] The periodical classification is just for analysis purpose.

investment in sectors of infrastructure and human resource development. The share of private investment in total gross investment increased from 50.1% in 2001/02 to 61.7% in 2011/12 (MoFED, 2014). Its average growth rate for the period of 2000/01 – 2010/11 is 16.06%. When we compare this amount of growth with Africa average growth rate of 6.6, the performance is too impressive one.[4]



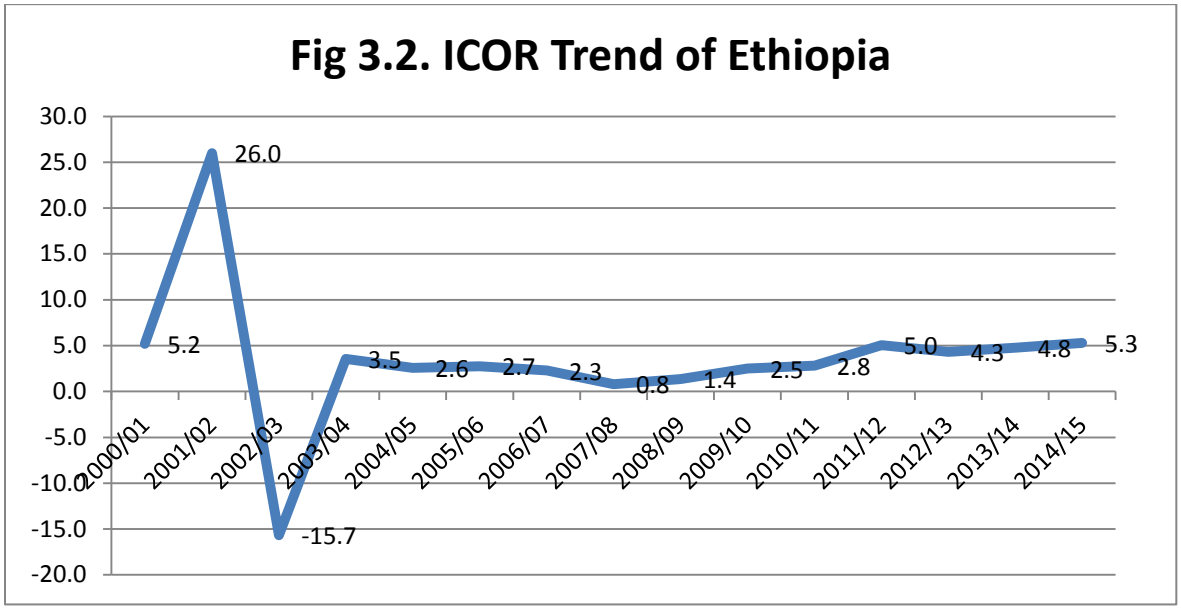
Source: Charted based on MoFED data

When we look at the qualitative part of investment, we have investment efficiency; as discussed before the efficiency of investment is measured by ICOR.

Between the years 2000/01 and 2002/03, the economy was characterized by declining rate. The ICOR curve (as presented in fig 2) and its value (at Annex 1) for the period shows unusual trend. It attains the highest elevation of 26 and lower of negative 15.7. The first value indicates

[4] Low investment rates are especially prevalent in a broad range of African countries. For example, over the period 2000 to 2011, the following countries had average investment ratios below 15 per cent: Angola, the Central African Republic, the Comoros, Cote d'Ivoire, Guinea-Bissau, Liberia, Libya, Nigeria, Sierra Leone, Swaziland, and Zimbabwe. Economic Development in Africa Report 2014. (UNCTAD 2014).

inefficient investment and the second value has no economic meaning. This is because; during this period the economy was at recovery after Ethio-Eretria war. Subsequently, in 2003/04 due to the actions taken by the government to recuperate the economy, the growth rate of the economy is increasing in sustained manner. Tasks performed to implement SDPRP, PASDEP and GTP I, makes the economy to growth at average rate of 9.8 and the ICOR is 1.7 for the period of 2002/03 -2014/15.



Source: Graphed based on MoFED data and own computation

While looking the average trend by dividing in to three plan periods, it amounted negative 3.2 for SDPRP, 1.9 for PASDEP and 4.5 for GTP I. As presented in the table below the higher ICOR attachment with lower growth rate and lower ICOR with higher growth rate, proves the theoretical arguments.

Table 3.1 ICOR and average GDP growth rate for three different plan periods

Period	average ICOR	average GDP growth rate
SDPRP (2002/03-2004/05)	-3.2	7.4
PASDEP (2005/06-2009/10)	1.9	11.0
GTP I (2010/11-2014/15)	4.5	10.1

Source: Tabulated based on MoFED data and own computation

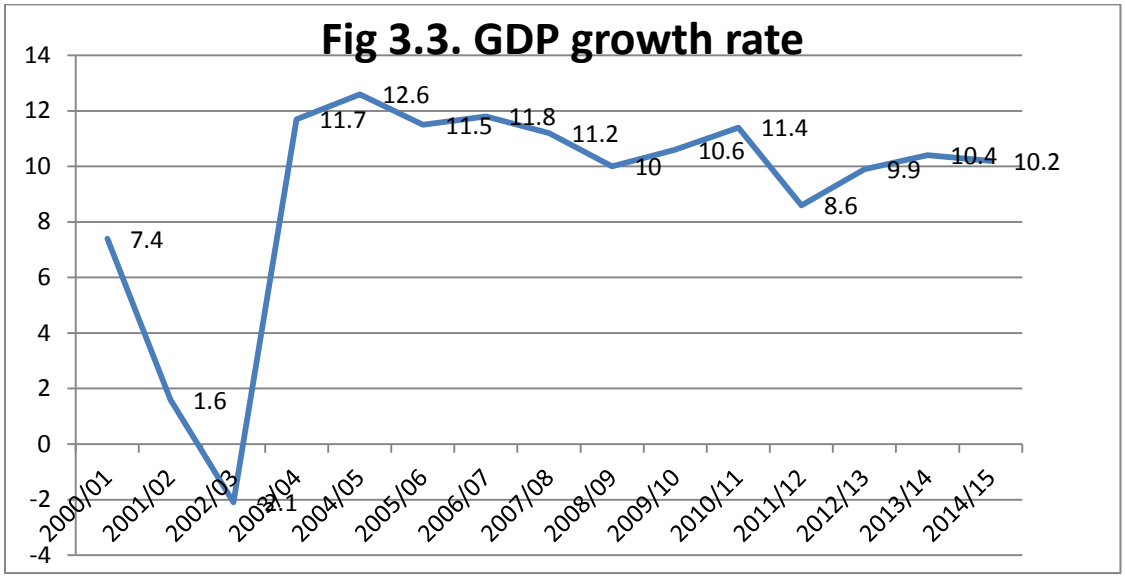
When comparing Ethiopia's investment efficiency with other developing and African average, the Ethiopia's value shows higher efficiency. A study by UNCTAD found ICOR value for developing countries is around 4.1 in the period of 2000-2011. For Sub-Saharan Africa the value is 5.5 and for East Africa the value amounts 4.9. For the same period the ICOR value is 3.3 for Ethiopian economy.

Table 3.2 ICOR in Developing, Sub-Saharan African, East Africa and Ethiopia

Regions	periods	
	1990-1999	**2000-2011**
Other developing	4.5	4.1
Sub-Saharan Africa	7.7	5.5
East Africa	5.9	4.9
Ethiopia	2.43	3.3

Source: UNCTAD (2014) and own Computation based on data from MOFED

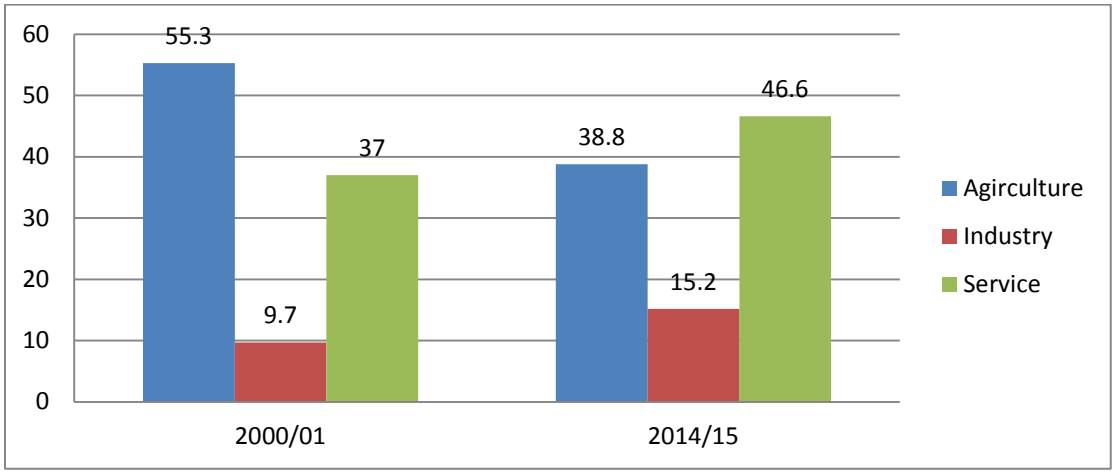
While looking the economic growth, between 2000/01 and 2014/15, the economy of the country is performing in a healthier manner. The real GDP increases from Birr 198,320.8 million to Birr 714,300.0 million. When we look at the growth rate, the economy grows at faster rate. The country's economy grows by 7.4 percent in 2000/01 and 10.2 in 2014/15. In three plan periods on average the economy grown by almost 10 percent.



Source: Graphed based on MoFED data

In terms of sectorial structure, the performances of three major sectors are shows increasing performance for most of the years. The GDP growth rate by major industrial classification at constant basic prices is, by 2000/01 agriculture 9.6, industry 5.1 and services 5.2 by 2014/15 the amount is shifted to, 5.4, 21.2 and 11.9 agriculture, industry and services respectively. Also the shares of the sectors from GDP show some changes. The share of agricultural sector declines from 55.3 percent in 2000/01 to 38.8 percent in 2014/15. On the other hand the share of both industry and service sector increases from their amount for the period 2000/01. The industrial sector increase from 9.7 percent in 2000/01 to 15.2 percent and the share of service moves from 37 percent to 46.6 percent in the same period.

Fig 3.4. Percentage Distribution of GDP by Major Industrial classification



Source: Graphed based on MoFED data

While looking the trend by dividing in to three plan periods, during SDPRP average investment, average ICOR and average GDP growth rate are Birr 86,409.9 million, -3.2 and 7.4 percent respectively. The investment amount in average becomes Birr 283,385.0 million during GTP I period, and shows Birr 196,975.1 million difference between three periods. The ICOR and GDP growth rate also demonstrate positive changes.

Table 3.3. Average Investment, ICOR and GDP growth rate at three planning periods			
Period	**SDPRP (2002/3-2004/5)**	**PASDEP (2005/6-2009/10)**	**GTP I (2010/11-2014/15)**
Average Investment in million Birr	86,409.90	78,611.22	283,385.0
average ICOR	-3.2	1.9	4.5
Average GDP growth rate	7.4	11	10.1

Source: Tabulated based on MoFED Data and own computation

The ICOR moves from -3.2 to 4.5 and the GDP growth rate move from 7.4 percent to 10.1 percent on average. As presented in the table above the higher ICOR attachment with lower growth rate and lower ICOR with higher growth rate, proves the theoretical arguments.

Thus, through period; investment and economic growth shows improved trends and the incremental capital-output ratio also displays good result compered to Africa average for the period of 2000-2011.

3.2 Investment, Its Efficiency and Economic Growth: Relationship

3.2.1 Data sources and description

In this study the main sources of data are the MoFED and NPC. Data on Gross domestic product (GDP) and gross investment are basic and from them the ICOR, the other variable used in the regression analysis is derived. The ICOR value for each year is calculated based on Harrod-Domar model of growth.

The value of GDP and investment for the year between 2015/16 – 2019/2020 is obtained from GTP-II macroeconomic projection, which shows the expected performance of the overall economy in coming five years. In models going to be developed, the GDP, I and ICOR represent Gross Domestic Product, Investment and Incremental Capital-Output Ratio respectively and GDP assumed the dependent variable and I and ICOR are independent variables.

The length of the time series data used in the analysis ranges from 2000/01 to 2014/15.

3.2.2 Testing the basic classical linear regression assumptions and others

Before we are going to discuss the existing relationship among three variables, let see the behaviors of our data. Since we are going to see the association among variables, it is necessary to develop econometric models that are fit with classical linear regression assumption and other necessary tests for the data at hand.

As presented in chapter one in section of data analysis the paper is going to apply simple and multiple regression for data analysis. But, before undertaking regression and interpreting results, it is mandatory to test for important assumptions and others tests.

Assumption 1: Zero mean assumption $E(\varepsilon i)= 0$. This assumption requires the average value of the constant term to be zero. While runing regression this assumption will never be violated if the regression equation contains a constant term. Thus, the calculated mean of error terms for three models are approximately zero (see the appendix for more detail). The sum of error for the first model is 0.000000199, for the second model it becomes 0.0000000954 and for the third model it becomes 0.00000035. Thus, the models fulfill the zero mean assumption, as the numbers displayed are approximates zero.

Assumption 2: Homoscedasticity or equal variance of εi. Heteroscedasticity means the presence of different variances of the error term. In classical linear regression model we assume that the error term have constant variances over all observation (homoscedasticity). Thus, when the assumption of classical linear regression is violated we face the problem of the heteroscedasticity. Heteroscedasticity mean existence of disparity (increase or decrease) of variance between different observations.

Symbolically, $Var(\varepsilon_i) \neq Var\ (\epsilon_j)$ i $\neq j$

Given the value of I and ICOR, the variance of εi must be the same for all observations of I and ICOR. That is, the conditional variances of εi are to be identical.

Symbolically, we have:

var (εi |*Ii*) = σ^2,
var (εi |ICOR*i*) = σ^2,
var (εi |I*i*,ICOR*i*) = σ^2, where **var** stands for variance.

To see the result for this assumption the paper follows the Breusch-Pagan/Cook-Weisberg test. The result of the test shows absence of heteroscedasticity problem. The Breusch-Pagan/Cook-Weisberg test P-values of 0.1027 for the model with GDP and investment, 0.5634 for GDP and ICOR and 0.1150 for the model which uses both investment and ICOR. Based on the p-values of test (Breusch-Pagan/Cook-Weisberg) which are greater than alpha (of 5%), we conclude that there is no problem of heteroscedasticity in the models.

Assumption 3: No autocorrelation between the disturbances. Autocorrelation mean the existence of correlation among disturbance (error) terms. Given any two X values, Xi and Xj (i ≠ j), the correlation between any two ui and uj (i ≠j) is zero.
Symbolically,
cov (ui, uj |Xi, Xj) = E{[ui − E(ui)] | Xi} {[uj − E(uj)] | Xj}
= E(ui |Xi)(uj | Xj)
= 0, where i and j are two different observations and where cov means covariance. The above equation postulates that the disturbances ui and uj are uncorrelated. Technically, this is the

assumption of no serial correlation, or no autocorrelation (Gujarati 2004). The classical leaner regression model assumes no auto, or serial, correlation in the error terms.

Our data for three models show no autocorrelation. The STATA result for corrgram tests shows AC (autocorrelation) is falling for all variables (GDP, investment and ICOR) shows absence of autocorrelations problem.

Assumption 4: states that the disturbance ε and explanatory variables are uncorrelated. Zero covariance between εi and I*i* and ICOR*i*, or E(εiI*i*), E(εiICOR*i*) E(εiI*i*ICOR*i*) = 0. I and ICOR are non-stochastic variables whose values are fixed and individual as well as together uncorrelated to respective error terms. The STATA correlation result proves this fact.

Table 3.3. STATA result of Correlation between error term and independent variables

```
. corr investment e
(obs=15)

             | invest~t      e
-------------+------------------
  investment |   1.0000
           e |   0.0000   1.0000

. corr icor ei
(obs=15)

             |     icor       ei
-------------+------------------
        icor |   1.0000
          ei |   0.0000   1.0000

. corr investment icor eii
(obs=15)

             | invest~t     icor      eii
-------------+---------------------------
  investment |   1.0000
        icor |   0.1380   1.0000
         eii |   0.0000  -0.0000   1.0000
```

Source: Tabulated based on MoFED Data and own computation

Assumption 5: There is no perfect multicollinearity: Multicollinearity is observed in multiple regression model among different independent variables. It is the presence of linear relationship among all or some of the explanatory variables in a regression. This assumption is about absence

of perfect linear relationships among the explanatory variables. The STATA output of vif command after the regression is used to check for multicollinearity. vif stands for variance inflation factor. As a rule of thumb, a variable whose VIF values are greater than 10 and average VIF greater than 6 may merit for multicollinearity. Tolerance, defined as 1/VIF, is used too to check on the degree of collinearity. A tolerance value lower than 0.1 is comparable to a VIF of 10. It means that the variable could be considered as a linear combination of other independent variables. Thus, the STATA result for multicollinearity between I and ICOR is 0.138 and the VIF (the variance inflation factor) and 1/VIF results are 1.02 and 0.980956 respectively. Morover, the auxiliary regression results of investment on icor and icor on investment value of cofficient of determination (R^2) is less than the R^2 obtained from overall model. Thus, both results are support absence of perfect multicollinearity (multicollinearity is not a serious problem in the data).

Assumption 6: Normality Assumption: The other assumption of the regression model is that residuals should behave 'normal'. The residuals (in appendix indicated by the letter "einvestment", "eicor" and "eboth") are the difference between the observed values GDP and the predicted values $\widehat{GDP}$. The Shapiro-Wilk test shows normality of the data. The test results for three models are Shaipro-Wilk W of 0.93647 and P-values of 0.34000 for simple regression with investment, 0.92452 and 0.2257 for simple regression with ICOR and 0.95543 and 0.61352 for multiple regression model. Thus, since our P-value is higher than alpha value of 0.05, the data are normal.

Stationarity and Unit Roots

In economic research involving time series data, all variables in the model have to be tested for their stationarity. A data series is said to be stationary if its error term has zero mean, constant variance and the covariance between any two – time periods depends only on the distance or lag between the two periods and not on the actual time which it is computed (Harris, 1995).

There are various statistical tests for the detection of non-stationarity. The unit root approach has become a widely popular approach to test for stationarity. There are several ways of testing for the presence of a unit root. This includes Dickey-Fuller (DF) test, Augmented Dickey-Fuller (ADF) test, and Philips-Peron (PP) test. In this study the researcher is going to employ the

Augmented Dickey-Fuller (ADF) test to determine the existence of a unit root. The Augmented Dickey-Fuller (ADF) test approach states the null hypothesis as the series is non-stationary, against the alternative of stationarity.

The Augmented Dickey-Fuller (ADF) test test result for time series data of GDP, I and ICOR shows stationarity for GDP, I and ICOR with MacKinnon approximate p-value of 1.0000 and 0.9829 and 0.5684 respectively with lag period two.

3.2.3 Empirical Results and Interpretation

Based on the results of assumptions, (as all the required assumptions of classical linear regression model as well as other necessary assumptions are fulfilled) the paper will proceed to undertake regression analysis. Both simple and multiple regression will be employed for the analysis. The simple regression analysis is applied to show how real GDP behave against investment and ICOR individual and the multiple regression is for discussing how investment and ICOR together affects the GDP.

The relation between GDP and investment

The hypothesises established is:

- Ho: Investment has significant impact on economic growth.
- HA: Investment have no significant impact on economic growth.

The last fifteen year data employed in this paper shows the existing effect of investment on GDP growth (economic growth). The P-value for the model is P<0.0000; show how the investment affects significantly the economic growth.

GDP = 181.8 + 1.3I
(34.82) (0.18)

Where,

- GDP Gross Domestic Product and
- I stands for investment

The R square for this model is 78.8 percent. That means about 79 percent of GDP is determined by investment and the remaining 21 percent is by other variables. Moreover, the relationship observed from the linear regression equation reflects a one Birr investment increase leads to an increase of GDP by Birr 183. This implies that, investment has higher positive impact in country's economy and the government should work more in attracting foreign as well as domestic investors. Thus, based on our results, investment has significant impact on economic growth. Therefore, we accept the H_0.

The relation between GDP and ICOR

The hypothesises established is:

- Ho: Investment efficiency has significant impact on economic growth.
- HA: Investment efficiency have no significant impact on economic growth.

The result of the analysis show ICOR has no significant effect on GDP. The STATA result of P-value which is about 0.9363 is much higher than the alpha value of 0.05, which reflects in the country's economy the impact of ICOR is inconsequential.

GDP = 375.48 – 0.77ICOR
(48.58) (5.69)

Where;

- GDP is defined as usually and
- ICOR is for incremental capital-output ratio.

The R square for this model is 0.0014 percent. This means GDP is not affected by ICOR for the periods. The GDP for the period between 2000/01 to 2014/15 is determined by other factors such as consumption, export, import, etc. not by ICOR. Concluding, the relationship between investment efficiency and economic growth is insignificant. And we reject our H_0 and accept the H_A (Investment efficiency have no significant impact on economic growth).

The relation between GDP, Investment and ICOR

The hypothesises established is:

- Ho: Investment and its efficiency have significant impact on economic growth.
- HA: Investment and its efficiency have no significant impact on economic growth.

The multiple regression result of our data is:

GDP = 185.48 + 1.33I – 1.77ICOR
(36.05) (0.19) (2.70)

Where,

- GDP, I and ICOR are defined as before.

The STATA result for multiple regression show together I and ICOR significantly affect the GDP. The P-value of the result is 0.0001 and which is lower than our alpha value. The R square is about 79.5 percent. That shows 80 percent of GDP for the period is determined by I and ICOR. The remaining percentage is determined by other variables. When we look the significance of individual independent variables, the P-value of I is 0.000 and the P-value of ICOR is 0.526. As we see before, investment has significant effect on GDP and ICOR has no significant effect. Thus, from the above equation we can say, keeping ICOR constant, a Birr increase in investment leads to increase of GDP

by amount of Birr 186.81. It is also possible to say a Birr increase in I and a unit increase in ICOR makes the GDP to increase by 185.04. Thus, the overall effect of I and ICOR on GDP is significant and we accept our H_o (Investment and its efficiency have significant impact on economic growth).

3.3 Investment, Its Efficiency and Economic Growth: Prospect

In this short section the paper going to present how the future movements of GDP, I and ICOR be in the coming five years period. The macroeconomic projection for the year between 2015/16 – 2019/2020 is already done by NPC when developing the GTP-II. The projection show the expected performance (in birr, percentage share and growth rate) of the overall economy (GDP, consumption (private and government), investment, export, import, saving, resource balance, etc.) in coming five years. Having this data, the future trend of ICOR is estimated.

The investment projection (prospect) for the coming five year shows increasing amount. As the projection show the investment is expected to be Birr 563.6 billion in 2015/16, Birr 701.7 billion by 2016/17, Birr 868.0 billion by 2017/18, Birr 1067.7 billion by 2018/19 and it projected to become Birr 1302.6 billion by end of GTP-II (2019/20). On average the investment is expected to grow at rate of 21.8 percentages and its average annual share is projected to 39.9 percent (GTP-II).

Coming to investment efficiency (ICOR), the result from the projection data predicts the ICOR is expected to increase. As presented in figure 3.2 the ICOR of the base year (2014/15) is about 4.5 and the own computation based on projection data show the ICOR to be 3.8 by 2019/20. This implies that plan of action to increase the efficiency of investment.

In the coming five years the economy of the country is expected to grow on average by 11 percent. The GDP is expected to shift from Birr 773.2 billion by 2015/16 to Birr 1174.0 billion by 2019/20. While looking the sectorial expected growth rate, the agriculture and allied activities are planned to growth by 8 percent, industry 20.0 percent and the service by 10.0 percent on average. The distribution of the sectorial share reflects as there be planned to increase the share of industry and to reduce the share of the agriculture.

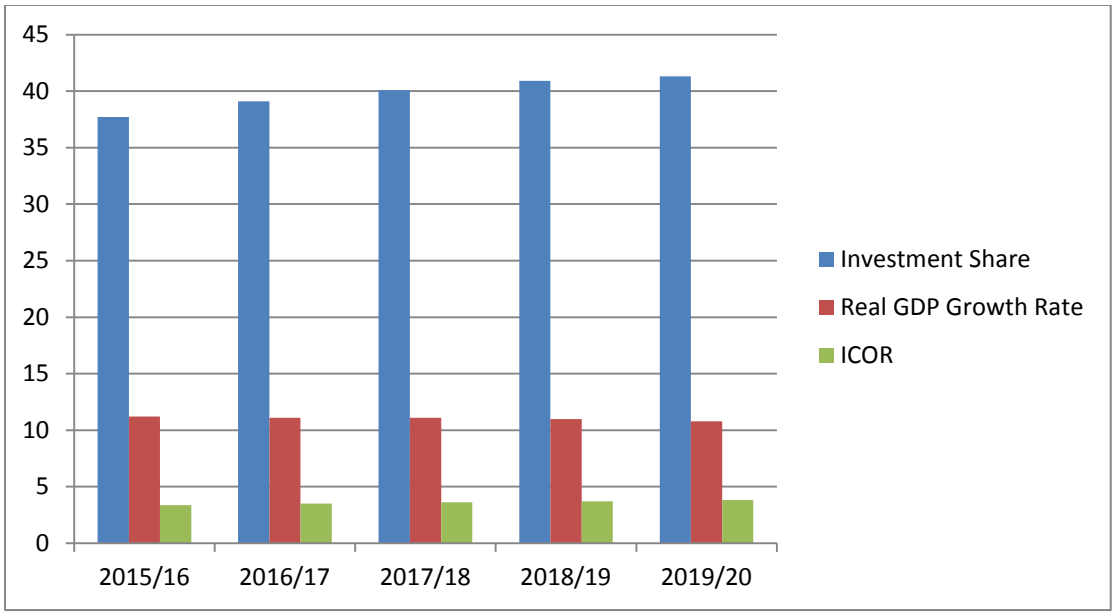
Table 3.4. GTP II (2008-2012) Supply Side Projections Percent Share in GDP

Sector	2015/16	2016/17	2017/18	2018/19	2019/20	Average
Agriculture and allied	37.5	36.4	35.4	34.4	33.5	35.4
Industry	16.6	18.0	19.4	20.9	22.3	19.4
Service	46.0	45.6	45.2	44.8	44.3	45.1

Source: NPC

Over all, the investment is expected to grow at higher rate and the GDP is expected to grow at almost in constant trend. The ICOR expected to decrease i.e., it become more efficient.

Fig 3.6. Investment, GDP growth rate and ICOR prospect for the period of 2015/16 – 2019/20



Source: NPC and own computation

Chapter Four:
Conclusion and Policy Recommendation

4.1 Conclusion

The economy performance of a given country is observed from different directions. The total GDP, per-capita income, HDI, consumption expenditure, investment, import and export are among traditional mirrors to look the overtime trend of an economy. This performance is determined by different socio-economic and political factors. The Ethiopian economy is performing bitterly since 2000/2001. Hence, examining the past and future movements as well the existing relationship between investment, its efficiency and economic growth in Ethiopia is the main objective of this thesis.

Different authors and publications explain the terminologies of investment, its efficiency and economic growth. There are also a number of theories which are fully explains them and the determining factors that influence their performance. We have also measuring tool for each of them.

Based on different research outputs, the paper disclosed the empirical evidence on the existing relationship between them. Research works with topics of investment and economic growth, investment role in courses of economic growth, investment, incremental capital-output ratio and economic growth, others, shows existing association between the dependent economic growth and the independents, i.e. investment and ICOR.

The paper also presented their trend from point of view of developing countries. Hence, it would be appropriate to analyze the trend of, existing relationships between and the future prospects of investment, its efficiency and economic growth in Ethiopia.

The trend of investment is increasing one for most of the years in the period. By 2000/2001 the investment amount is Birr 82,703.5 billion and by 2014/15 it becomes Birr 404,220 billion. Though for most of the period the investment is efficient, but currently it demonstrates increasing trend. The ICOR is 5.2 and 5.3 for the same time period. The economy growth rate is some what attractive one. For the last fifteen years, the country registered an average growth rate of more than 9 percent.

While looking at their relationship; the statistical result of investment and economic growth both in simple as well as multiple regression shows higher association between investment and economic growth. The influence of (investment efficiency) ICOR is insignificant for the time being.

Coming to the issue of future trend (the prospect movements) of three variables, both investment and economic growth are expected to grow on average by 21.8 percent and 11 percent respectively. The ICOR part is expected to become more efficient than before. It is expected to move from 5.3 for 2014/15 to 3.8 by the end of 2019/20.

In sum, the past and the expected future trend of investment and economic growth are performing in better manner and the affiliation between them is also decent. Concerning ICOR, though some improvements are observed in last fifteen years and also expected to be more than before, but the current atmosphere for is not worthy. And its contribution for economy growth is insignificant.

4.2 Policy Recommendation

The study has provided empirical evidences on the trends, relationships and prospects of investment, its efficiency (of course measured using ICOR) and economic growth in general. These empirical findings highlight some useful policy and theoretical implications for development.

One immediate implication of the analysis is that expanding both public and private investment and improving its efficiency through refining the bottlenecks in the current investment policy, incentive methods, bureaucratic system, etc. are basic to attract investors and sustain the growth.

Moreover, investment in sectors such as roads, rail and ports, power stations, water and sanitation, food security (agriculture and rural development), climate change mitigation and adaptation, health and education is to be priority, to reduce poverty.

The other issue is, the government should give hands to improve efficiency within the economy. That is, enlightening the business environment, increasing accountability of state enterprises, and

improving monitoring system on public investments, etc. is necessary to make the invested investment to be more productive.

Finally, Janvier d.Nkurunziza identified increasing investments in infrastructure sector would increase the productivity of capital and leading to lower ICORs, therefore investing in infrastructure should get main concern.

Reference

Books, Publications and Articles

A & C Black, Dictionary of Economics, London.

Abdul Khaliq and Ilan Noy, (2007) Foreign Direct Investment and Economic Growth: Empirical Evidence from Sectorial Data in Indonesia.

Andrea Bassanini and Stefano Scarpetta (2001)The Driving Forces of Economic Growth: Panel data evidence for the OECD countries, Economic Studies No. 33, 2001/II.

C.S.Nagpal Anmol, Dictionary of economics. New Delhi, India, 2004.

Donald W.Moffat (1976) Dictionary of economics, 2nd ed.

Dornbusch and Fischer (1978) macroeconomics sixth edition

Duo Qin, Marine Anne Cagas, Pilipinas Quising and Xin-Hua He (2005) "How much does investment drive economic growth in china?", Queen Mary, University of London

H.L.Bhatia (1980) History of Economic Thought, 2nd revised edition, vikas publishing house pvy.ltd.

Harris, R.I.D. (1995), "Using Co-integration Analysis in Econometric Modeling, Simon and Schuster International Group", England.

Harry Landreth and David C. Colander, History of Economic Thought. Houghton Mifflin Company. 4th ed.

Hiroyuki Taguchi and Suphannada Lowhachai in their work of "A Revisit to the Incremental Capital-Output Ratio: The Case of Asian Economies and Thailand".

Hualun Zhang, Wei Song, Xiaobao Peng, Xiaoyan Song (2012), "Evaluate the Investment Efficiency by Using Data Envelopment Analysis: The Case of China", American Journal of Operations Research.

Indira Gandhi National Open University press, Economics of growth and development, Economics Growth Models.

James R. Crotty (1993) Neoclassical and Keynesian approaches to the theory of investment.

Janvier D. Nkurunziza (2014), Capital Flight and Poverty Reduction in Africa.

Jeffrey Parker (2009)Theories of Investment Expenditures.

Johan E Eklund (2013)Theories of Investment: A Theoretical Review with Empirical Applications.

John Black (1997) Oxford dictionary of economics, oxford university press.

Jürgen Georg Backhaus (2012) Handbook of the History of Economic Thought, Insights on the Founders of Modern Economics.

Kanu, Success Ikechi & etal (2014), Capital Formation and Economic Growth in Nigeria, Global Journal of HUMAN-SOCIAL SCIENCE: Economics, Volume 14 Issue 4 Version 1.0.

Karnatl Lingaiah (2001) Economic growth and development models, S.Chand & Company ltd. Ramnagar, New Delhi.

M.L.Jhingan (2007), the economics of development and planning, 39th revised edition, Vrinda Publication (P) LTD.

Maaida Hussain Hashmi, Waqar Akram and Amara Amjad Hashmi (2012),Role of Investment in the Course of Economic Growth in Pakistan, International Journal of Academic Research in Economics and Management Sciences.

Mankiw, N.Gregory. 2001. Macroeconomics.5th.Edition. New York: Worth.

Melville J.Ulmer, Economics Theory and Practice Second Edition, Houghton Mifflin Company, Boston.

Michael Greenstone and Adam Looney Investing in the Future: An Economic Strategy for State and Local Governments in a Period of Tight Budgets, STRATEGY PAPER 2011. The Hamilton Project America.

MoFED (2010) The federal democratic republic of Ethiopia Growth and Transformational Plan I, Addis Ababa.

MoFED (2013) National Economic Accounts Statistics of Ethiopia, Addis Ababa.

MoFED (2014) Ethiopia: Review of Macroeconomic Development (2002-2012), Addis Ababa.

Nathalie Bernasconi-Osterwalder and Lise Johnson (2010), The Belgium's Model Bilateral Investment Treaty.

Nicolas Roys and Ananth Seshadri (2014) On the Origin and Causes of Economic Growth Department of Economics, University of Wisconsin-Madison.

Norman Loayza and Raimundo Soto, etal (2002) Economic Growth: Sources, Trends, and Cycles, by Central Bank of Chile.

NPC (2015) The federal democratic republic of Ethiopia Growth and Transformational Plan II, Addis Ababa.

OCED (2002) DAC working paper, Aid Evaluation, Glossary of key terms in evaluation

and results based management.

Philippe Aghion and Peter Howitt (2009) The Economics of Growth, the MIT Press.

Ranadev Banerji, (1968) An Experimental with incremental capital-output ratio. Research Memorandum No.14.

Ricardo Gottschalk (2000), Growth and Poverty Reduction in Developing Countries: How Much External Financing will be needed in the New Century? Institute of Development Studies, University of Sussex.

Siraj Mustefa (2014), Private Investment and Economic growth Evidence from Ethiopia, Mekelle University, a published Masters of Art Thesis.

Sumru Altug and Ünal Zenginobuz, What has been the Role of Investment in Turkey's Growth Performance?

Sylvanus I. Ikhide 1992, Financial Deepening, Credit Availability and the Efficiency of Investment for Selected African Countries United Nations Economic Commission for Africa.

Tefera Fekadu (2015), Indira Gandhi National Open UNIVERSITY, a published Masters of Art Thesis.

Teshome Ketema (2006) The impact of government spending on economic growth: the case of Ethiopia, Addis Ababa University, 2006, a published Masters of Art Thesis.

The Government of Japan and The Government of The Republic of Korea (2002) Agreement between the government of Japan and the government of The Republic of Korea for the liberalization, promotion and protection of investment.

Ugwuegbe S. Ugochukwu and Uruakpa Peter Chinyere (2013), The Impact of Capital Formation on the Growth of Nigerian Economy, Research Journal of Finance and Accounting.

UNCTAD (2004), The International Investment Agreements Key Issues. Volume I.

UNCTAD (2014), Economic Development in Africa.

UNCTAD (2014), World Investment Report.

W. Arther Lewis, (1957) The theory of economic growth third edition, Geogre Allen and Unwin LTD.

W.W.Rostow, (1959) The stages of economic growth. The Economic History Review, vol.12, no.1.

William Easterly, the Ghost of Financing Gap. Testing the Growth Model Used in the International Financial Institutions.

Wolassa L. Kumo Infrastructure Investment and Economic Growth in South Africa: A Granger Causality Analysis, African development bank group, working paper series 2012.

World Bank Group (2010) The Investment Law Reform handbook for development practitioners, Investment Climate Advisory Services I.

Web pages

- http://en.wikipedia.org/wiki/Incremental_capital-output_ratio.
- http://economywatch.com/economicstatistics/economicindicators/Investment_Percentage_of_GDP/ .
- http://www.blog.kpmgafrica.com/africas-top-10-fastest-growing-economies/
- http://www.investopedia.com/terms/e/economicgrowth.asp
- Investopedia
- Wikipedia free encyclopedia

Appendixes

Appendix-1

Investment, Investment Share, GDP Growth Rate and ICOR for period between 2000/01 - 2014/2014

year	Investment in Billion Birr	Investment Share	GDP	GDP Growth rate	ICOR
2000/01	82.7	38.4	198.3	7.4	5.2
2001/02	90.9	41.6	201.6	1.6	26
2002/03	70.4	32.9	197.3	-2.1	-15.7
2003/04	100.7	41.5	220.5	11.7	3.5
2004/05	88.1	32.4	248.4	12.6	2.6
2005/06	94.7	31.5	277	11.5	2.7
2006/07	90.3	26.9	309.7	11.8	2.3
2007/08	32.5	8.7	344.3	11.2	0.8
2008/09	54.9	13.6	378.9	10	1.4
2009/10	120.7	26.5	418.9	10.6	2.5
2010/11	165.4	32.1	475.6	11.4	2.8
2011/12	242.3	43.3	517.0	8.6	5
2012/13	265.2	42.9	568.4	9.9	4.3
2013/14	339.9	49.8	627.1	10.4	4.8
2014/15	404.2	54.0	691.0	10.2	5.3

Appendix-2.

Appendix-2.1 STATA Report for GDP and Investment

```
. reg gdp investment
```

Source	SS	df	MS	Number of obs =	15
Model	299787.478	1	299787.478	F(1, 13) =	48.31
Residual	80669.3291	13	6205.33301	Prob > F =	0.0000
				R-squared =	0.7880
				Adj R-squared =	0.7717
Total	380456.808	14	27175.4863	Root MSE =	78.774

gdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
investment	1.313902	.1890335	6.95	0.000	.90552	1.722284
_cons	181.8033	34.82284	5.22	0.000	106.5731	257.0334

```
. predict e, resid

. swilk e
```

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
e	15	0.93647	1.232	0.412	0.34000

```
. sum e
```

Variable	Obs	Mean	Std. Dev.	Min	Max
e	15	-1.99e-07	75.90847	-99.63696	124.9635

```
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of gdp

         chi2(1)      =     2.66
         Prob > chi2  =   0.1027
```

Appendix-2.1 Cont.

```
. corr investment e
(obs=15)
```

	invest~t	e
investment	1.0000	
e	0.0000	1.0000

```
. vif
```

Variable	VIF	1/VIF
investment	1.00	1.000000
Mean VIF	1.00	

```
. corrgram investment
```

LAG	AC	PAC	Q	Prob>Q	[Autocorrelation] -1 0 1	[Partial Autocor] -1 0 1
1	0.7199	1.2119	9.4402	0.0021		
2	0.4578	-0.1118	13.551	0.0011		
3	0.2353	-0.1453	14.728	0.0021		
4	0.0053	0.0251	14.728	0.0053		
5	-0.1294	0.6697	15.155	0.0097		

```
. dfuller investment, lag(2)

Augmented Dickey-Fuller test for unit root         Number of obs   =        12
```

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	0.439	-3.750	-3.000	-2.630

```
MacKinnon approximate p-value for Z(t) = 0.9829
```

Appendix-2.2 STATA Report for GDP and ICOR

```
. reg gdp icor
```

Source	SS	df	MS		
Model	546.601375	1	546.601375	Number of obs	= 15
Residual	379910.206	13	29223.862	F(1, 13)	= 0.02
				Prob > F	= 0.8933
Total	380456.808	14	27175.4863	R-squared	= 0.0014
				Adj R-squared	= -0.0754
				Root MSE	= 170.95

gdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
icor	.7786194	5.693229	0.14	0.893	-11.52085	13.07809
_cons	375.4896	48.58585	7.73	0.000	270.5262	480.4529

```
. predict ei, resid

. swilk ei
```

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
ei	15	0.92452	1.463	0.753	0.22570

```
. sum ei
```

Variable	Obs	Mean	Std. Dev.	Min	Max
ei	15	-9.54e-08	164.7314	-194.1337	311.3837

```
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of gdp

         chi2(1)      =     0.33
         Prob > chi2  =   0.5634
```

Appendix-2.2 Cont.

```
. corr icor ei
(obs=15)
```

	icor	ei
icor	1.0000	
ei	0.0000	1.0000

```
. vif
```

Variable	VIF	1/VIF
icor	1.00	1.000000
Mean VIF	1.00	

```
. corrgram icor
```

LAG	AC	PAC	Q	Prob>Q	-1 0 1 [Autocorrelation]	-1 0 1 [Partial Autocor]
1	-0.4178	-0.4195	3.179	0.0746		
2	-0.0026	-0.2526	3.1791	0.2040		
3	0.0007	0.0918	3.1791	0.3648		
4	-0.0007	0.0156	3.1791	0.5283		
5	0.0188	0.0946	3.1882	0.6710		

```
. dfuller icor, lag(2)

Augmented Dickey-Fuller test for unit root         Number of obs   =        12
```

	Test Statistic	Interpolated Dickey-Fuller: 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	-1.429	-3.750	-3.000	-2.630

```
MacKinnon approximate p-value for Z(t) = 0.5684
```

Appendix-2.3 STATA Report for GDP, Investment and ICOR

```
. reg gdp investment icor
```

Source	SS	df	MS		
Model	302562.932	2	151281.466	Number of obs =	15
Residual	77893.8758	12	6491.15631	F(2, 12) =	23.31
Total	380456.808	14	27175.4863	Prob > F =	0.0001
				R-squared =	0.7953
				Adj R-squared =	0.7611
				Root MSE =	80.568

gdp	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
investment	1.331517	.1952057	6.82	0.000	.9062	1.756833
icor	-1.771462	2.709106	-0.65	0.526	-7.674097	4.131173
_cons	185.4876	36.05874	5.14	0.000	106.9224	264.0529

```
. predict eii, resid

. swilk eii
```

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
eii	15	0.95543	0.864	-0.289	0.61352

```
. sum eii
```

Variable	Obs	Mean	Std. Dev.	Min	Max
eii	15	3.50e-07	74.59121	-109.7384	122.7921

```
. hettest

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of gdp

         chi2(1)      =     2.48
         Prob > chi2  =   0.1150
```

Appendix-2.3 Cont.

```
. corr investment icor eii
(obs=15)
```

	invest~t	icor	eii
investment	1.0000		
icor	0.1380	1.0000	
eii	0.0000	-0.0000	1.0000

```
. vif
```

Variable	VIF	1/VIF
icor	1.02	0.980956
investment	1.02	0.980956
Mean VIF	1.02	

```
. reg investment icor
```

Source	SS	df	MS		
Model	3307.00861	1	3307.00861	Number of obs	= 15
Residual	170348.068	13	13103.6976	F(1, 13)	= 0.25
				Prob > F	= 0.6238
				R-squared	= 0.0190
				Adj R-squared	= -0.0564
Total	173655.077	14	12403.9341	Root MSE	= 114.47

investment	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
icor	1.915171	3.812297	0.50	0.624	-6.320797	10.15114
_cons	142.6959	32.53404	4.39	0.001	72.41038	212.9814

```
. reg icor investment
```

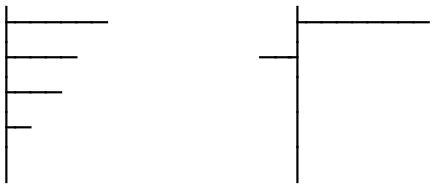
Source	SS	df	MS		
Model	17.1699157	1	17.1699157	Number of obs	= 15
Residual	884.443411	13	68.0341086	F(1, 13)	= 0.25
				Prob > F	= 0.6238
				R-squared	= 0.0190
				Adj R-squared	= -0.0564
Total	901.613327	14	64.4009519	Root MSE	= 8.2483

icor	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
investment	.0099435	.0197934	0.50	0.624	-.0328174	.0527045
_cons	2.079845	3.646238	0.57	0.578	-5.797373	9.957063

Appendix-2.3 Cont.

```
. corrgram gdp
```

LAG	AC	PAC	Q	Prob>Q	[Autocorrelation] -1 0 1	[Partial Autocor] -1 0 1
1	0.7996	1.1181	11.644	0.0006		
2	0.6020	-0.2991	18.752	0.0001		
3	0.4052	0.0613	22.241	0.0001		
4	0.2211	-0.0475	23.374	0.0001		
5	0.0477	-0.0534	23.432	0.0003		



```
. dfuller gdp, lag(2)

Augmented Dickey-Fuller test for unit root         Number of obs   =        12
```

	Test Statistic	Interpolated Dickey-Fuller 1% Critical Value	5% Critical Value	10% Critical Value
Z(t)	3.522	-3.750	-3.000	-2.630

```
MacKinnon approximate p-value for Z(t) = 1.0000
```