

***Impacts of National Saving On Economic Growth In Ethiopia***

*A Thesis Submitted To School Of Graduate Studies In Partial Fulfillment Of The Award of The Masters Of Science In Economics (Specialized In Economic Policy Analysis) Degree*

By:

**ASSEFA BEKELE**



**JIMMA UNIVERSITY  
COLLEGE OF BUSINESS AND ECONOMICS  
DEPARTMENT OF ECONOMICS**

**MAY 30, 2016  
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By:

**ASSEFA BEKELE**

Under the Guidance of

Dr. Wondaferahu Mulugeta

And

Ato Yilkal Wassie



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**Approval Sheet**  
**Members of The Board Of Examiners**

External Examiner

Signature

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Internal Examiner

Signature

Date

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Advisor

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Co-advisor

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MAY, 2016  
JIMMA, ETHIOPIA

## CERTIFICATE

*This is to certify that the thesis entitles “Impacts of National Saving on Economic growth: In the case of Ethiopia”, submitted to Jimma University for the award of the Degree of Master of Science in Economics (MSc) and is a record of bonafide research work carried out by Mr. Assefa Bekele Yomeso, under our guidance and supervision. Therefore, we hereby declare that no part of this thesis has been submitted to any other university or institutions for the award of any degree or diploma.*

Main Advisor’s Name

Signature

Date

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\_\_\_\_\_

\_\_\_\_\_

Co-advisor’s Name

Signature

Date

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## **DECLARATION**

I hereby declare that this thesis entitled “Impacts of National saving on Economic Growth: In the case of Ethiopia”, has been carried out by me under the guidance and supervision of Dr. Wondaferahu Mulugeta and Ato Yilkal Wassie

The thesis is original and has not been submitted for the award of any degree or diploma to any University or institutions.

Researcher’s Name

Signature

Date

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### *Abstract*

*It has robust investigated the impacts of national saving on economic growth in Ethiopia by using time series data from 1974 to 2013. In this study has been given attention to identify the long run and short run as well as causality direction reaction of national saving on economic growth in Ethiopia by the help of ARDL bound test approach and ECM framework to examine the variables relationship. The empirical result revealed that gross national saving rate (GNSR), government consumption expenditure (GCE), and trade openness (TO) are found statistical significant impacts on economic growth. But inflation rate approximated by consumer price index (CPI) are statistical insignificant impacts on economic growth and bi-directional granger cause between national saving and economic growth in Ethiopia.*

*In addition to, in the short run, except consumer price index (CPI) the rest of the explanatory variables are such as gross national saving (GNS), government consumption expenditure (GCE) and trade openness (TO) found statistical significant effects on economic growth in Ethiopia. The speed of adjustment has a magnitude 0.45680 with negative sign that implied the convergence of economic growth model towards long run equilibrium. The overall finding of the study underlined the uses of raising the level of saving habit in a sustainable aspect, that of well-organized scheme of financial institution and financial policy has been adopted and intensify react for economic growth. Therefore, the reaction way of financial policy for saving mobilization is very crucial*

**Keywords:** *Economic growth, National saving and ARDL bound test approach.*

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## LIST OF ACRONYMS

|       |   |
|-------|---|
| ADF   | Augmented Dickey and Fuller                 |
| ARDL  | Autoregressive distributive lagged          |
| CSA   | Central Statistics Authority                |
| CV    | Critical Value                              |
| DW    | Durbin Watson                               |
| ECM   | Error correct model                         |
| ECT   | Error Correction Term                       |
| FDRE  | Federal Democratic Republic of Ethiopia     |
| GTP   | Growth transformation plan                  |
| LDCs  | Less developing countries                   |
| IMF   | International monetary fund                 |
| MoFED | Minister of finance and economy development |
| MRW   | Mankiw, Romer and Weil                      |
| NBE   | National Bank of Ethiopia                   |
| NBER  | National Bureau of Economic research        |
| OLS   | Ordinary least square                       |
| PP    | Phillps and Perrson                         |
| RGDP  | Real gross domestic product                 |
| SBC   | Schwartz- Bayesian criterion                |
| SSA   | Sub-sharan Africa                           |
| UEC   | Unrestricted error correction               |
| UNDP  | United nation development program           |
| VECM  | Vector error correction model               |
| WB    | World Bank                                  |

# CHAPTER-ONE

## INTRODUCTION

### 1.1 Background of the study

Direct policies for promoting saving are important, even if the capital accumulation may follow rather than lead the growth process, evidence suggest that sustaining high rates of growth requires substantial levels of physical capital accumulation. And to the extent a country faces binding lending constraint in the international capital markets or external balance conditionally (imposed by bilateral and external donors), national saving will derive aggregate investment; hence influence the prospect for sustainability of growth (Johan et. al, 2004).

Traditionally, many Economists have been worried about the connection between saving and capital accumulation. If recurrently inadequate rate of saving reduce investment, then the economy must shadow a Growth path on which output, income, productivity, and wage are all lower than they would be in a more frugal society. When an individual fails to save he, jeopardizes his own economic security, following retirement, serious illness, or involuntary job loss, he may well find that his resources are insufficient to maintain his comfortable standard of living and at time he may involvement significant hardship. Inadequate rate of saving also been blamed for a diversity of chronic macroeconomic problem (Bernheim, 19991)

Crossways countries Developed saving rates tends to go hand in hand with higher income growth. A circumstance that has been taken as resistant of the presence of both virtuous cycles of saving and prosperity and poverty traps of inadequate saving and stagnation. The social value of saving would exceed its private value because of imperfection in international financial market: a national saving rate broadly in line with the economy's investment rate reduce vulnerability to sudden shift in worldwide capital flow driven by uncontrollable force. We understood that in international financial market illustrates, low saving and high current account deficit can exacerbate the likelihood, and the antagonistic effects of capital flow (Loayza et. al, 2000).

According to (Dawit, 2005) that the macroeconomic theory believes that economic growth is substantially affected by the rate of investment which in turn is highly influenced by the rate gross national saving. However, the past summery overviewed trend shows the average national

saving rate as share to GDP has declining trend from past regime to current regime that is period 1970/71 to 1973/74 25%, 1974/75 to 1990/91 20% and 1991/92 to 2010/11 19% seen over time. Although, This because of behavior of governments that is having role to economic performance (Yohannes, 2014).

According to World Bank (2012) based on high level of public investment has been associated with strong economic growth delivered notable progress. During 2004-11 Ethiopia experienced strong and general broad based real economic growth averaging around 10.6 percent per year. However, the development model adopted by government of Ethiopia relies heavily on high level of large government led investment (like the Asian model of development), but faces low saving rate and limited availability of domestic resource unlike the Asian model.

Over the last three year, has been a recorded significance improvement in domestic saving mobilization in Ethiopia, but the gap between the investment requirements and the level of domestic saving remains huge. To narrow this gap using the strategies way to creating new job opportunities and introduce of new saving schemes to further stimulate saving behavior of the youth that will be pursued in the upcoming period to increase domestic savings (MOFED, 2014)

The national saving has significant role in financial sector when in creating capital and hence, insuring sustainable economic growth, and then saving come to leading. When savings fall short of filling the investment gapes, hence the countries expose to external source of finance such as loan, aid and foreign direct investment. And hence, evaluating the co-movements of the growth of the country and is national savings is informative while assessing whether the economic growth of the country is laid a strong base or not (Tsegaye, 2013).

The growth of the labor force was exogenously given while growth in the capital stock was inevitable because the saving ratio was taken as an absolute constant. As long as real income was positive, positive net capital formation must result. Furthermore, if savings can fall to zero when income is possible for net investment to cease and for the capital stock at least to become stationary (Solow, 1956).According to the theory of marginal propensity to save, the increasing of income are reinforced the saving expand. As experiences of economic crisis, if the country

has sufficient high rate of domestic saving, so it would not need the external saving which make a country expose to the uncontrollable risk from the world economic crisis.

Based on report of the World Bank development indicator (World Bank, 2012)the recent Ethiopia's development policies are obviously inspired by the achievement of East Asian countries and exacting the two high growth countries from the Republic of Korea and the Republic of China. However the development in the saving rate in Ethiopia was Basic variation compare to two countries. Moreover, it is numerically registered in both East Asian countries were ahead of 25 percent of GDP and even close to 45 percent of GDP in the cause of China (in Vietnam 28.3 percent of GDP). In contrast, in Ethiopia the gross domestic saving rate was a get together 3.2 percent in the period between 2004 and 2010.

## **1.2 Statements of the problem**

Developing countries have lack of sufficient domestic resource to build economic capacity. It is sounded by (Adom and Elbahnasawy, 2014) stated that main constraint facing in developing countries is saving gap which is, they are characterized by serious constraint to accelerate economic growths which cause from low saving rate.

Ethiopia being one of the developing countries' that is characterized by serious constraint to accelerate economic growth that cause from low saving rate. Therefore, the country should need improving saving habit to fill financial gap and meet demands of investment that accelerate sustainable economic development. Moreover, the major problem facing in Ethiopia in her attempt for accelerated growth and development is lack of capital formation. Inadequate capital formation has been caused for adverse effect on the output level of the economy through undertaking real investment. This was resulted from non-availability of credit to replace worn-out capital-stock and addition to existing ones.

The works out of saving rate habit in Ethiopia have been very low and even if, declined over time. It is sounded by (Abu, 2004) that during study period 1960-2003 the average domestic saving rate has been only 5.4 percent GDP, not only was the average saving rate has been low

relative to incomes , it show evidence of a decline trend. Further, the average saving rate was about 14 percent of GDP during the period 1960/-1974 and declined to nearly 7 percent during the Dergue regime and fall downed to about a get together 3.6 percent during the period 1991-2002. Moreover, the up to date rate of saving is too low by the country's possess position and comparative to other developing countries. It is not sufficient finance alternate necessity for capital depreciation allow unaccompanied to net investment.

To design an appropriate policy in Ethiopia, it is important to understand the process of significant affecting level of national saving with efficiency of investment on economic growth. Perhaps, gross national saving and economic growth rate have been low in Ethiopia over year, hence the effects of national saving types a small proportion of real GDP of country. Possibly, due to facts that government, policy makers and other stakeholders in the Ethiopia economy are awake of the positive relationship between national saving and economic growth rate on the basis of economic theory but uninformed of the point of view significant affecting of national saving on economic growth. As a result, should understand affecting level of national saving rate. While there become visible to exist effects of national saving to economic growth, the question is national saving has its own importance that positively affecting, accelerating economic growth in Ethiopia. Some of its own questions need explanations on the impacts of national saving on economic growth in Ethiopia are;

- ✚ Does national saving affects economic growth in Ethiopia positively?
- ✚ Does national saving accelerate economic growth?

Such question should need to provide the answer for policy implication in Ethiopia.

Concerning this topic the study has been not conducted so much. However, according to (Dawit, 2005 Shimelis, 2014) that has been detected only causal relationship between gross domestic saving and economic growth in Ethiopia. Our study employ to give explanation that rising debate about short and long run effects of national saving on economic growth by help of the empirical analysis of macroeconomics variables for Ethiopia.

Generally this study has tried to explain whether national saving has positive and significant impacts on economic growth in Ethiopia i.e. whether it has significantly assisted the country in

filling financial gap and meet demands of investment, And rising aggregate saving and investment, enhance economic Growth. Finally, the paper has made an effort to fill up this gaps and make payments to the shocks of saving on economic growth literature, more purposely would attempt to examine from policy perspectives the extent and track of such variables.

### **1.3 Objectives of the study**

The main objective of this study has been to explored impacts of national saving on economic growth in Ethiopia. To achieve the main objective the study has attempted;

1. Show the trend of national saving and economic growth
2. Examine the long and short run effects of national saving on economic growth
3. Identify causality direction relationship between national saving and economic growth.
4. Provide feasible recommendations to improve saving habits of Ethiopia

### **1.4 Significance of the study**

Understanding the contribution of national saving rate to belongs' sectors of the economy would help the country undertake essential processes for sustainable economic growth with its fully exercise benefits. Before now, the study has been not conducted so much concerning impacts of national saving on economic growth. But few studies have been conducted regarding the relationship between domestic saving and economic growth in Ethiopia. Among others (Dawit, 2005 Shimelis, 2014) are mentioned. However, (Dawit, 2005) discovered only on the causal relationship between domestic saving and economic growth in Ethiopia. But this study provide an empirical magnitude involvement of the national saving on economic growth which could be important to understand of proportion of the overall investment that is inspired to the economic growth in the saving habit. Furthermore, the study examine the long run and short run effect of national saving on economic growth, as well as wants to identify unfortunate direction of causality between the two variables, in doing so, this study has given the gap in literature arising from absence of comprehensive study in the Ethiopia context.



## **1.5 Scopes of the study**

This study has been analyzed the impacts of national saving on economic growth in Ethiopia for period 1973/74 to 2013/14. The study focuses on short run and long run effects of national saving and other macroeconomics variables on economic growth. Further, identify the national level of impacts of aggregate saving rate on economic growth but pay no attention to in disaggregate level of saving effects which is on the public, private and cooperative level for the variables.

## **1.6 Limitation of the Study**

Getting a robust, an accurate and reliable data set for macroeconomics time-series could be one of the blazing issues that highly limit the economic research in Ethiopia and may be other developing countries. Furthermore, the accuracy of data is again the limitation of the study which is inconsistent of the data collected on the same variable from different institution is different figure. The major difference is between the data provided by government and non-government/international organization. The reason may be the use of different method and assumptions is preparation of the macro-variables. The researcher used only governmental source of data such as the Ministry of Finance and Economic development (MoFED), National Bank of Ethiopia (NBE) to minimize the variations as the raw data mainly originate from these offices.

## **1.7 Organization of the study**

The study is organized as follows such as; In section two theoretical and empirical literature review; in section three describe data type, data source, methods of analysis and model specification of the body methodology in section four overview of Ethiopia economy and trends of economic growth with other macroeconomic variables, in section five reports of empirical results and discussion, In section six conclusion and providing policy recommendation.

# CHAPTER-TWO

## THEORETICAL AND EMPIRICAL REVIEW

### 2.1 Theoretical Literature

National saving is the sum of private saving and government saving. Private saving is private income minus tax minus private consumption and government saving is government tax revenue minus government spending.

$$SN = SP + SG$$

$$SP = Y - T - C$$

$$SN = Y - C - G$$

$$SG = T - G$$

In another expression, over a period is the change in its net foreign assets on the rest World:

$$CA_t = B_{t+1} - B_t = Y_t + r_1 B_t - C_t - G_t - I_t, \quad SY = Y_t + r_t B_t - C_t - G_t$$

National saving in excess of domestic capital formation flows in to net foreign asset accumulation (Obstfeld and Rogoff, 1996).

National saving is a dynamics component of the story of the driving shift in current account balance. The study noticed by (Shikha et. al, 2009 Deaton, 2009) that countries have achieved high growth rate are also characterized by high saving rate. Furthermore, high saving rate means high growth, at least if there are no constraint in the labor market, or may be, better higher investment leads to higher growth with the saving rate automatically equilibration to investment as simple Keynesian model

The study emphasized (Mumtaz and Oscar, 2016 Eduardo and Mathieu, 2015) that public saving measured by balance on current budget and overall budget balance are considered determinants of national saving and, hence it is strongly positive affect income as well as economic growth, but low national saving rate remain a binding constraint for capital accumulation. In addition to, the finding argued (Epaphra, 2014) that national saving is a critical way in promoting investment which in turn enhance economic growth through capital formation.

It is recognized by (Ramarkrisha and Venkateshwar, 2012) that saving and investment are considered to be important variables in achieving price stability and promoting employment opportunities and thereby contributing to economic growth. Moreover, the paper worth noticed by (Haile, 1999) economic theory has maintained for long that saving or capital accumulation is the main determinants of economic growth, and as mentioned in his paper all neoclassical growth theories developed in the 1950s and 1960 also emphasized the important of saving in the economic growth process which is higher saving leads to higher investment, and higher investment leads to economic growth.

It is theoretically assessed in (Abu, 2004) that, in the basis of the policy is that saving hand round as a source of capital formation which in revolve manipulates the productivity of labor and its growth overtime. Further, the actuality that investment would be financed either from current or future saving of a national economy linked with the defective international mobility of capital in general and to developing countries in exacting advance domestic saving rate is an important policy goal. Also this force to the question of what brand of public policies are effective in heartening domestic saving.

It is evidenced by (Singh, 2009 Amusa and Busani, 2013) that for steady-state effects of saving on income suggests that need to accelerate domestic saving to finance capital accumulation and foster higher income and growth. Particular, it is advised gross domestic saving has short and long run impacts on economic growth, especially strongly affects in the long run rather than short run. This is reinforcing of domestic saving and hence, investment can derive supporting the country's diversified growth. Finally, it is forwarded to generating permanently higher rate of economic growth through its positive effects on investment and capital accumulation.

It is noticed worthy by (Dornbusch and Fischer, 1999) the physical capital has always been at the center of explanations for economic progress. In order to invest a country must either save or else have access to foreign saving through loans or aid. If domestic saving is prerequisite for capital accumulations then attention must focus on policies to promote high saving. In addition to the government affects national saving through its budgetary, policies beyond the domestic economy countries can draw on foreign saving to investment.

The past theoretical literature examined by (Mankiw, Romer and Weil, 1992 Romer, 1989) that the Solow model is consistent international variation and convergence for whether poor countries tend to grow faster than rich countries. Argued that holding population growth and capital accumulation constant countries converge at the about the rate augmented Solow model predicts. Asserted that saving has too large an influence on growth and take this to be evidence for positive externalities from capital accumulation.

To understand more fully the international differences in economic performance, we must consider these effects of different saving rates. This means, if we consider what happen to an economy when saving rates increase. In the Solow model higher saving rate leads to faster growth, but only temporarily. Similarly, this view that inspire in the rate of saving motivates growth only pending the economy extents the new steady state. If the economy preserves a high saving rate, it will sustain a large capital stock and high level of output, but it will not keep a high rate of growth forever. Finally, the high level of saving rate follows the large capital stock in the economy and a high level of output in the steady state; if saving rate is low the economy will have a lesser capital stock and a small level of output in the steady state (Mankiw, 2009).

It is addressed the identified how Harrod's – Domar growth model still hunts development economics that determine the poor countries required investment rate for a target growth rate is the cause of different between the required investment and their own saving is the financial gap. If you have financial gap of 8 percent of GDP growth between the required investment(12 percent of GDP for 3 per percent GDP growth) and the current 4 percent of GDP level of national saving. The obvious way to avoid a debt problem with official donors was to increase national saving. The development Economists thought that poor countries were, so poor they had little hope of increasing their saving (Easterly, 1997).

Standard neoclassical growth model assume that foreign saving are perfect substitutes of domestic savings in financing domestic capital thus growth rate is independent of domestic saving (Ganioglu and Yalçın, 2015). This model fails to explain the divergence of growth rate between East Asian countries. Not only this, the empirical analysis for panel data by (Aizenman et.al, 2007 cited in Ganioglu and Yalçın, 2015) “saving-investment gap” the increasing the

fraction of domestic saving in the financing of domestic capital (i.e. rise in self-financing ratio contribute to grow performances of countries. This finding is more pronounced for low-middle income countries and/or countries with lower self-financing ratio.

The study suggested that the challenge for most developing countries especially in Africa to mobilize domestically enough capital to meet their extensive investment needs because of undeveloped nature of their financial system and the low rate of access of household to basic financial product (Adom and Elbahnsawy, 2014). It detect where consumption and saving are the determinant factors in typical household utility function. Calibration and simulation indicate significant gaps between optimal and actual level of saving and investment. Moreover, finding point out that these gaps are associated with relatively lowering growth rate of actual output compared to simulated output, with notable.

According to, (Keynes, 1936) that saving incomes the extra of income over expenditure on consumption. Any sensible meaning of the link between consumer-purchasers and investor-purchasers will help us equally well, provided that is steadily applied. Having well-defined income is equivalent to entire sale made by entrepreneurs minus collective user cost of the entrepreneurs and consumption identical to entire sale made by entrepreneurs and entire sale made by one to another entrepreneur. It follows that saving is like to total sale made by one to another entrepreneurs. Similarly, we have net saving for the extra of net income over consumption equivalent to entire sale made by one to another entrepreneur minus collective user cost minus investment. Decided that income is equivalent to the value of current output, that current investment is equal to the value of the part of current output which is not consumed, and that saving is equal to the extra of income over consumption. He concludes the equality of saving and investment;

Income=value of output=consumption + investment

Saving=income –consumption

Therefore saving=investment

Solow growth model asserted the impacts of the three variables on the production output. His Central assumptions concern the properties of the production function and the evaluation of the three in to production. The division of the government's purchases between consumption and

investment good's the division of its revenues between taxes and borrowing and its tax treatment of saving and investment are all likely to affect the fraction of output that is invested, thus it is natural to investigate the effects of change in saving rate. Moreover, the Solow economy theory those are on a balanced growth path, and suppose that there is a permanent increase in saving. The role of saving, this experiment will illustrate the model's properties when the economy is not on a balanced growth path (Romer, 1996).

Similarly, according to Harrod's contributed theory shown that given the marginal propensity to save(s) and the desired or normal capital/output ratio (v) an economy in which consumption and investment are the only components of effective demand will grow at a rate consistent with normal capacity utilization if and only if the actual growth rate coincides with growth rate=saving/capital-output ratio i.e.  $g=s/v$  (Ruttan, 1998 Sergio, 1999).

The domain framework of consumption and saving decisions elaborated, income are determined the saving rate on the household (Huggett, 2015 Obstfeld and Rogoff, 1996 Modigliani, 1986 Friedman, 1957). Furthermore, argued that with rapid trend growth in per capita income (similarly, happened in Japan) will also have high saving rate and other things are equal, larger current account surpluses. The young people save a positive amount, and when income growth accelerates the scale of their saving in GDP raises compared to the dissaving by the old. Higher growth influences the overall lifetime earning saving rate through a scale effect that raise the wealth accumulated by young saver relative to the wealth un accumulated by the old.

An increasing of saving rate has positive effects on the income per capita (Solow, 1956 Frankel, 1962). This emphasis saving rate is the determinants of living standard for long run living. Hence, this derives for increasing saving rate will increase capital per capita and income/output per capita. Thus, it encourage of capital accumulation as an engine of growth.

It is concluded by (Undp, 2005 Imoughele and Ismaila, 2014) that the domestic sources of finance include public revenue (such as taxes) and private saving (such as household saving corporate keep hold of earnings). However, the primary constraint in Africa is low national saving, thus domestic finance is not sufficient to raise capital per worker (capital Deeping) and to

deriving force of economic growth. It was considered saving provides developing countries with the much needed capital for investment which improve economic growth. But it is recommend to be channeled with, increase in saving leads to increase in capital formation and production activities that will leads to employment creation and reduce external borrowing of government low domestic saving rate may maintain low growth level because Harrods-Domar model argued that saving is an important factor for economic growth.

The earlier literature suggested that saving has significant long run effects on income and growth and accounting for the bidirectional causality between saving and income (Singh, 2008 Najarzadeh et. al, 2014 Budhedeo, 2015). The study stylized evidence of the steady-state effects of saving on income demonstrate the need of accelerates domestic saving to finance capital accumulation and foster higher income and growth. Most of the saving comes from household that meet their investment requirements and finance the resource gap for the study period. Furthermore, the incentive-based measure to increase income and strength the capacity to save, would be useful to saving and reinforce the acceleration of income and growth.

The study ascertained that incorporating the saving parts finding out bidirectional causality between saving and economic growth for short run and unidirectional causal from economic growth to saving to dominate in the long run (Hooi and Song, 2008 Odhianb, 2009 Sajid and Sarfraz\*, 2008). However, the result indicates unidirectional causality from public saving to output (GNP and GDP) and private saving to gross national products for long run and unidirectional causality from gross national product to national and domestic saving for short run in Pakistan. The scholars' motivation shows that foreign capital flow and saving granger-cause each other while economic growth granger-cause foreign capital inflow.

The analysis holding true saving rate has statistically significant relationship for low-middle income countries whereas it is insignificant for high-income countries for panel data (Remolina, 2010 Chaturvedi et. al, 2009 Alomar, 2013 Andrei, 2013). We are ensured that the income source of countries does play part to decisive the way of causality. Further, in those countries where most income originates from natural resources, way of the causality from economic growth to domestic saving.

The national saving has high indirect significant effects on the importance of the economic growth. It is worthy noticed (Palmer, 2012 Zafar et. al, 2012) if it is necessary to expand the productive base of the economy then additional capital goods and services will be required. Thus, the requirement is achieved in the modern economy through national savings that is creating conducive investment environment which is particularly for production of capital goods.

## 2.2 Empirical literature

So far, many related empirical literatures have been conducted that belongs to saving and economic growth but, they have different finding and conclusion.

According to ( Paiva and Jahan, 2003 ) suggested the low national saving rate one of the most serious impediments to the achievement of higher and more sustainable growth rate in Brazil. Increasing the country's investment rate is a key to accelerating economic growth, but the relatively high external current account deficits observed in the few years discourage the reliance on the addition foreign saving to finance or sustain this process. Moreover, it is also well addressed (Hafizah, Zaheawati, Zokaria, Hussin, Suniati and Mahazri, 2011) that saving regularly has been seen as an important source for investment which a directly influences the economic growth. As recognized on their literature that higher savings was due to higher economic growth and designated so as to enhance the economic growth in Malaysia

It is accountable (Singh, 2011) that the acceleration of output and economic growth in a developing economy hinges heavily on the acceleration of investment and the improvements in factor and total factor productivity in India. This is consistent (Hebbel et.al, 1996) saving drives the growth through enhancing investment. If the growth result less from saving or investment (that is less from physical capital accumulation) than technological innovation or improvement in human capital, study for World Bank.

Investment is the source of capital accumulation in both neoclassical and post-neoclassical models of long term growth and a component of aggregate demand in the Keynesian models of short-term business cycle fluctuations. It is ensured by (Miszta, 2011) the empirical results for



the relationship between saving and economic growth for different level of economic development that ensured the existence one way causal direction from gross domestic saving to economic growth over in the study level of economic development in University of Radom, Sucharskiego.

It is notable relevant by (Singh, 2008) saving serves as a channel for tradeoff present consumption against future consumption and, thus, helps smooth the time line of consumption. The fundamental alarms remain the mobilization of domestic saving for financing investment requirements, accelerating the accumulation of capital, keeping current account trade deficits in manageable bounds, and producing the virtuous circle of high saving and high economic growth. The CADs, however, have been kept controllable and least, and a predominant (insignificant) amount of investment has been financed by domestic (foreign) saving.

It is remembered in (Ciftciogul and Begovic, 2010) that examined domestic saving and economic growth correlation using panel data for Central and East European countries the estimation result properly addressed the domestic saving has exerted a statistically significant effect on economic growth over the sample period. The paper conducted for the conference of financial frictions and the macro economy in Bank of Canada for 91 countries.

The result detected saving has more positive effects on economic growth for 61 poorest countries than 30 richest countries (Aghion and Howit, 2005). However, it was the Solow's neoclassical growth model which has shown how the saving rate could affect the growth rate of output for a temporary period of time. Their concept implies on the way of increasing exogenously given progressive technology. On the other hand, as context of my studying area assess empirical analysis of economic growth simply like regressors such as saving rate, public consumption, the rate of inflation, level of financial development and the degree of trade openness would probably be correlated with each other.

In MRW (1992) modified the Solow (1956) growth model to account for human capital as well as physical capital. In their model the steady state level of income per capita depends on the rate saving and investment for both physical capital and human capital. Even though, the saving rate

for physical capital on the steady state level of income per capita is much larger than in the Solow model. For reasonable parameter values a given increase in the saving rate for physical capital has twice the impact on steady state income per capita in the MRW model as in the basic Solow model in Washington (Lasky, 2004)

It is noticed by Carroll and Weil,(2000) that analyzing the derivative of the gross saving rate with respect to the growth rate of output will be positively which means the relationship between saving and growth is positively only if the instantaneous coefficient of relative risk aversion less than tow. Not only but also, assessed the way that the tow variables more positive makes consumer more willing to postpone consumption in response to productivity rate stronger and the growth in the utility function increasing the value of productivity rate makes it possible for consumer to achieve higher steady-state growth rate. Thus, consumer care directly about productivity rate partly to boost the steady-state growth rate (increasing the saving rate). Finally, findings are directly consistent with growth-to-saving causality.

It is recognized by (Rasmidatta, 2011) that the relationship between saving and economic growth using Granger causality test economic growth granger causes to rate saving with higher income level. But, domestic saving does not cause to economic growth. He stated, this problem from high gap of internal saving and investment using time series data for period 1960 to 2010 in Thailand. This is consistent with (Mohan, 2006) causal relationship economic growth and domestic saving with different income level. It is argued that examined using time series data from 1990 to 2013 there are long and short run relationship and in the short run unidirectional causality appeal economic growth to private saving and in the long run there is bilateral causality between the private saving and economic growth. This is inconsistent with (Sothan, 2014) that means the causality between economic growth and saving is insignificant. Worth noticed that using annual data the disaggregate saving achieve the steady-state equilibrium in the long run moving together with economic growth although, a deviations may occur in the short run. Thus, the domestic saving explains a more sustainable amount of movement in economic growth than foreign saving in Malaysia (Chor and Hooi, 2009).

It is remembered by (Opschoor, 2015) that panel data study with income level private saving has insignificant impacts on economic growth. The study also magnified that economic growth for Asia, saving rates in Asia were not usually larger thirty years ago but they have grown substantially and are now among the highest in the world. Moreover, as we saw earlier saving rates were significantly larger in Asia than in other region of the world in 1990. The estimation of result showed the strong relationship between per capita GDP growth and national savings in which faster growth leads to higher savings which in turn support more rapid growth (Radelet and Wha, 1997). This is consistent with (Carrol and Weil, 1993) who used causality tests to conclude that growth positively affects saving.

Saving as channeled line investment is considered as engine for economic growth and development in economic literature. The literature realized by (Collins, 1992) that empirically examined saving exhibits strong positive correlation with real output growth most of countries study for ten developing countries. Furthermore, according to (Paszhko, 2015) that addressed the lack of investment resource of in Ukraian economy are the main constraint for its economic growth and development. The article identified the level of economy and financial potential of household saving for economy. Moreover, the household saving prosperity greatly depends on the level of GDP in Ukraian

Finally, the recent study examined the causal relationship between real economic growth and growth rate of real gross domestic saving by using co-integration tests and vector error correction model(VECM) for Ethiopia. It is ascertained that the order of integral one by using ADF procedure, there is long relationship by using co-integration test and bi-directional causal relationship in the two variables (Dawit, 2005). But this study has been focused on short and long run impacts (i.e. positively and accelerate or not) and direction causality of national saving and economic growth for Ethiopia by using ARDL models.

## **CHAPTER-THREE**

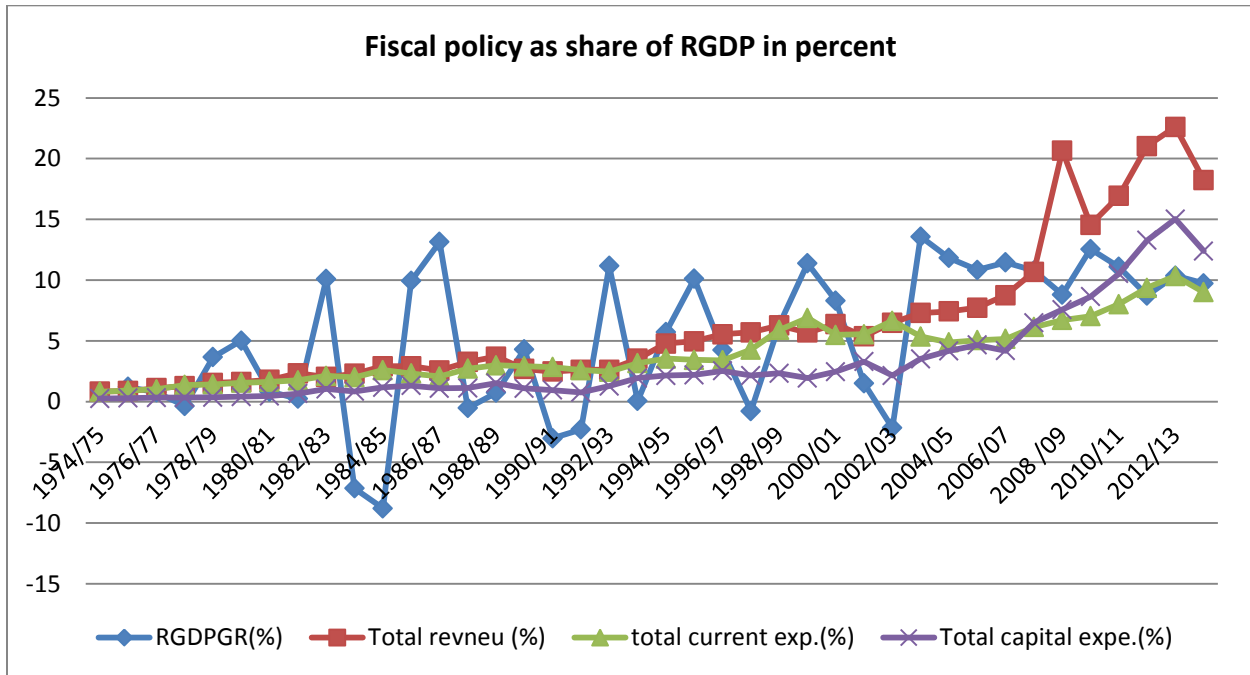
### **OVERVIEW OF ETHIOPIA ECONOMY**

#### **3.1 Macroeconomic performance**

The Ethiopia economy has progressive change in multidimensional economic path through in political stability and service, social service and development, economic service and development and total capital expenditure. Following of their trend shows increasing behavior with in the period of viewing that means from 1974 to 2013. Moreover, according to MOFED fiscal year of GTP implementation report, recognized progressive increasing at decreasing rate. Growth rate of overall economy has registered which is 2010/11 is 11.4 percent, 2011/12 was 8.8 percent, 2012/13 was 9.7 percent and average growth rate for 2010/11-2012/13 was 10 percent respectively (MOFED, 2014). In addition to this more effective implementation of prudent macroeconomic and sector policies has contributed to this progressive change and broad-based growth. It also this leads to the creation of employment and poverty reduction. Beside the per capita income has also increased from 377USD to 392USD in 2009/10.

Ethiopia's fiscal performances become visible to be adequate given the current states of the economy and financing requirements for development. The overall general government deficit (including grants) in 2010/11 was 1.6 percent of GDP and improved to 1.2 percent in 2011/12. To a great amount the deficits are financed through external project loans, and to a lesser amount of extent also from receipt through privation. On the revenue side a tax reform was launched in 2010 and is going but already showing significant improvement in tax collection. At the same time, achievements of public financial management restructurings are continuing to strengthen the expenditure side. This includes sketches to moves to a program supported budgeting approach. Public debt is on a declining trend and expected to be below 35 percent of GDP in 2011/12. The latest sustainability analysis for external debt carried out in 2012 indicates the Ethiopia keeps on at low jeopardy of external debt suffering similar to the findings in 2009/10 and 2010/11 (World development Bank indicator, 2012).

**Figure 3.1: Trends of fiscal policy as share of RGDP in percent (1974-2013)**



Source: own computation based on MoFD (2016)

The above figure 4.1 demonstrated the fiscal policy as share of real GDP

During study entire period the fiscal policy as share of real GDP has been registered maximum in 2012 which means the total revenue has leading share in fiscal policy was registered 22.6 percent and the following total current expenditure, total capital expenditure was recorded 10, 15 percent respectively in this year. Furthermore, the average sharing of total revenue, total current expenditure and total capital expenditure to real GDP has been recorded 2.2 percent, 1.97 percent and 0.77 percent in Dergue regime (1974-1991) and 9.7 percent, 5.8 percent and 5.2 percent in 1992-2013 which is EPRDF regime. In general total revenue and total capital expenditure has demonstrated fast growth since 2006.

**Table 3.1: Trends of major sectors sharing to RGDP in average**

|                                       | Years     |           |           |
|---------------------------------------|-----------|-----------|-----------|
|                                       | 1974-1991 | 1992-2013 | 1974-2012 |
| Major sectors of percentage in RGDP   |           |           |           |
| Average of Growth rate of RGDP in (%) | 1.6       | 7         | 4.9       |
| Agricultural sector in(%RGDP)         | 69        | 48        | 53        |
| Industrial sector in (% RGDP)         | 9.8       | 10        | 9.85      |
| Service sector in (%RGDP)             | 31        | 38        | 36        |

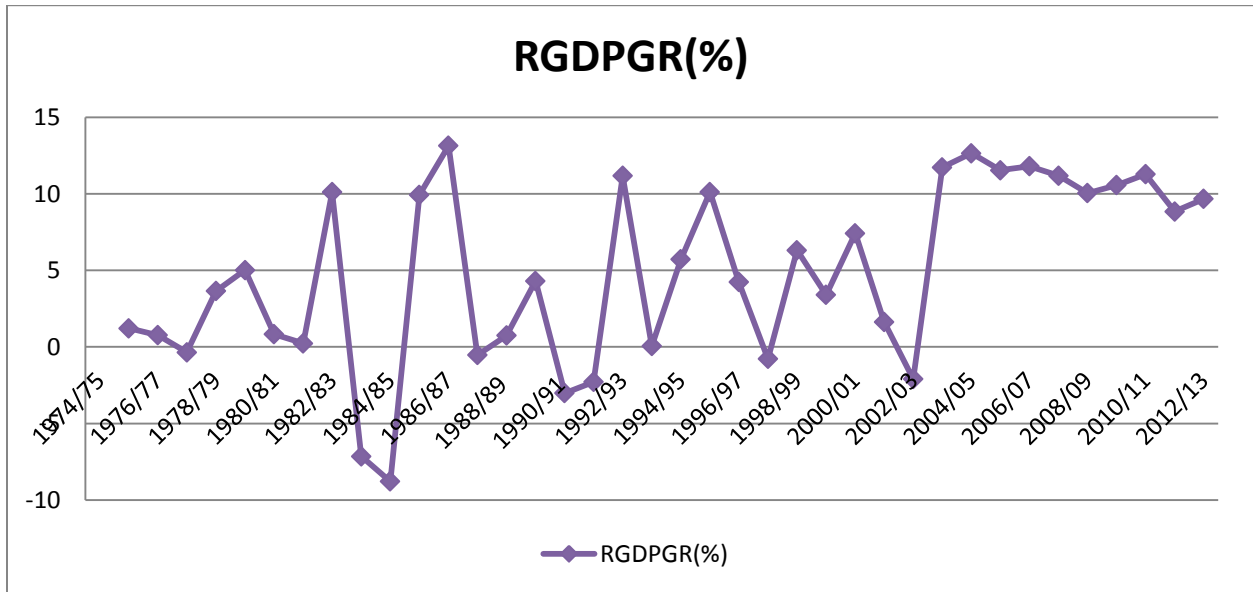
*Source: own computation from MOFED (2016).*

### **3.2 Trend of Economic growth**

Ethiopia has been among Africa's most impressive growth performances' over the past decade averaging 10.9 percent annual growth between 2004 and 2014, despite being a non-oil producing country. The government's economic strategies has been premised on sound macroeconomic policies diversification by promoting agricultural and industrial development, and creating business environment that is conducive to investment, supported by infrastructural development (Martyn & Solomon, 2015).

The annual average growth rate of real GDP through the study period was 1.6 percent in Dergue regime and 7 percent for current government. Moreover, growth rate of economic growth was stable and positively grew in current government rather than last government. In addition to, the trend path of economic growth was smoothly followed since 2004 to recent in positively increase.

**Figure 3.2: Trends of real GDP in percent (1974-2013)**



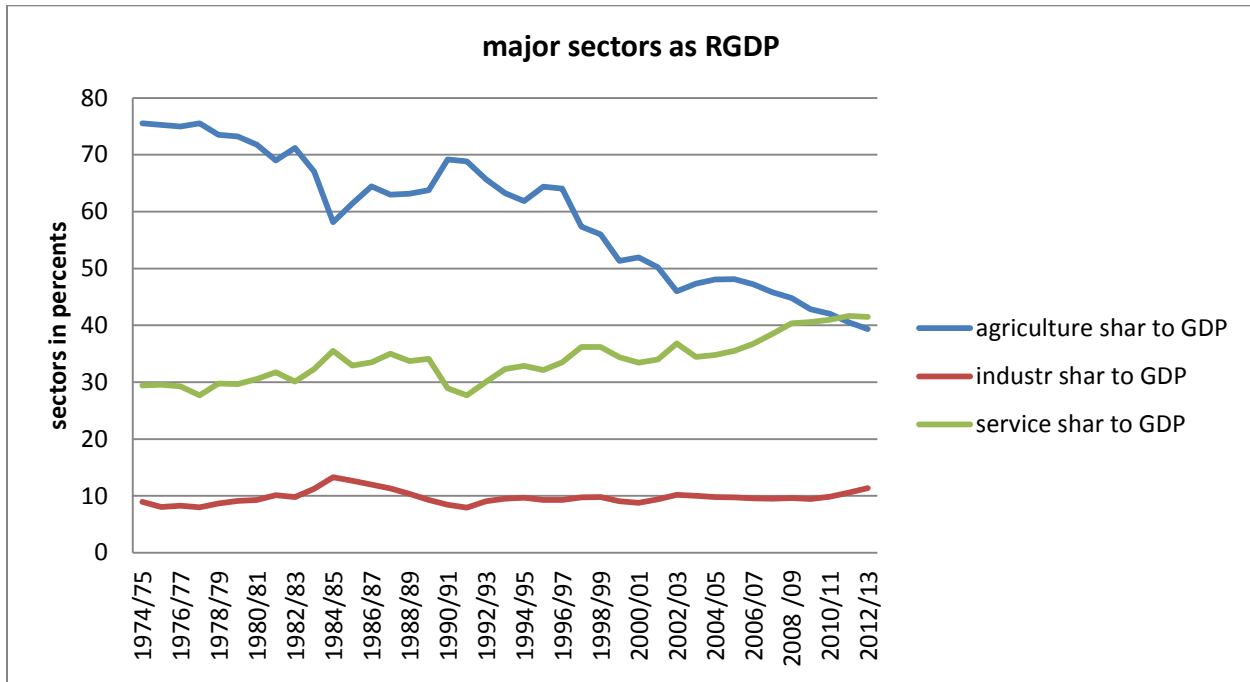
Source: own computation based on MoFED (2016)

In above figure the experience of growth rate of RGDP fall to -8.8% at 1984 which is minimum point and return to increasing maximum point 13.1% in 1986 in the studying period. In the over viewing of sample period the economic growth does not stable performance between 1974 and 2003. But it is faced visible stable since 2004 with growing at decreasing rate.

### 3.3 Trends of major sector performance

More percent of Ethiopia economy contributed to real GDP was agricultural sector in term of output contribution, market contribution, and employment and export earnings. The overall growth rate of agricultural sector value added around 50 percent. On the other hand, According to observing sample period the industrial sector remained relatively static amount contribution to real GDP through in sample period. The share of service sector in real GDP has been slightly rising. Furthermore, the relative growth in service was driven by the rapid expansion in financial intermediation, public administration and real business activities.

**Figure 3. 3: Trends of major sectors sharing components to RGDP**



Source: own computation based on MoFD(2016)

In the above figure demonstrated agricultural, industrial and service sector as share of real GDP

During the study period the agricultural sector contributed to overall economy has been registered 73 percent in 1974 has been declining steadily to 39 percent in 2012 respectively. Moreover, generally the average agricultural sector share to real GDP was 69 percent for Dergue regime has been declining to 48 percent for current EPRDF regime. Whereas, the industrial sector remained relatively static amount to between 9.8 and 10 percent in 1974-1991 and 1992-2012 respectively. In the other hand, the relatively growth in service sector reached maximum 40 percent in 2012. Furtherly, The service sector average sharing to real GDP slightly grow from 31 percent in 1974-1991 to 38 percent in 1992-2012 respectively. Table 2 trend of average of gross national saving and its sharing to RGDP over study period.



**Table 3.2: Trends of gross national saving**

|   | years     |           |           |           |
|---|-----------|-----------|-----------|-----------|
| Gross national saving in percent                  | 1970-1973 | 1974-1991 | 1992-2013 | 1970-2013 |
| Average of gross national saving(in million b)    | 1288      | 14499     | 82469     | 31170     |
| Average gross national saving sharing to RGDP (%) | 1.75      | 1.93      | 13.7      | 7.8       |

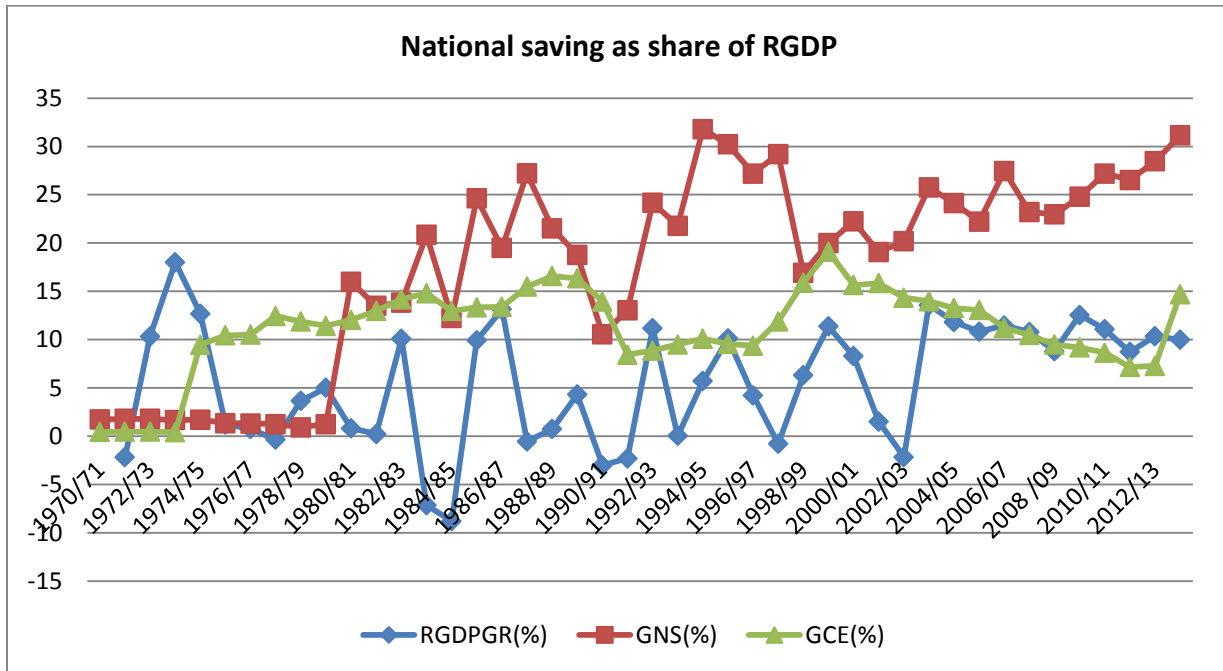
*Source: own computation based on MoFED (2016)*

The annual average gross national saving over through period in 1970-1973, 1974-1991 and 1992-2013 has been registered 1288, 14499 and 82469 in million birr respectively. Further, the annual average of gross national saving sharing to real GDP might be occupied in 1970-1973, 1.75 percent 1974-1991,1.9 percent and in 1992-2013, 13.7 percent respectively. This show the saving performance of the nation has improvement over current government than other last two regimes and due to conductive economic environment, political stability.

### **3.4 Trend of gross national saving, gross government consumption and economic growth**

The economic growth discouraged through in government budget deficit by national saving and government consumption. Government budget deficit means government spending greater than government revenue which is cause to small amounts of national saving and hence, discourage capital accumulation. In other hand, government consumption run by government debt stimulate interest rate which is crowd-out investment and would encourage capital to flow in from abroad.

**Figure 3.4: Trends of gross national saving, gross government consumption and growth rate of RGDP**



Source: own computation based on MOFED(2016)

As above figure the pattern seems to suggest that there is strong relationship between gross national saving sharing to real GDP and real GDP. Due to implication of having significant similarity direction of trend path between national saving sharing to real GDP and real GDP. The theory noted by (Haile, 1999) saving is automatically translated into capital accumulation and there by growth, on that this translation is simply the mechanism underlying the positive correlation between saving and growth. The trend of gross national saving was fluctuate between the minimum declining point 0.9 percent in 1978 and increasing peak point 31.8 percent 1994 respectively over the through period. Furthermore, real GDP fluctuated in the same direction with gross national saving and has been shown stable trend after year of 2004, was implies national saving positively affect economic growth.

In the other hand, government consumption expenditure has shown less than 0.5 percent as share to real GDP till 1973 which means Dergue regime and reached 19 percent as share of real GDP in 1999 which is maximum entire in the sample period. More over, the average of government consumption expenditure as share to real GDP through study period was 0.45 , 12.8 and 11.7 percent in per 1974, 1974-1991 and 1992-2013 respectively. In addition to this, the average

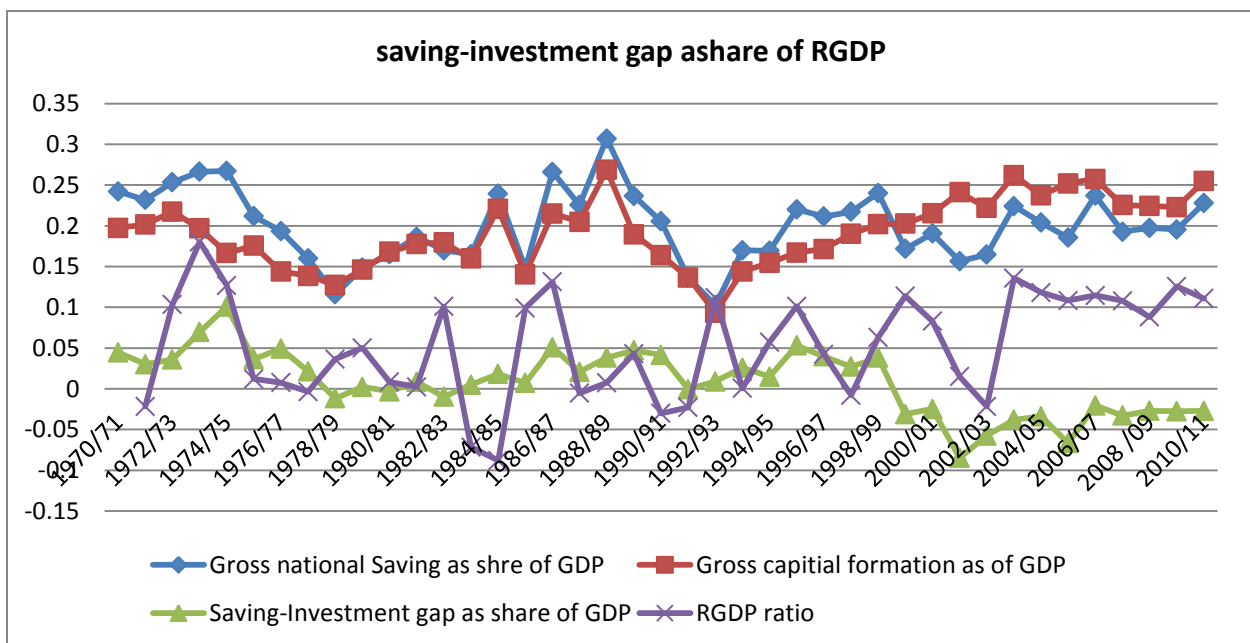
government consumption as share of real GDP of current government (EPRDF) regime was less than from Dergue regime which means more percent of annually running government budget in current government to be for investment purpose than consumption from that of Dergue regime.

### 3.5 Trend of gross national saving, gross capital formation and saving-investment gap

Recently, the government has schamed to mobilize saving proformance by increased the minimum deposit interst rate and introduced a number of saving instrument. Such as, the Ethiopia govrnment bond, national bank of Ethiopia bill, house schames, saving schames for construction machineries, and social securities are some of the saving instruments. This is induced Growth of national saving channenally increasing coresponding with increased investment with containuosly trend and hence, aggergately increase economic growth.

Realtive to GDP , Ethiopia now has one of the hihgest gross fixed capital formation ratio globally , spending 40 percent its GDP in 2014 onland imrovments, equipment purchases, the constraction on roads and railways, social, comercial and industrial buildings.

Figure 3.5: Trends of gross national saving, gross capital formation and saving-investment gap and RGDP



Source: own computation based on MoFED (2016)

As we see in the above figure the gross national saving sharing to real GDP, gross fixed capital formation sharing to real GDP, saving-investment gap sharing to real GDP and real GDP ratio in the sample period under consideration.

We can recognize from above figure both gross national saving and gross fixed capital formation sharing to real GDP fluctuate in the same direction. This implies the gross national saving furtherly finance the gross fixed capital formation. Further more, we can be see from 1972 to 1978 and 1984 to 2000 the line of gross national saving above the gross fixed capital formation, means national saving financed the requirement of fixed capital formation without any external source. On the other hand, from 2001 to 2011 the gross national saving sharing to real GDP doesn't finance required gross fixed capital formation due to recent government can implementing huge investment.

Saving-investment gap is the widening range of saving and investment which is requirement of saving to investment. Behavior of saving-investment gap trend in to four partion. The first part from 1972-1978 and 1985-2001, saving gap was above zero which means national saving financed required investment except in 1992, the second from 1979-1984 the saving-investment gap fluctuate around zero which means gross national saving was matched to investment during in the period. The third from 2001-2011 the saving-investment observed negative wide range of gap. During this period gross national saving wasn't covered the required investment.

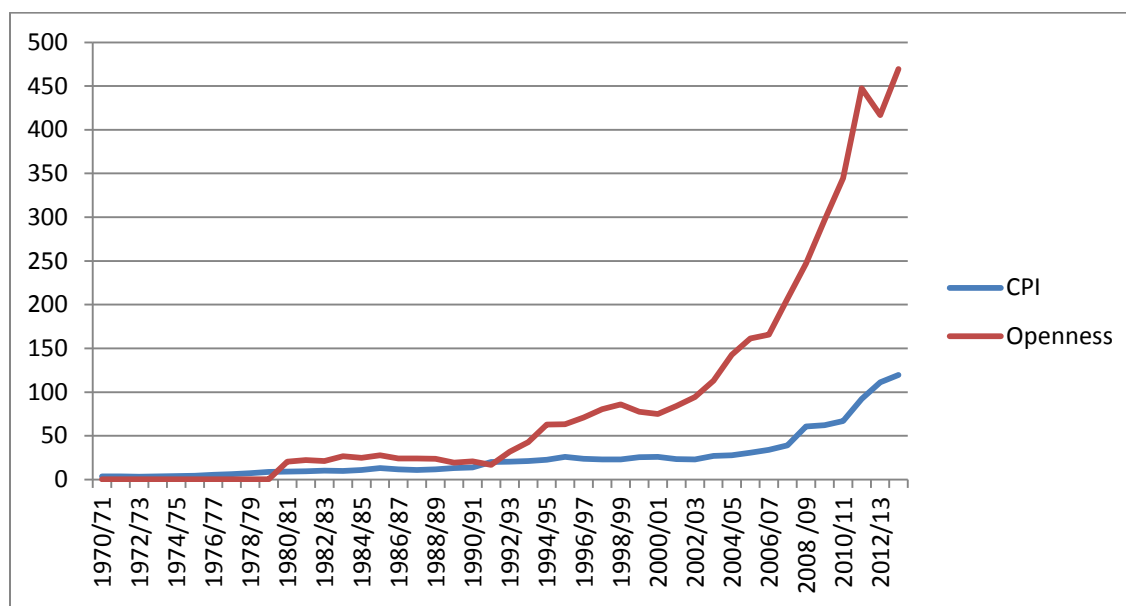
### **3.6 Trend of inflation rate and trade openness**

Macroeconomic performance is judged by the characters of inflation rate because the issues affects our daily lives. Where the price level continuously rising, due to it is fact that difficult to maintain macroeconomic stability. Further more, during inflation, the prices of goods people buys are rising. Partly for this reasons inflation is unpopular, even if people's income rise along with the price (Dornbusch & Fischer, 1999).

Trade openness is open mechanism by which a country to generate finance resource and assistance from the rest world that allows domestic economic agent relax their current collective budget constraints. Whereas openness to international trade, measured by the ratio of external

trade to GDP, relatively it may be create the opportunities the economy to has well interaction with trading parterns and generate investment resource. On the other hand, it expose the national economies to contravene their collective budget constraint and engage in decision that could have adverse effects on their long run economic proformance(Abu, 2004).

**Figure 3. 6: trends of inflation in CPI and trade openness**



Source: own computation based on MoFED (2016)

The above figure inflation is measured by consumer price index which has increase trend experience over study period . the minimum inflation rate has registered in the beging period in 1971-1973, 3%. After this period it is contniuosly increase up to reached maximum registered point. The maximum consumer price index has registered in year of the sample period was 120 percent in 2013. From observed period 1971 -2007 annual average rate of inflation rate has registered under 40 percent, but since 2008 imdetly increase from 61 percent maximum reached 120percent to 2013. This due to acording of MOFED report as per capita income level increase from 377USD to 392USD in 2009/10 and weaker foreign exchange earning, rising demand for imports that depleted international reserves of the country.

Ethiopia is one going small open economy interact external trade to finance domestic resource. In the above figure demonsterted the graph was very increasing from 63 percent in 1994 to 469 percent to 2013 at increasing rate. This implies the international trade intreaction of current

government (EPRDF) has better interaction with the rest world than the last Empiral regime per 1974 and Dergue regime in1974-1991 repecively. This in the fact current government could be run huge budget resource required investment and consumption by covering budget constraint.

## **CHAPATRE-FOUR**

### **DATA AND METHODOLOGY**

#### **4.1 Type of data and Sources**

For this study has been used only secondary source of data, due to the nature of the study based on a country level of macroeconomics data. A yearly time series data on real gross domestic product is dependent variable and gross national saving rate, inflation rate, public consumption, trade openness are independent variables. The observation data has been gathered with covering the period from 1973/74 to 2013/14. The choice of the period is basically based on the availability of data.

The relevant data has been collected from Ethiopia, Ministry of Finance and Economic Development (MOFED), National Bank of Ethiopia (NBE), Central Statistical Agency (CSA), International Monetary Fund (IMF) database, World Bank (WB) database and other sources which are perceived to be relevant and reliable.

#### **4.2 Methods of data analysis**

In this study has been used both descriptive and econometric methods to discuss and analysis the issue part. In the descriptive statistics has been used to show the trending behavior of economic growth with respect to gross national saving rate and other variables. In the econometric method part, emphasis has employed on investigating the gross national saving rate on real gross domestic products. The nature of the model has been given in logarithmic form because of many economic series such as GDP showed growth approximately exponential, so the logarithm of these series grows approximately linearly and Standard deviation of many economic time series is approximately proportional to its level and Standard deviation of the logarithm of the series is approximately constant (Muhammad, 2012).

#### **4.3 Model specification**

The empirical results of this study aimed to detect the existences of short and long run as well as causal direction relationship among the dependent variable real gross domestic products and independent variable, gross national saving and inflation, public consumption and trade





$LNRGD Pt$  =Log of real gross domestic product

$LNGNS t$  =Log of gross national saving to GDP ratio

$LNIFR t$  =Log of inflation (proxy consumer price index) to GDP ratio

$LNGCE t$  =Log of government consumption expenditure to GDP ratio

$LNTOT$  = Log of trade openness to GDP ratio

$\varepsilon t$  =White noise error term

#### 4.4 Definition of Variables

##### **Economic Growth (GDP)**

Gross domestic product (GDP) is defined as the market value of all finished goods and services produced in country certain periods of time. It may measures as factor costs (agriculture sectors, industrial/ manufactures sectors and service sectors) as well as market price (private consumption, government consumption and gross fixed capital formation). In another hand, it is refers to an increase in the productive capacity of an economy as a result of which the economy is capable of producing additional quantities of good and service (Palmer, 2012).

##### **Gross national saving (GNS)**

At the macro-economic level saving is not measured directly, but it is the residual between two large magnitudes which is GDP and consumption (Haile, 1999). Moreover, saving in narrow sense is the supplying of saving by household sector is defined as the net amount that all households together which to lend under different conditions. The first note for saving some individuals will want to borrow and some will want to lend and some will to do both.

Generally the total saving is defined as the sum of household saves, government saving and the rest world (external) saving. In the classical model government saving and external saving are exogenous variables (i.e.  $SG = NT - G$ ) and  $SR = M - X$  depends only on exogenous variables and are therefore themselves exogenous (Jochumzen, 2010). In terms of neo-classical model representation;  $Y = \alpha K^\beta (HL)^{1 - \beta}$ ,  $S = sY$ ,  $I = \frac{dK}{dt} = K$ ,  $S = I$ ,  $L = L_0 e^{\delta t}$ ,  $H = H_0 e^{\mu t}$

##### **Government consumption expenditure c(Y);**

It depends positively on GDP in the cross model and in the classical model depends on the interest rate. If GDP is divided in real terms over a numbers of years, private consumption, government consumption and investment will also each roughly be doubled.

### **Inflation rate (as proxy consumer price index);**

It is between two points in time is defined as the percentage increase of the price index between these two points in time. It is independent of which year we use as our base year for our price index. Moreover, it meant to capture the consistency of monetary and fiscal policies in that large, structural fiscal imbalances, may lead to debt monetization and higher inflation rate. The major international institutions focus on controlling inflation as a mechanism for boosting long-run economic activity (Easterly & Levine, 2002).

### **Trade openness**

Openness measure the degree to which the country does or does not interfere with foreign trade. When country is open; it is defined as non-tariff barriers cover less than 40 percent of trade, the average tariff rates are less than 40 percent and the black market premium was less than 20 percent during the 1970 and 1980s. In addition to this, the economy shouldn't be socialist and the government doesn't control major exports through marketing abroad (Easterly and Levine, 2002). Also it is measured as sum of exports and imports of goods and services as share of GDP can raise real GDP if more openness leads to a change in domestic employment and output (Barro, 1996).

## **4.5 The Unit Root test**

In order to examine the integrity level of variable standard tests like Augmented Dickey and Fuller (1981) and (Phillips and Perrson, 1988) are employed. Data series is said to be stationary if it error term has zero mean, constant variance and the covariance between any two-time period depends only on the distance or lag between the two period and not on the actual time which it is computed (Gujarati, 2004). The tests will used extensively in order to find out the order of integration, although the ARDL co integration approach does not required unit root test ,nevertheless, we will need to conduct this test to ensure that none of the variables will the integrated of order 2, i.e. I(2). Because, in case of I (2) variables, ARDL procedures makes no



The parameter  $\delta_i$ , where  $i=1,2,3,4,5$ , is the corresponding long-run multipliers, whereas the parameter  $\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$  are the short-run dynamic coefficients of the underlying ARDL model. The null hypothesis i.e.  $H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = 0$ . It is implying no co-integration among variables, again alternative hypothesis,  $H_1: \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq 0$ . The first step will be tested by computing a general F-statistic using the variables in the model. The F-statistic is compared with the critical value tabulated by (Pesaran et al., 2001 or Narayan, 2004) these critical values will be calculated for the different number of regressors and whether the model contains an intercept and/or a trend these critical values include an upper and a lower band covering all possible classifications of the variable into I (1) and I (0) or even fractionally integrate (Pesaran et al., 2001). The null hypothesis of no co-integration is rejected if the calculated F-statistic falls above the upper bound. If the computed F-statistic falls below the lower bound, then the null hypothesis of no co-integration will not be rejected. Finally, the result will be inconclusive if it falls in between the lower and the upper bound levels. F test statistics will all be less than the corresponding critical values tabulated. The null hypothesis of no co-integration cannot be rejected in these cases. Therefore, we can have a possibility of a long-term relationship if and only if LRGDP appears as a dependent variable followed by its 'forcing variables' (*gns, gce, infr, to*) one of the more important issues in applying the ARDL will be the choice of the order of the distributed lag function.

### 3.6.1 Error correction model Representation

It is the short run vibrant has been captured by the individual coefficients of the lagged periods; the error correction term (ECT) comprises the information of long run causality. Further, the estimation of the short runs vibrant coefficients via the following error correction model.

$$\Delta LNRGDpt = \beta_0 + \sum_{j=1}^m \beta_1 j \Delta LRGDPt_{-j} + \sum_{j=1}^n \beta_2 j \Delta LGDSRt_{-j} + \sum_{j=1}^o \beta_3 j \Delta LINFt_{-j} + \sum_{j=1}^p \beta_4 j \Delta \ln PCt_{-j} + \sum_{j=1}^q \beta_5 j \Delta LTOt_{-j} + \delta ECMt_{-1} - \mu t \dots \dots \dots 4.6$$

Where,  $ECMt_{-1}$  representing the error - correction term resulting from the verified long-run equilibrium relationship and  $\delta$  is a parameter indicating the speed of adjustment to the equilibrium level after a shock. The sign of the  $ECMt_{-1}$  must be negative and significant to ensure convergence of the dynamics to the long run equilibrium.

## 4.7 Granger causality test

The existence of a long-run relationship among the variables indicates that there must be at least one direction of causality to hold the existence of long-run equilibrium relationship (Engle and Granger, 1987). The causality relationship among variables has been examined within the framework of error correction model (ECM), with co integrated variable. Significance of lagged explanatory variable are depicted short run causality while a negative and statistical significant error correction term (ECT) is assumed to signify long run causality. The short-run causality has been determined from the following ARDL model.

$$\Delta X_t = \varphi + \sum_{i=1}^n \Phi_i X_{t-1} + \rho ECM_{t-1} + \varepsilon_t \dots \dots \dots 4.7$$

Where, X is the 5×1 vector of the variables include the model(Rgdp, Gns, Inf, Gce And To),  $\varphi$  is the 5×1 vector of constant terms,  $\Phi$  is the 5×5 matrices which include the interaction coefficients of the coefficients for each of the error correction terms and  $\varepsilon_t$  the vector of disturbance term.

## CHAPTER-FIVE

### RESULT AND DISCUSSION

#### 5.1 Unit root result:

Most of the macroeconomics variables are non-stationary in nature. As result the estimation of model not to be spurious regression, the stationary test is basic issue in the research. In this study all variables considered in the study are tested the stationary characteristics of the variables by Augmented Dickey-Fuller and Phillip-perron test methods with only intercept and with intercept and liner trend, in order to determine the degree of integration of the data series. All variables are non-stationary at the variable level and stationary at the first difference that is remove non-stationary in all causes and null hypothesis has unit root clearly rejected at the 5% significant level with only intercept and intercept and liner trend of the data series. The estimation result in the Table (1) shows at the level all variables are non-stationary but all variables become stationary at the first difference. Thus, all variables are integrated of the same order of one I(1) which means that the co integration test could be applied.

**Table 5.1: Results of Augmented Dickey-Fuller(ADF) and Phillips-Perron(PP) unit root test**

| Variables | Variables at the levels |                     | Variable at first difference |                     | Order of integration |
|-----------|-------------------------|---------------------|------------------------------|---------------------|----------------------|
|           | only intercept          | Intercept and trend | Only intercept               | Intercept and trend |                      |
| LNRGDP    | -1.9241                 | -1.8895             | -5.724**                     | -5.631**            | I(1)                 |
| LNGNS     | 0.179                   | -0.8225             | -5.814**                     | -5.986**            | I(1)                 |
| LNGCE     | -0.642                  | -2.01               | -5.112**                     | -5.415**            | I(1)                 |
| LNCPI     | 1.232                   | -0.8097             | -4.523**                     | -4.472**            | I(1)                 |
| LNT0      | -1.89                   | -2.276              | -6.042**                     | -6.123**            | I(1)                 |

(\*\*) indicate statistical significant at 5%, which means the null hypothesis has unit root is rejected at critical value is -2.954 and -3.553 with intercept and trend

The optimal lag length is performed for the different variables by lag length of three to determine how many lag are appropriate is formed by the lag order selection criteria for the model of ARDL. Table (3) below indicates as appropriate lag length of one as selected by majority of the criteria.

**Table 5.2: VAR order selection criteria**

| lag | LogL     | LR      | FPE      | AIC       | HQIC      | SBIC     |
|-----|----------|---------|----------|-----------|-----------|----------|
| 0   | -83.7953 | -       | .000177  | 5.5497    | 5.62562   | 5.77873  |
| 1   | 47.0021  | 261.59  | 2.4e-07* | -1.06263* | -.607147* | .311496* |
| 2   | 66.6653  | 39.326* | 3.8e-07  | -.72908   | .105975   | 1.79015  |
| 3   | 85.3202  | 37.31   | 8.1e-07  | -.332511  | .882114   | 3.33183  |

(\*) indicate lag order selected by criterion. LR: sequential modified LR test statistics (each at 5% level).FPR: final predication error. AIC: Akaike information criterion. HQIC: Hannan-Quinn information criterion. SBIC: Schwarz Bayesian Information criterion.

To make sure the optimal number of lag order to estimate the ARDL model should be selected from the standard information criteria. Pesaran and Smith (1998), Gujarati (2004) suggested that the Schwartz Bayesian criterion (SBC) is preferable to other model specification criteria due to more parsimonious model specification. Therefore, using SBC more parsimonious model and hence, decision to be better.

## 5.2 ARDL Bound Test for Co-Integration

The study has robust identified the unit root of integral order and available optimal lag selection for which considered variable in the study. The next step, testing existence of long run relationship among variables based on chapter three equations by using bound approach test. The long run association is done by using computed F-statistics compared with Narayan, 2004 critical value. The optimal lag length is selected one as base of above table result.

The study has been ascertained unrestricted model by the help of OLS which was modeled in methodology part of this paper, and hence test of long run relationship among variables by using variable addition test with F-statistics by using micro fit 4.1 software packages. We have made decision when the computed F-statistics compared with Narayan critical value at 5 percent level significance if F-statistics falls below lower bound of the Narayan critical value, then we can conclude there is no long run relationship among variables, and if F-statistics fall above upper bound of Narayan critical value then we can concluded there is long run relationship among variables, and if F-statistics fall between lower and upper bound of Narayan critical value, then

we can concluded it is inconclusive. For further information for this case, we can check error correction term in short run is negative and statistical significant, then confirmed the existence long run relationship among variables. The result is reported below as table

**Table 3.3: Result of F-test or variable addition test for co-integration (ARDL cause)**

|   |                         |                |             |                |
|---|-------------------------|----------------|-------------|----------------|
| Dependent variable is LNRGDP  |                         |                |             |                |
| List of the variables added to the regression                           |                         |                | LNGCE(-1)   |                |
| LNRGDP(-2)  | LNGNS(-1)               | LNCPI(-2)      | LNTO(-1)    |                |
| 38 observation used for estimation from 1976 to 2013                    |                         |                |             |                |
| Regression  | coefficient             | Standard error | T-ratio     | [prob]         |
| DLNRGDP(-1)   | 0.73024                 | 0.22001        | 3.3192      | 0.003          |
| DLNGNS  | -0.016561               | 0.028112       | -0.58912    | 0.561          |
| DLNGCE  | -0.058529               | 0.087833       | -0.66637    | 0.511          |
| DLNCPI  | 0.28080                 | 0.16982        | 1.6536      | 0.111          |
| DLNCPI(-1)  | -0.42968                | 0.17156        | -2.5045     | 0.019          |
| DLNTO   | 0.013801                | 0.01685        | 0.82004     | 0.420          |
| LNRGDP(-2)  | 0.50307                 | 0.24973        | 2.0145      | 0.556          |
| LNGNS(-1)   | 0.0214545               | 0.027709       | 0.77425     | 0.446          |
| LNGCE(-1)   | -0.19447                | 0.099438       | -1.9557     | 0.62           |
| LNCPT(-2)   | -0.26592                | 0.14493        | -1.8346     | 0.071          |
| LNTO(-1)  | 0.022624                | 0.16323        | 1.3860      | 0.179          |
| CONS  | 0.92897                 | 0.75788        | 1.2258      | 0.232          |
| TREND   | 0.013015                | 0.0081571      | 1.5955      | 0.123          |
| Joint test of zero restriction on the coefficient of addition variables |                         |                |             |                |
| Lagrange multipliers  | Chq(4) = 18.0866(0.001) |                |             |                |
| Likelihood ratio  | Chq(4) = 24.303(0.001)  |                |             |                |
| F-statistics  | F(4, 29) = 6.27(0.002)  |                |             |                |
| Narayan critical value  | No of observation       | Lower bound    | Upper bound | Decision       |
| 1%  | 38                      | 2.782          | 3.827       | Exist relation |
| 5%  | 38                      | 3.189          | 4.329       | Exist relation |
| 10%   | 38                      | 4.011          | 5.331       | Exist relation |



Source : own computation based on MoFED (2016)

The table result indicates as preformed in above assumption the calculated F-statistics was 6.27 which is greater than upper bound 4.329 of Narayan critical value at 5 percent level significant. This indicated the existence of long run relationship between with explained variables and explanatory variables. The ARDL approach was used to perform bound test for null hypothesis showing co-integration. The critical value with intercept and trend at  $p=0.05$  was 3.189 to 4.329. It indicates the value F-statistics is greater than the upper bound of critical value. Thus, the null hypotheses no long run association among explained and explanatory variables was rejected and hence this gives obvious recognition of long term association among variables.

In addition to, ARDL model in case of unrestricted error correction term was employed all variables were taken as explained and explanatory variables turn by turn. Moreover, as it is given lag length level variable in the ECM when changing from explained to as explanatory variables.

**Table 5.4: Test of unrestricted correction version for co-integration**

| Dependent variable | independent variables          | lag | F-statistics | Decision      |
|--------------------|--------------------------------|-----|--------------|---------------|
| DLNRGDP            | DLNGNS, DLNGCE, DLNCPI, DLNTO  | 1   | 6.27         | Co-integrated |
| DLNGNS             | DLNRGDP, DLNGCE, DLNCPI, DLNTO | 0   | 0.888        | No            |
| DLNGCE             | DLNGNS, DLNRGDP, DLNCPI, DLNTO | 0   | 1.33         | No            |
| DLNCPI             | DLNGCE, DLNGNS, DLNRGDP, DLNTO | 1   | 0.915        | No            |
| LNTO               | DLNCPI, DLNGCE, DLNGNS DLNRGDP | 0   | 0.86         | No            |

Source: own computation based on MoFED (2016)

The estimation value of F-statistics is greater than upper limit 4.329 at  $p=0.05$  when only for  $\ln r_{gdp}$  as explained variable. Therefore, it also proved the null hypothesis no co-integration among variables was rejected and it is confirmed there is long term association between explained and explanatory variables.

The procedure of ARDL bound test approaches are conducted the steps. The first steps determined the existence of a long run co-integrating relationship among variables as above table 5.3/4 result based on F-statistics. The second step determined the goodness of ARDL model, relevant diagnostic tests and stability test. In this step, table 5.5 result is confirmed only the diagnostic test without considering the coefficients value of the variables. Finally, the third step estimates

the coefficients of elasticity of long run and short run relationship and determined their value based on tables 5.6&7

**Table 5.5: ARDL Estimates ARDL (1,0,0,0,0) selected based on Schwarz Bayesian criterion for diagnostic test**

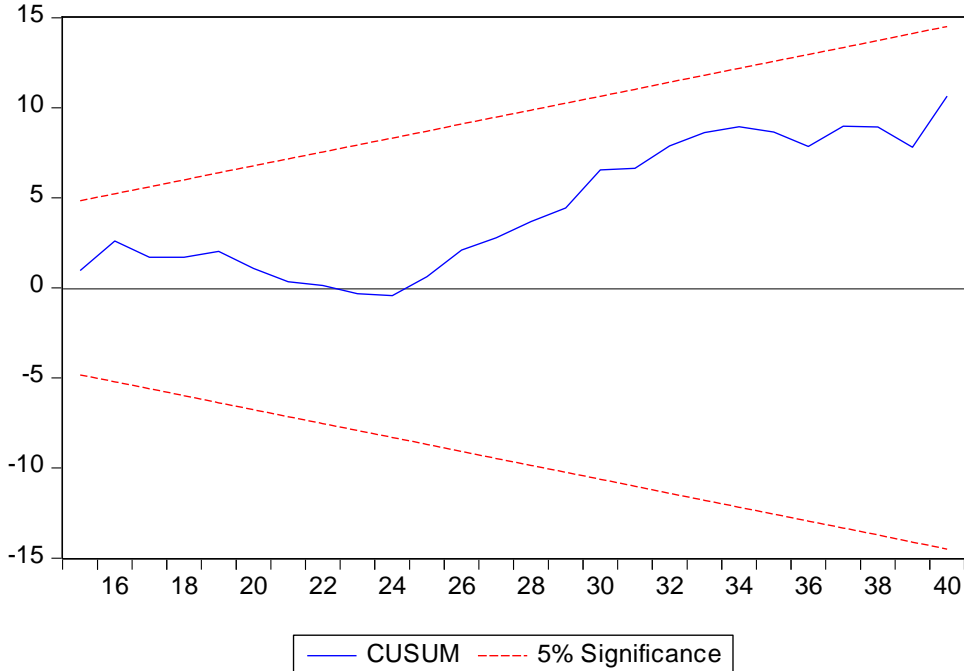
| Dependent variable is RGDP                           |                           |                |                           |        |
|--|---------------------------|----------------|---------------------------|--------|
| 39 observation used for estimation from 1975 to 2013 |                           |                |                           |        |
| Regression   | Coefficient               | Standard Error | T-Ratio                   | [prob] |
| LNRGDP   | 0.54320                   | 0.063212       | 8.6069                    | 0.000  |
| LNGNS  | 0.34088                   | 0.064931       | 5.2498                    | 0.000  |
| LNGCE  | -0.73616                  | 0.12513        | -5.8831                   | 0.000  |
| LNCPI  | -0.22851                  | 0.1557         | -1.4689                   | 0.152  |
| LNT0   | -0.14461                  | 0.038874       | -3.7201                   | 0.001  |
| CONS   | 8.7325                    | 1.4968         | 5.8340                    | 0.000  |
| TREND  | 0.41855                   | 0.012521       | 3.342                     | 0.002  |
| R-squared  | 0.94454                   |                |                           |        |
| R-Bar-square   | 0.933412                  |                |                           |        |
| DW-Statistic   | 2.1175                    |                |                           |        |
| Diagnostic Tests                                     |                           |                |                           |        |
| Test statistics                                      | LM version                |                | F-version                 |        |
| Serial correlation                                   | CHSQ(1) = 0.41716(0.518)  |                | F(1, 31)=0.3308(0.567)    |        |
| Functional form                                      | CHSQ( 1) = 1.7620(0.184)  |                | F(1, 31) = 1.4669(0.235)  |        |
| Normality  | CHSQ (2) = 0.01888(0.991) |                | F(1, 31) = Not applicable |        |
| Heteroscedasticity                                   | CHSQ (1) = 2.2152 (0.137) |                | F(1, 37) = 2.2282(0.144)  |        |

Source: own computation based on MoFED (2016)

We have been detected the validity of estimates through a number of diagnostic tests including, the Bresuch-Godfrey serial correlation LM test which is more general and statistically more power full than Durbin's-Watson or Durbin's h statistics for first order autoregressive, the Ramsey reset for model specification, the Jarque-Bera normality test and ARCH test for Heteroscedasticity are carried out. The estimation results are the residual of the Bresuch-Godfrey serial correlation LM test statistics with probability 0.4172(.518) indicates that the estimates are free from serial correlation. The homoscedastic nature of the residual is confirmed by the ARCH test statistics 2.2152 with probability .137. Ramsey reset test evaluate whether the correct functional form of equation is used. The test statistics 1.7620 with probabilities 0.184 suggest that the correct functional forms have been used. The hypothesis of normality test statistics is 0.08888 with probability (.991) then the hypothesis is accepted, hence observation is normally distributed. Final, to check the stability of the parameters of the estimated equation CUSUM and CUSUM of square test are employed; hence graph below show there is stability

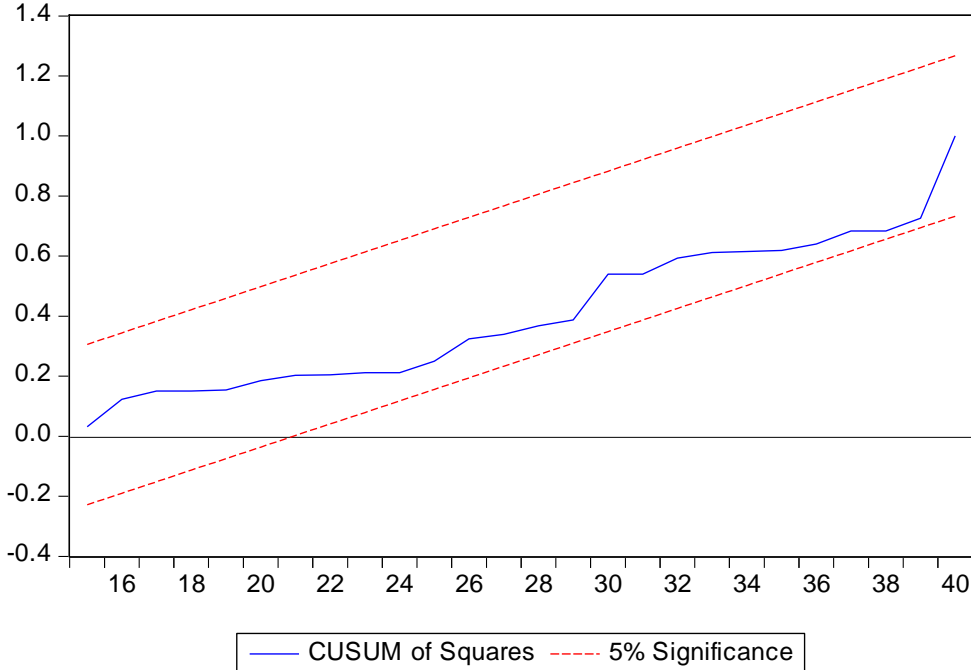
within the estimated parameter at 5% critical value

**Figure 5.1: Cumulative sum of recursive residual**



Note: the straight line represent critical bound at 5% significance level.

**Figure 5.2: Cumulative sums of squares of recursive residual**



Note: The straight line represent critical bound at 5% significance level



and income are volatile (e.g. rural income, rain fed agriculture), meeting emergency needs due to income or health risk, purchasing durables and housing accumulation resource for one's heir.

Government consumption expenditure has negative effect on the economic growth with statistical significant in Ethiopia. Real GDP accountable for 1 percent change of government consumption expenditure was decrease -1.612 percent. This finding argue with traditional thought that consumption could be affect the national saving through falling current account balance, people start to financing budget deficit by borrowing from abroad. As result, the government borrowing reduces national saving and crowds out capital accumulation depress economic growth in the long run (Mankiw, 2009).

The impact of inflation rate on economic growth is found negative and statistical insignificant in Ethiopia. It has been not supported effects of inflation rate on economic growth as result of macroeconomic instability

Long run effect of openness has demonstrated adverse effect on economic growth. The real GDP Response for trade openness was negative sign and statistical significant elasticity. Furthermore, the elasticity of real GDP for 1 percent of change in trade openness was -0.31658 percent decreases in real GDP. This implies according to traditional view, Ethiopia was characterized trade deficit which caused the inflow of capital accumulation from abroad lessens the effect of the fiscal policy change on capital accumulation. Moreover, fiscal policy change also cause the dollar to appreciate which is resulting fall in net export reduce the short run expansion impacts of the fiscal change on output and employment (Mankiw, 2009).

In addition to this, the theoretical literature (Ahmed, 2011) argued trade openness in developing countries were struggling to compensate their dollar balance which is caused by the paying of more for their import, capital, investment and government expenditure than to be paid for their balance of payment adjustment process but also put its own negative impact in the nation effort to improve primary education, basic health and per capita income of nation. As resulting, will reinforce to adjust the past iniquity, happing of foreign exchange deficit and thus, lead them time-taking macroeconomic instability.

Table 5.7: Error correction Representation for the selected ARDL (1,0,0,0,0) selected based on Schwarz Bayesian criterion.

| Dependent variable is DLNRGDP                        |             |                |         |         |
|--|-------------|----------------|---------|---------|
| 39 observation used for estimation from 1974 to 2013 |             |                |         |         |
| Regression   | coefficient | Standard Error | T-Ratio | [prob]  |
| DLNGNS   | 0.34088     | 0.064931       | 5.2498  | 0.000** |
| DLNGCE   | -0.73616    | 0.12513        | -5.8831 | 0.000** |
| DLNCPI   | -0.22851    | 0.15557        | -1.4689 | 0.152   |
| DLNTO  | -0.14461    | 0.038874       | -3.7201 | 0.001** |
| CONS   | 0.7325      | 1.4968         | 5.8340  | 0.000** |
| DTREND   | 0.041855    | 0.012521       | 3.3427  | 0.002** |
| ECM(-1)  | -0.45680    | 0.063112       | -7.2374 | 0.000** |
| R-Square   | 0.69896     |                |         |         |
| R-Bar-square   | 0.64251     |                |         |         |
| DW-Statistics  | 2.1175      |                |         |         |

Source: own computation based on MoFED (2016)

Note :(\*\*) indicate the variable that statistical significant at p=0.05 level.

Based on result of given in table 5.7 the short run economic growth equation is;

$$\begin{aligned}
 LNRGDP = & 8.3725 + 0.34088LNGNS - 0.73616LNGCE - 0.22851LNCPI \\
 P - value = & (0.000) \quad (0.000) \quad (0.000) \quad (0.152) \\
 & -0.14461LNTO - 0.45680ECM + 0.041855TREND \\
 & (0.001) \quad (0.000) \quad (0.002)
 \end{aligned}$$

Table 5.7 results reveals that the coefficient value expresses elasticity of dependent variable in one percent changes independent variable in the short run. The table result shows the short run effects of national saving to economic growth forward positive face and statistical significant at 5% significance level. The short run impact of national saving on economic growth is 0.340 which means a 1 percent change in national saving leads to 0.340 percent economic growth. This empirical finding is incorporate with past theoretical literature that suggests in the short run context saving rate might have indirect effect on the growth performance by improving macroeconomic stability and creating Cushion against external shocks (Abu, 2004).

Government consumption has adverse effect on economic growth in short run in Ethiopia. The elasticity of RGDP for 1 percent change of GCE is -0.73616 percent in the short run. Further, higher consumption may affect aggregate demands to expand and stimulates inflation rate

through government budget deficit. Hence, this may cause macroeconomic instability in short run.

The impact of trade openness is found to be negative effects on economic growth in short run. The elasticity of RGDP a 1 percent change in TO is -0.1446 percent in the short run. This may be reflecting beside, openness exposes countries to external shocks that can trigger domestic conflicts and political upheavals in the short run.

ECM (-1) is most important it should at least be negative and significant and also if it is better its value be between 0 and -1, then it will be ensure that there is convergence in the model which indirectly means that there is a significant long run relation. Our finding is argued with this thought; it indicates the speed of adjustment which restores equilibrium in the dynamic model. It should be statistical significance coefficient with expected negative sign it measure how quickly variables return to equilibrium due to certain shock adjusted by 46% over next year. In addition to, the variable have both short and long run component significant, it indicates variables have strong causal effects on the dependent in the long run.

**Table 4: Granger causality Wald test.**

| Equation | Excluded | Chi2    | df | Pro>chi2  |
|----------|----------|---------|----|-----------|
| LNRGDP → | LNGNS    | 6.4789  | 1  | ( 0.011)* |
| LNRGDP → | LNGCE    | 2.20067 | 1  | 0.137     |
| LNRGDP → | LNCPI    | 16.049  | 1  | ( 0.000)* |
| LNRGDP → | LNTO     | 0.07994 | 1  | 0.777     |
| LNRGDP → | ALL      | 26.889  | 4  | (0.000)*  |
| LNGNS →  | LNRGDP   | 11.855  | 1  | ( 0.001)* |
| LNGNS →  | LNGCE    | 8.8376  | 1  | ( 0.003)* |
| LNGNS →  | LNCPI    | 14.057  | 1  | ( 0.000)* |
| LNGNS →  | LNTO     | 0.94749 | 1  | 0.330     |
| LNGNS →  | ALL      | 26.438  | 1  | ( 0.000)* |
| LNGCE →  | LNRGDP   | 0.246   | 1  | 0.620     |
| LNGCE →  | LNGNS    | .14908  | 1  | 0.699     |
| LNGCE →  | LNCPI    | 1.1326  | 1  | 0.287     |
| LNGCE →  | LNTO     | 0.00368 | 1  | 0.952     |
| LNGCE →  | ALL      | 1.7882  | 4  | 0.786     |
| LNCPI →  | LNRGDP   | .39319  | 1  | 0.531     |
| LNCPI →  | LNGNS    | .03314  | 1  | 0.856     |
| LNCPI →  | LNGCE    | .22692  | 1  | 0.634     |
| LNCPI →  | LNTO     | 3.2338  | 1  | 0.072     |
| LNCPI →  | ALL      | 8.5152  | 4  | 0.074     |
| LNTO →   | LNRGDP   | 1.2575  | 1  | 0.162     |
| LNTO →   | LNGNS    | .94142  | 1  | 0.332     |
| LNTO →   | LNGCE    | 18.304  | 1  | (0.000)*  |
| LNTO →   | LNCPI    | .39221  | 1  | 0.531     |
| LNTO →   | ALL      | 20.618  | 1  | ( 0.000)* |

Source: own computation based on MoFED(2016)

(\*) donated ,the granger causality can be evidenced through the statistical significance of the chq-test at 5% which means the null hypothesis of one variable does not granger cause to other variable considered in this study is rejected.

The granger causality test assume that the information relevant to the prediction of variables. The investigation feedback in the given table 9 shows that there is bi-directional causality between real economic growth and gross national saving in Ethiopia. this finding is opposite to holding in Pakistan that is there no causality relationship between two variables (Muhammad, 2012). This



means in the long run there is bilateral causality between the national saving and economic growth. This means economic growth Granger causes the national saving and national saving granger cause the economic growth. The results indicate that the economic growth could stimulate the national saving, and also national saving could accelerate the economic growth in the long run. There is uni-direction causality from gross national saving to government consumption and inflation rate. It indicates the national granger cause to government consumption and inflation rate. This means national saving could stimulate the government consumption and inflation rate in the long run. There is uni-direction between economic growth and inflation. This means the economic growth that causes the inflation rate. It indicates economic growth could stimulate the inflation rate in the long run. Finally, the trade openness that causes the government consumption. This means the trade openness could stimulate the government consumption expenditure in the long run in Ethiopia

# **CHAPTER-SIX**

## **CONCLUSIONS AND POLICY RECOMMENDATIONS**

### **6.1. Conclusions**

This study employed the impact of national saving on economic growth by using time series data from 1974 -2013 to examined the short and long run effects of gross national saving on economic growth as well as causality direction of some macroeconomic variables such as, RGDP, GNS, GCE, CPI, Openness (TO) in Ethiopia. The method used Augmented Dickey-Fuller and Phillip-Perron to test stationary, hence all variable considered in this study become stationary at the first difference which is integrated in the order one, i.e., I(1) and analysis ARDL estimation and ECM of ARDL version to examine the long and short-run impacts as well as causality direction between national saving and economic growth. The result provides strong evidence that national saving has positive and statistical significance effects on economic growth but government consumption and trade openness have negative and statistical significance effects on economic growth in long and short-run at 5% for Ethiopia. Similarly, there is bi-direction granger causality between national saving and economic growth in Ethiopia. This finding evidence supporting the effects of national saving on economic growth has important implication for the formulation of macroeconomic policies to accelerate higher growth rate for Ethiopia. In addition to, national saving granger cause to inflation and government consumption and trade openness granger cause to government consumption in Ethiopia. This channeled with line of Singh (2009) that need to accelerate saving to foster higher income growth and generate the virtuous circles of high saving and high growth

### **6.2: Policy Recommendation**

The study has given important policy direction to implement in influential in economic growth path with chain of national saving. Persistent challenges in Ethiopia is un amendment and wide saving –investment gap which is financed by external source before now. Even if, saving habit has registered well performance in the recent time. Country relying on external source of finance which expose to uncontrolled risk, due to this it to be reinforced to motivate on reliance of saving

rate to finance the investment. Hence, gives incentive to government increase national saving to finance.

- ✚ Policy maker should follow the chain of national saving and economic growth through in macroeconomic policy and financial sector to achieve saving objectives. The understanding the behavior of economic agents with respects to the allocation of their economic resource for the purposes of consumption and saving requires is basic force to saving motive. The objectives of saving motive includes precautionary, the life-cycle, the inter-temporal substitution, enterprise, the independence, the dawn payment, the improvements and the bequest motive. Further, this microeconomics decision shapes aggregates allocation of resources of macroeconomics from the perspective of national saving.
- ✚ Accountability in the national saving rate takes a truly investment activity enhancing, growth promoting and prudent in fiscal and monetary policy environment in Ethiopia. Therefore, the country should ensure appropriate incentive schemes and financial instrument that appeal and suitable to the majority of the private sector to engage in saving efforts.
- ✚ The macroeconomic stability is accountable through low inflation rate, which is the macroeconomic policy tool to increase saving rate in Ethiopia. Moreover, the macroeconomic stability is precondition to keep economy wellbeing to be continued. In Addition to, this political stability is main things that to improve national saving and sustain economic growth in Ethiopia.
- ✚ Implementing advanced financial development schemes could help to keeping inflation rate under control, subsequent use as input to encourage saving rate efficiently and smoothly follow of economic growth. These leads to deepening financial with movable banking sector that help both public and private economy are a key to motivate saving rate. Hence, could be promoting saving product environment through innovation due to more competition of the financial sector.
- ✚ Recently, the government is creating conducive investment environment to mobilize saving rate in Ethiopia. The implementation should be continue with strategic way to mobilize the household saving through smoothly financial sector accessibility, promoting

attractive investment environment with attractive funding from the large Ethiopian Diaspora and keeping macroeconomic stability.

- ✚ Banking system should be managed saving instrument that is not to be financial instability, large and negative real interest rate. This reinforce saving to be negative, and hence it is cause to household saving to be sharply reduced, or they shift their saving abroad (which is called capital flight) or/and they accumulate their saving in unproductive asset such as gold.
- ✚ Finally, however Ethiopia currently runs budget and current account deficit to achieve huge investment; this makes the opportunities to employment and reducing dependent ratio. Hence saving can be improved.

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## Appendices

### Appendix i: Estimation of ARDL for diagnostic test

: Autoregressive Distributed Lag Estimates

ARDL (1,0,0,0,0) selected based on Schwarz Bayesian Criterion

\*\*\*\*\*

Dependent variable is LNRGDP

39 observations used for estimation from 1975 to 2013

\*\*\*\*\*

| Regressor  | Coefficient | Standard Error | T-Ratio[Prob] |
|------------|-------------|----------------|---------------|
| LNRGDP(-1) | .54320      | .063112        | 8.6069[.000]  |
| LNGNS      | .34088      | .064931        | 5.2498[.000]  |
| LNGCE      | -.73616     | .12513         | -5.8831[.000] |
| LNCPI      | -.22851     | .15557         | -1.4689[.152] |
| LNT0       | -.14461     | .038874        | -3.7201[.001] |
| INPT       | 8.7325      | 1.4968         | 5.8340[.000]  |
| TREND      | .041855     | .012521        | 3.3427[.002]  |

\*\*\*\*\*

|                            |         |                            |               |
|----------------------------|---------|----------------------------|---------------|
| R-Squared                  | .94452  | R-Bar-Squared              | .93412        |
| S.E. of Regression         | .13687  | F-stat.F( 6, 32)           | 90.7994[.000] |
| Mean of Dependent Variable | 9.7950  | S.D. of Dependent Variable | .53323        |
| Residual Sum of Squares    | .59944  | Equation Log-likelihood    | 26.0801       |
| Akaike Info. Criterion     | 19.0801 | Schwarz Bayesian Criterion | 13.2576       |
| DW-statistic               | 2.1175  | Durbin's h-statistic       | -.39920[.690] |

\*\*\*\*\*

#### Diagnostic Tests

\*\*\*\*\*

| Test Statistics *   | LM Version | *              | F Version |
|---|------------|----------------|-----------|
| *A: Serial Correlation*CHSQ( 1)=.41716[.518]*F( 1, 31)= .33518[.567]  |            |                |           |
| *Functional Form *CHSQ( 1)=1.7620[.184]*F( 1, 31)= 1.4669[.235]       |            |                |           |
| *C: Normality*CHSQ( 2)= .018888[.991]*                                |            | Not applicable |           |
| *D: Heteroscedasticity*CHSQ ( 1)=2.2152[.137]*F( 1, 37)= 2.2282[.144] |            |                |           |

\*\*\*\*\*

A: Lagrange multiplier test of residual serial correlation

B: Ramsey's RESET test using the square of the fitted values

C: Based on a test of skewness and kurtosis of residuals

D: Based on the regression of squared residuals on squared fitted values

### Appendix ii: Estimation of long run coefficient using ARDL approach

: Estimated Long Run Coefficients using the ARDL Approach

ARDL(1,0,0,0,0) selected based on Schwarz Bayesian Criterion

\*\*\*\*\*

Dependent variable is LNRGDP

39 observations used for estimation from 1975 to 2013

\*\*\*\*\*

| Regressor | Coefficient | Standard Error | T-Ratio[Prob]   |
|-----------|-------------|----------------|-----------------|
| LNGNS     | .74623      | .14560         | 5.1252[.000]**  |
| LNGCE     | -1.6116     | .25725         | -6.2645[.000]** |
| LNCPI     | -.50025     | .35074         | -1.4263[.163]   |
| LNT0      | -.31658     | .092107        | -3.4371[.002]** |
| INPT      | 19.1167     | 2.5655         | 7.4516[.000]**  |
| TREND     | .091627     | .028979        | 3.1619[.003]**  |

\*\*\*\*\*

### Appendix iii: Error correction representation for the selected ARDL model

Error Correction Representation for the Selected ARDL Model

ARDL(1,0,0,0,0) selected based on Schwarz Bayesian Criterion

\*\*\*\*\*

Dependent variable is dLNRGDP

39 observations used for estimation from 1975 to 2013

\*\*\*\*\*

| Regressor | Coefficient | Standard Error | T-Ratio[Prob] |
|-----------|-------------|----------------|---------------|
| dLNGNS    | .34088      | .064931        | 5.2498[.000]  |
| dLNGCE    | -.73616     | .12513         | 5.8831[.000]  |
| dLNCPI    | -.22851     | .15557         | 1.4689[.152]  |
| dLNT0     | -.14461     | .038874        | 3.7201[.001]  |
| dINPT8    | .7325       | 1.4968         | 5.8340[.000]  |
| dTREND    | .041855     | .012521        | 3.3427[.002]  |
| ecm(-1)   | -.45680     | .063112        | 7.2379[.000]  |

\*\*\*\*\*

List of additional temporary variables created:

dLNRGDP = LNRGDP-LNRGDP(-1)

dLNGNS = LNGNS-LNGNS(-1)

dLNGCE = LNGCE-LNGCE(-1)

dLNCPI = LNCPI-LNCPI(-1)

dLNT0 = LNT0-LNT0(-1)

dINPT = INPT-INPT(-1)

dTREND = TREND-TREND(-1)

ecm = LNRGDP -.74623\*LNGNS + 1.6116\*LNGCE + .50025\*LNCPI +  
 .31658\*LNT0 -19.1167\*INPT -.091627\*TREND

\*\*\*\*\*

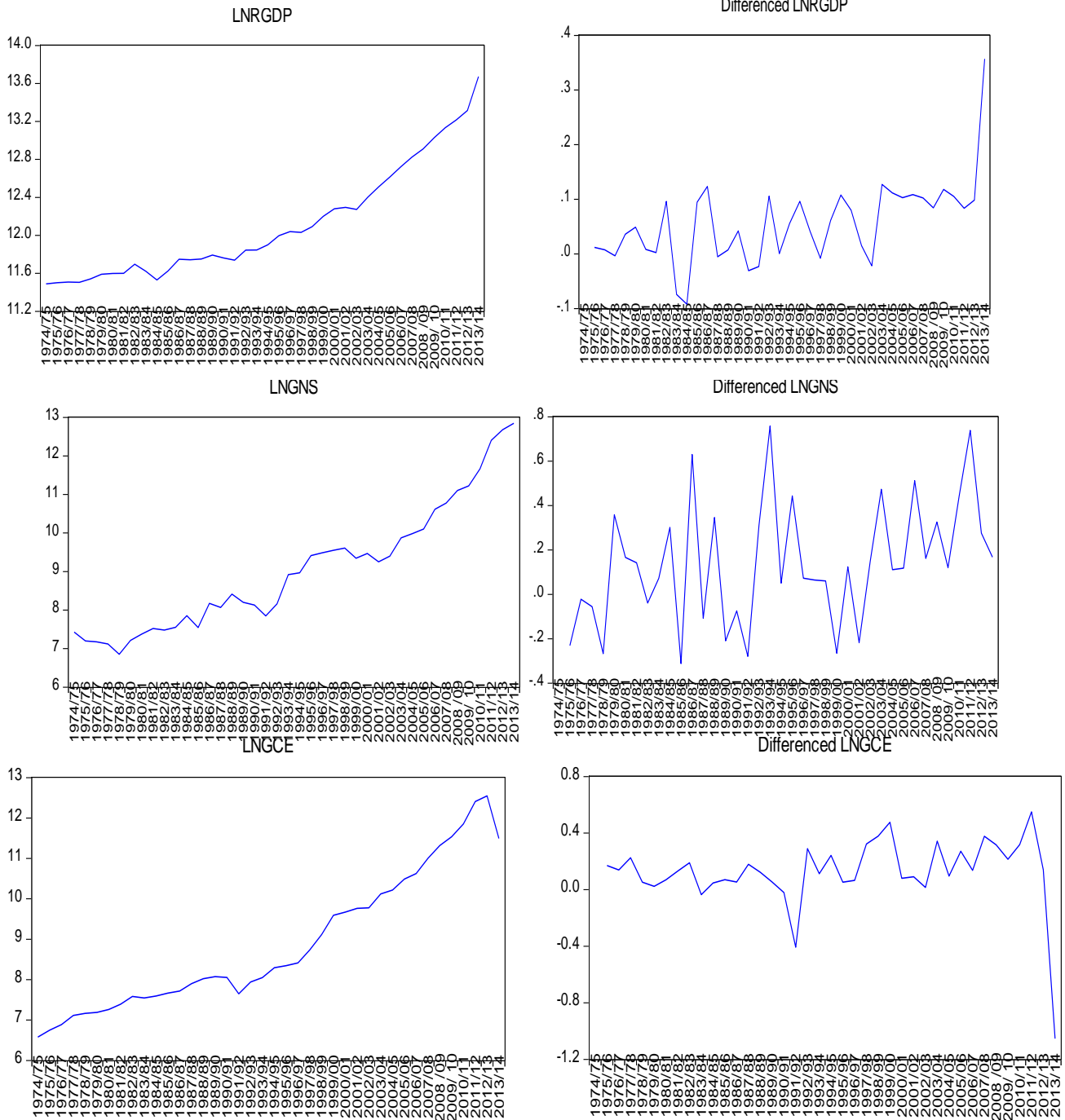
|                            |         |                            |               |
|----------------------------|---------|----------------------------|---------------|
| R-Squared                  | .69896  | R-Bar-Squared              | .64251        |
| S.E. of Regression         | .13687  | F-stat.F( 6, 32)           | 12.3830[.000] |
| Mean of Dependent Variable | .036326 | S.D. of Dependent Variable | .22891        |
| Residual Sum of Squares    | .59944  | Equation Log-likelihood    | 26.0801       |

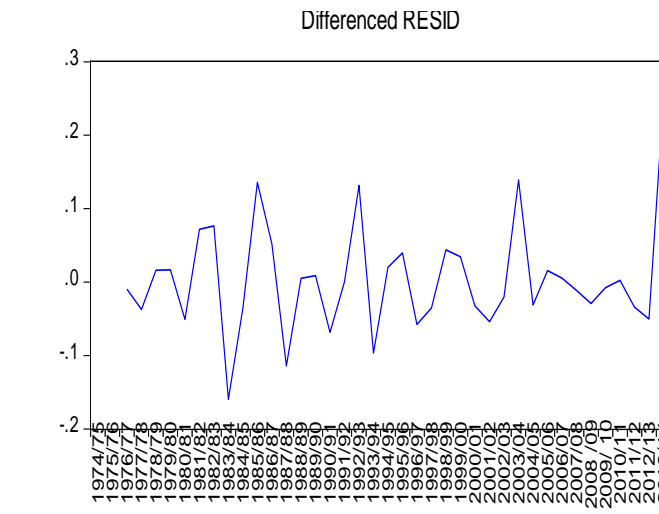
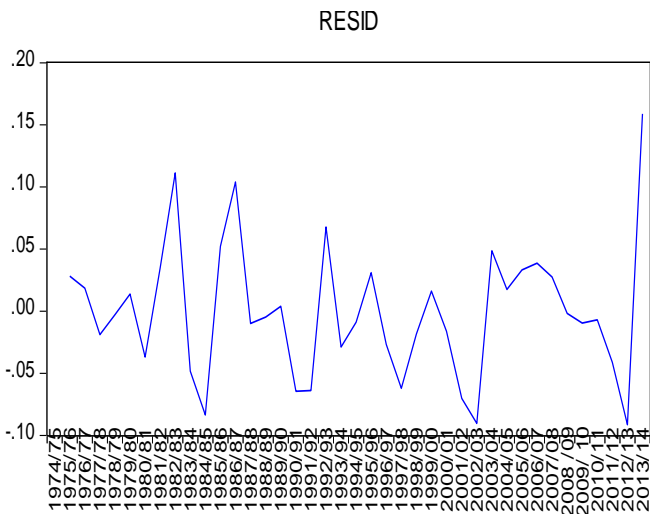
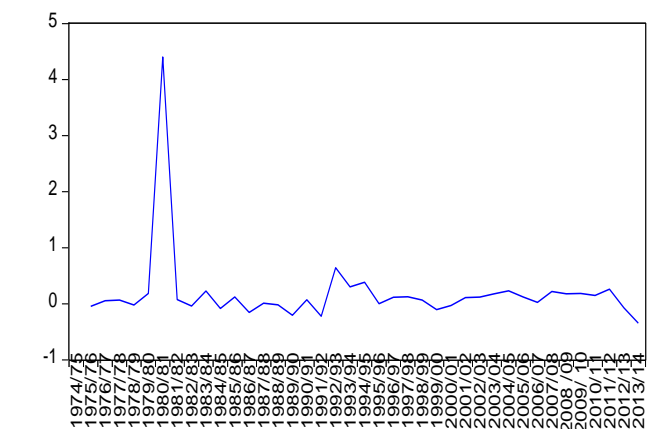
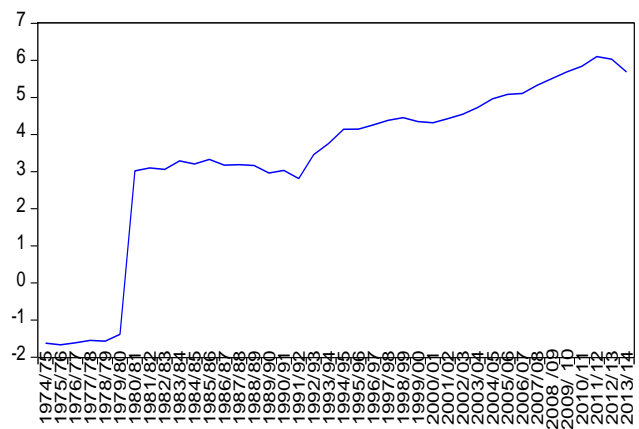
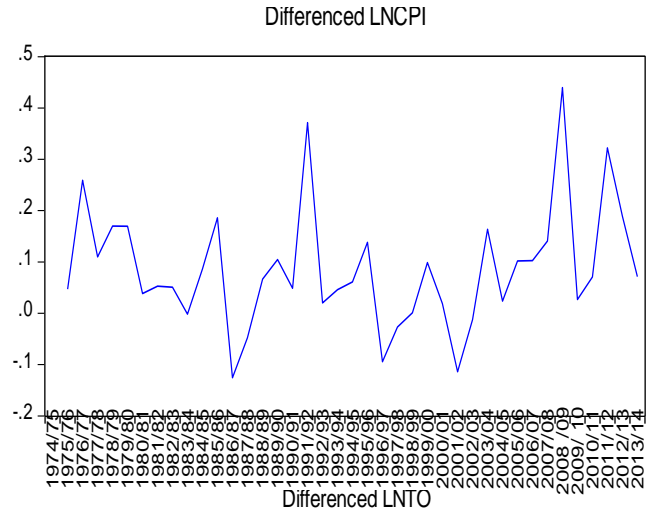
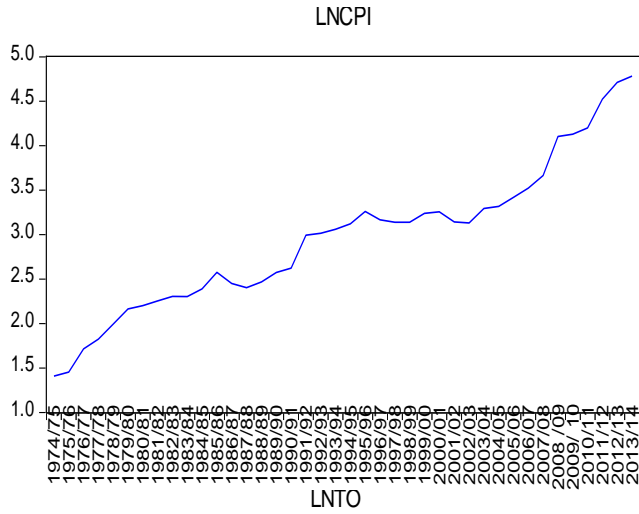
Akaike Info. Criterion 19.0801 Schwarz Bayesian Criterion 13.2576  
 DW-statistic 2.1175

\*\*\*\*\*

R-Squared and R-Bar-Squared measures refer to the dependent variable dLNRGDP and in cases where the error correction model is highly Restricted, these measures could become negative

### Appendix iv: variables included in an analysis at the level and first difference





### Appendix v: Stability test

