

# **DETERMINANTS OF DOMESTIC SAVING IN ETHIOPIA**

**A thesis submitted to the school of graduate studies of Jimma University  
in partial fulfillment of the requirements for the degree of Masters of  
Science in Economics (Economic policy analysis)**

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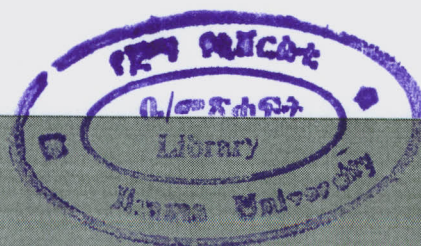
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## DECLARATION

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

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## Acronyms and Abbreviations

GDP	Gross Domestic Product
LCH	Lifecycle Hypothesis
RIH	Relative Income Hypothesis
PIH	Permanent Incomes Hypothesis
GTP	Growth and Transformation Plan
WB	World Bank
EPRDF	Ethiopian People's Revolutionary Democratic Front
MOFED	Ministry of finance and Economic development
NBE	National Bank of Ethiopia
OECD	Organization for Economic Cooperation and Development
IFS	International Financial Statistics
EEA	Ethiopian Economics Association
AIC	Akaike Information Criterion
HQ	Hannan-Quinn Criterion
SC	Schwartz criterion
LR	Likelihood ratio
ADF	Augmented Dickey-Fuller test
DF	Dickey-Fuller test
VAR	Vector auto regressive
VECM	Vector Error Correction Model
ARDLM	Auto regressive Distributed Lag Model

## **Abstract**

*The objective of this paper is to investigate the determinants of domestic saving in Ethiopia using time series annual data form 1969/70-2010/11. In this study, both qualitative explanations and econometric analysis are used. The qualitative (descriptive) part of the analysis shows that average domestic saving in Ethiopia was low and continuously falling. In the econometric analysis, effort has been made to identify the long run and short run determinants of domestic saving in Ethiopia using Johnson Maximum Likelihood co-integration test and Vector error correction mechanism (VECM). Estimated results reveal that growth rate of GDP, government consumption and foreign aid are statistically significant long run determinants of domestic saving in Ethiopia. On the other hand, deposit interest rate, dependency ratio, and financial depth are found to be insignificant determinants. However, in the short run, all the explanatory variables included in this study do not have statistically significant meaning in explaining domestic saving in Ethiopia. The speed of adjustment has value 0.585743 with negative sign, which shows the convergence of saving model towards long run equilibrium. By considering the significant as well as insignificant but very important variables to enhance domestic saving: Sustainable economic growth, increasing private sector participation as well as selective privatization of government owned institutions, expansion of financial intermediaries and creating competitive environment in the financial sector are suggested to improve domestic saving in Ethiopia.*

# CHAPTER ONE

## INTRODUCTION

### **1.1. Background**

Financial resource is one of the key factors that affect domestic investment. There are two main views regarding the means of financing domestic investment. The first view is that, in the world of perfect capital mobility, domestic investment is determined by the international flow of capital. This idea magnifies the role of international saving than domestic saving to finance domestic investment. In other words, if capital is perfectly mobile, domestic investment may be less correlated with domestic saving. The other view is that due to the existence of substantial impediments to capital mobility across international borders, domestic investment is highly dependent on domestic savings. According to the second view, since foreign saving is something exogenous, countries that tried to depend on foreign savings can be highly affected by external shocks. In this regard, most economists argue that domestic saving is the major determinant of domestic investment (Feldstein, 1983; Khan, 2006; Culpeper, 2008).

Following the argument on the major role of domestic saving to finance domestic investment, what determines the level of domestic saving has been the concern of macro economists as well as policy makers. Economic literatures tell us that domestic saving can be affected by several factors. Theoretically, Keynesian consumption theory, lifecycle hypothesis (LCH) and permanent income hypothesis (PIH) laid the foundation

to analyze the determinants of saving behaviors. Keynes argued that current disposable income is the main determinant of saving. According to him, it is higher disposable income that leads to higher domestic saving. The LCH and PIH, on the other hand, postulated that income growth and demographic factors such as age structure and life expectancy are the major determinants of domestic saving (Modigliani, 1986).

Empirically, the determinants of domestic saving have been examined in several studies. These studies have also been conducted at various levels. While some studies tried to investigate the determinants at international level (e.g. see Masson et al, 1998), and some others investigated the determinants at various organizational and regional levels (e.g. see Keho, 2011; Adewuyi et al, 2007). In addition to these there are groups that also focused on country level studies.

Even though each study has its own strength, cross-country studies are mainly criticized on the ground that it assumes homogeneity in the observed relationship across countries. This is a very restrictive assumption because each country has its own various social, economical and political backgrounds. On this ground, country level studies are appreciated to handle the problem of heterogeneity.

Several country level studies have been conducted to show the major determinants of domestic saving in developing countries. For example, Athukorala and Sen (2004) investigated the effects of policy and non-policy variables on the private saving rates of India and the study identified that both the level and growth rate of disposable income,

real interest rate on bank deposit, public saving, banking facilities, inflation and external terms of trade are major determinants of private savings in India. As stated in another study conducted by Touny (2008) to the case of Egypt, growth of per capita income, budget deficit ratio, development of financial market, real interest rate, inflation, and current account deficit are the major determinants of domestic saving.

In Ethiopia, very few studies were conducted to explore the major determinants of domestic savings. To the best of the researcher knowledge, Abu (2004), Kidane (2009), and Worku (2010) have tried to analyze the determinants of domestic saving in Ethiopia using time series data. While the first study conducted by Abu (2004) identified growth rate of income, lagged growth rate of income, level of current income, foreign saving, current account deficit, inflation and financial depth as major determinants, the study undertaken by Worku (2010) revealed that current per capita incomes, export, lag in government consumption and current inflation rate are most important determinants of domestic saving in Ethiopia. Kidane (2009) also reported that current per capita income level, growth rate of per capita income, tax growth rate, inflation, dependency ratio, and lagged domestic saving rate are the major determinants of domestic saving in Ethiopia.

The purpose of this study is; therefore, to further investigate the major determinants of domestic saving in Ethiopia by applying Johansson co-integration procedure and VECM.

## **1.2. Rationale**

In today's real world the idea that saving is highly important for sustainable economic growth increases the emphasis given to raise domestic savings. For example, the reason

for the recent miraculous economic growth in south East Asian countries is highly associated with the high rate of capital accumulation achieved through high rate of domestic savings (Stiglitz, 1996).

In developing countries, like Ethiopia, domestic saving rate is very low for several decades. Due to this reason capital accumulation was very low and is mostly mentioned as one of the main constraints that were responsible to the slow and sometimes retarded economic growth registered so far.

It is clear that understanding what affects domestic saving behavior in a particular country or region is the first step in the process of boosting saving. This is important to introduce a new policy measure or strengthen the existing ones to enhance domestic saving. Therefore, the rationale behind this particular study is to show which of the factors are affecting domestic saving in Ethiopia. This study applied econometric tools to evaluate the role of per capita income, growth rate of income, dependency ratio, interest rate, financial depth, inflation, government consumption, and foreign aid in the Ethiopian domestic saving.

### **1.3. Statement of the Problem**

It is fact that domestic saving in Ethiopia is very low. During the period between 1969/70 to 2010/11, the average domestic saving rate was only 7.9 per cent of GDP. Average domestic saving rate was 13.8 per cent of GDP during the period from 1969/70- 1973/74, around 7 per cent from 1974/75-1990/91 and about 7.3 per cent from 1991/92 -

2010/11. As a result of this, the saving investment gap in Ethiopia has been widening for more than three decades. This means, while average saving investment gap as a percentage of GDP for the period from 1974/75- 1990/91 was 6.11, it increased to 11.1 during the period from 1991/92-2002/03. This average also raised to 16.6 per cent in the period between 2003/04 and 2010/11.

Low domestic saving rate has at least two major problems. From a long run perspective, low domestic saving affects the countries growth rate. Even though, foreign capital can be used to finance domestic investment, in the long run international capital flows are limited, and thus that a sustained rise in the rate of domestic investment requires a sustained rise in the rate of domestic saving (Bruno, 1996; Razin, 1996 as cited in Gavin et al, 1997). From the short-run perspective, low domestic saving increases vulnerability to macro economic instability. A lower or declining saving rate may occasionally force to run large capital account deficits to maintain reasonable levels of investment. Moreover, excessive reliance on foreign saving unduly exposes the economy to the volatile international capital market. A sudden decline in the inflows of capital might force on the recipient economy a very unexpected and, therefore, disruptive macroeconomic adjustment.

Since 2003/04, Ethiopia has experienced fastest economic growth for eight consecutive years. While the average growth rate of real GDP between 1996/97 and 2002/03 was 4 per cent, it significantly jumped to around 11.3 per cent between 2003/04 and 2010/11 (MOFED, 2010/11). According to lifecycle and permanent income hypothesis, economic growth is one of the primary determinants of domestic saving through its effect

on the lifetime income of the working population (Modigliani, 1986). However, similar to the previous period, saving rate has never shown a sign of improvement between 2003/04 and 2010/11. Instead, it showed decline in the average saving rate of the country which declined from 7.4 per cent between 1991/92 and 2002/03 to 7.1 per cent between 2003/04 and 2010/11. This implies that, even though there was economic growth, the trend shows domestic saving rate in Ethiopia has never changed and this seems inconsistent with the life cycle and permanent income hypotheses.

A sufficiently strong saving performance is an important precondition for achieving sustainable economic growth, macroeconomic balance and financial and price stability. The researcher believes that, the long stayed low domestic saving rates in Ethiopia were the result of weak performances in the macro economic variables that could enhance domestic saving. Low domestic saving may also arise when the impact of negative determinants of domestic saving outweighs positive contributors.

Therefore, identifying the major determinants of domestic saving in Ethiopia might help to understand which variables are responsible for the low saving rates registered so far and what would be the interventions to tackle this critical problem.

#### **1.4. Research Questions**

The paper aimed to answer the basic questions:

1. What are the determinants of domestic saving in Ethiopia?
2. How these factors affect the long run and short run saving behavior of the economy?



3. If there is long run relationship between saving and its determinants how the deviation will adjust towards the long run equilibrium or to find out the speed of adjustment?

### **1.5. Objective of the Study**

The main objective of this study is to identify the major determinants of domestic saving in Ethiopia. To achieve the main objective, the following specific objectives are targeted:

- Assess the performance of domestic saving and its determinants in Ethiopia.
- Empirically investigate the long run and short run determinants of domestic saving in Ethiopia
- Give policy recommendation regarding domestic saving in Ethiopia.

### **1.6. Significance of the Study**

Effective resource mobilization is a key for sustainable economic growth. Therefore, this study can give important insights to policy makers and researchers about the determinants of domestic saving in Ethiopia. With the recent revival of growth in Ethiopia, the demand for investable resource is expected to increase. Unless the increasing investment demand can be properly matched through rising domestic saving, the observed economic growth will not be sustainable.

Since the attempt to increase such a low level of saving rate needs, first, a critical investigation of what affects saving behavior in Ethiopia, this study might assist policy makers by providing feed backs on the major determinants of domestic saving.

Moreover, in the current GTP of Ethiopia, the government has a plan to raise the domestic saving rate from its lowest level (5.5 percent in 2009/10) to a minimum of 15-17 per cent by the end of the plan period (i.e, 2014/15) (EEA, 2011). Therefore, this study is very important in that it tries to address one of the contemporary economic issues of the country.

Lastly, the researcher hopes that this research will motivate researchers to conduct further investigations on saving behaviors and other related issues of the country.

### **1.7. Scope and Limitation of the Study**

The study is designed to explore the major determinants of domestic savings in Ethiopia using a time series data that covered the period between 1969/70-2010/11. The reason why 1969/70 is chosen as a cutoff point is due to the availability of data for all of the variables of interest starting from this period.

One limitation of this study is that it uses data obtained from different sources. In addition, since the data reported by different organizations are different, it created lack of confidence about the reliability of data. Hence, the econometric result of this study is also limited by the quality of the data.

## **1.8. Organization of the Thesis**

The remaining part of the thesis is organized in 5 parts. The second chapter is devoted to the review of theoretical and empirical literatures. The third chapter of this thesis covers the methodology applied to estimate and analyze the model as well as the type and sources of the data used. Chapter four of this thesis deals with the descriptive part of the analysis. The fifth chapter also contains the discussion and Estimation of results. Finally, conclusions, policy implications and areas of further research are presented in chapter six.

## CHAPTER TWO

### LITERATURE REVIEW

#### 2.1. Theoretical Literature

Saving is the part of income left over consumption. Hence, the developments of saving theories were associated with the development of consumption theories. The most widely mentioned theoretical bases of consumption and saving are: the Keynesian consumption theory (absolute income hypothesis), Relative income hypothesis by Dusenbary, Ando-Modigliani's lifecycle hypothesis, Friedman's permanent income hypothesis, and the recent buffer -stock theory of saving. Hence, this theoretical literature part aims to show the contributions of these different theories for the existing knowledge's of saving.

##### 2.1.1. Keynesian Absolute Income Hypothesis

The basic Keynesian consumption function shows that consumption expenditure is determined mainly by current disposable income (Mankiew, 2000). Keynesian consumption function is usually written in a linear form as follows.

$$C_t = \alpha + \beta Y_t \quad \dots\dots\dots (1)$$

Where  $\alpha$  and  $\beta$  represents autonomous consumption and the marginal propensity to consume (MPC) respectively.  $C_t$  and  $Y_t$  also represents consumption expenditure and disposable income at any time "t" respectively.

If the definition of saving at any time "t" is given by  $S_t = Y_t - C_t$ , then the saving function is;

$$S_t = -\alpha + (1 - \beta)Y_t \dots\dots\dots (2)$$

Where  $-\alpha$  reflects the amount of saving when current income is zero and the coefficient  $(1 - \beta)$  is the marginal propensity to save (MPS).

Equation (2) indicates, like current consumption expenditure, saving is determined by the current disposable income.

Keynes used two measures of the sensitivity of saving to income: average and marginal propensity to save. In the above linear saving function, marginal propensity to save is constant. However, since average propensity to save is the ratio of total saving to total income, it can be simplified to the following equation:

$$APS = (1 - \beta) - \frac{\alpha}{Y_t} \dots\dots\dots (3)$$

From equation (3) above, MPS is greater than APS showing that average propensity to save rises with disposable income. This shows that a higher absolute level of income lead to a greater proportion of income to be saved.

According to Keynesian absolute income hypothesis equation (3) can be used to explain the saving behavior of the relatively poor countries. In poor countries saving rate can increase with rising disposable income. However, for rich countries the size of saving rate might decline as per capita income rises to higher level and may even become negative when investment opportunities and growth are relatively lower.

However, Keynes's saving function that implies saving is always an increasing function of current income faced immediate challenge from the side of Kuznets. Simon Kuznets have tried to empirically test the Keynesian saving function using a time series data taken from United States. He estimated two different consumption functions (long run and short run) that gave him two different results and this is commonly called the Kuznets paradox. The paradox was that the share of income saved increases with income only in the short run, but becomes constant in the long run. In the long run, marginal and average propensities to consume are equal. In other words, the proportion of income to be saved will be constant in the long run. Kuznets also found evidence supporting the short run result from cross-sectional data using individual household's consumption expenditure. His cross-sectional study revealed that high income household saves a larger fraction of their income than lower income households did (Mankiw, 2000).

### **2.1.2. Relative Income Hypothesis (RIH)**

The Kuznets paradox failed to explain how two different consumption functions can arise. The relative income hypothesis, therefore, is developed in the attempt to reconcile those conflicting results. Relative income hypothesis is developed by James Duesenberry in 1949. The hypothesis postulates that consumption not only depends on current income but the current income relative to some income standard that the household sets based on its own past income or on the income of other households around it (Mankiw, 2000).

RIH was built based on two variants of models: cross section and time series models. The cross-section version of the study shows that household consumption depends not

just on its own current level of income, but on its income relative to those in the subgroup of the population with it identifies itself.

On the other hand, the time series version of the hypothesis found that consumption depends on the current income relative to its own past income levels. Therefore, a household that enjoyed higher income in the past than present attempts to maintain the high consumption levels that it achieved earlier. Hence, consumption would not fall in proportion when income falls. Therefore, saving rate will decline whenever income falls. In other words, the time series version of the study shows saving not only depends on the current level of income but also on the lagged levels of income.

Although the relative-income hypothesis is quite successful in explaining the Kuznets paradox, it seems to have been relegated to the economic scrap heap. One important justification is that the cross-section variant involves interdependent utility functions in which one household's utility depends not only on its own consumption activities but also on those of other households. This interdependent utility functions greatly complicated the problem of modeling consumption behaviors and this opened the opportunity for the development of modern consumption theories.

Modern consumption theories were built based on the idea that consumption decision of individual's are subject to an inter-temporal decision-making process, the aim of which is to maximize utility. Inter- temporal decision reflects that rational and forward-looking consumer's decide how much to consume and how much to save depending on both the

present income and the income they expect in the future. As a result, consumers are always facing tradeoffs in their consumption decisions. The more they enjoy today, the less will be left for consumption in the future (Mankiw, 2000).

The two initially distinct modern consumption theories that eventually merged into one are the life cycle model developed by Franco Modigliani, Albert Ando, and Richard Brumberg in the mid-1950s and the permanent-income hypothesis introduced by Milton Friedman in 1957.

### **2.1.3. Life Cycle Hypothesis (LCH)**

Beginning from the two famous articles by Modigliani and Brumberg (1954) and by Ando and Modigliani (1963), life cycle hypothesis (LCH) has been the centerpiece of the modern, mainstream theory of aggregate consumption and saving behavior. The model starts from the classic Fisher postulate of individuals choose to maximize utility derived from their life resources by allocating them optimally between current and future consumption (Modigliani, 1986).

In simplest form, the model divides the lifetime of individuals into non-working and working period. In early life, labor income is usually low relative to later working years. Income increases during the middle age and typically peaks in the last part of the working life, and then drops at retirement. Consumers who wish to smooth consumption would prefer to borrow during the early low income years, repay those loans and build up



wealth during the high-income years, then spend off the accrued savings during retirement (Schmidt-Hebbel and Serven, 1999).

Because income tends to fluctuate systematically over the course of a person's life, saving behavior is determined by one's stage in the lifecycle. Therefore, the cornerstone of the lifecycle hypothesis is age related consumer heterogeneity and the prediction that savings follow a hump shaped pattern, which is high at middle age and low at young and old age (Modigliani and Cao, 2004).

Basically, the structure of lifecycle hypothesis gives income growth and the age structure of the population a special role in explaining the national saving rate. Income growth increases the life time resource of the working population than the non- working group. Since consumption and saving decision depends on the life time earnings, it increases aggregate saving. Since the age structure of the population determines the size of the non -working population, it can greatly influence the level of national savings. The higher the share of the non-working population, the stronger the impact a decline in wealth causes at this stage of life. Aging populations therefore mean a lower saving rate, as saving by the active population is squeezed by the negative or low saving of those no longer in works.

In summary, lifecycle hypothesis shows that aggregate saving rate is unrelated to per-capita income but depends instead on the long-term rate of income growth.



#### **2.1.4. Permanent Income Hypothesis (PIH)**

According to the permanent income hypothesis, consumption depends on the permanent part of income. The hypothesis was put forward by Milton Friedman in 1957, which draws a distinction between permanent and temporary income. Friedman defined permanent income as the average income that households normally expect over their lives. People normally estimate their average income by looking at their current wages and what they expect to earn in the future. It is based on this estimation that consumers plan their spending (Schmidt-Hebbel and Serven, 1999).

Permanent income changes do not justify current saving since more can be consumed now and in the future. Transitory income, on the other hand, is the positive or negative deviations from the permanent income. That means, transitory income constitutes unexpected income. Hence, since this income is unplanned part of income, all of or majority of such kind of income is assumed to be saved. The idea here is that consumer's use saving and borrowing to smooth consumption in response to transitory changes in income.

In summary, according to permanent income hypothesis higher growth (that is, higher future income) reduces current saving. In contrast to the life-cycle hypothesis, the permanent income hypothesis focuses on the income of consumer earned in recent past as well as expected future earnings (Mankiw, 2000).

### **2.1.5. Buffer Stock Theory of Saving**

The idea of buffer stock saving behavior is first introduced by Deaton (1991) and Carroll (1997). Though permanent income hypothesis predicts consumption is determined by the expected value of lifetime resources, two significant discrepancies occurred between the model's predictions and aggregate data. The first one is, contrary to the PIH, aggregate consumption growth is found much smoother than aggregate income growth (eg. see Deaton, 1989). Secondly, even though PIH predicts that consumption changes are orthogonal to predictable or lagged income changes, aggregate consumption growth was found to be excessively sensitive to lagged labor income growth (Blinder and Deaton, 1985). As a result, buffer-stock theory of saving was developed to modify the PIH by allowing for precautionary saving motives, impatience, and restrictions on borrowing.

The central idea of buffer stock saving is that consumers hold assets mainly in order to protect their consumption against unpredictable fluctuations in income. The theory predicts that because of important income uncertainty, consumers become both impatient and prudent. Impatience means that if income were certain, consumers would like to borrow against future income to finance current consumption and prudence in the sense that they have precautionary motive.

Carroll (1997) explained that uncertainty helps to explain why consumption follows income so closely (contradicting the simple permanent-income hypothesis) in the case of young consumers who expect positive but uncertain future income growth: their risk

aversion is at war with their impatience. It also explains why the retired save a positive amount or dissave little, as they face much uncertainty regarding the length of their life and health costs. According to him, under plausible circumstances this tension would imply the existence of a target wealth stock. Whenever wealth is below the target, fear or prudence will dominate impatience and consumers will try to save. On the other hand, if wealth is above the target, impatience will have a stronger role and consumers will plan to dissave.

In general, buffer stock behavior emerges if consumers with important income uncertainty are sufficiently impatient. Uncertainty about future income reduces current consumption, and thus rises saving and such kind of saving is called precautionary saving. The presence of precautionary saving implies that not just expectations of future income but also uncertainty about that income affect consumption and saving behaviors.

## **2.2. Empirical Literature**

Regarding the determinants of saving, there are several international, regional and country level studies conducted by using different methodologies. This empirical literature part has the aim to discuss some of the recent and most relevant literatures for this study. This survey of empirical literatures tried to include all forms of studies (i.e., international, regional and country level studies).

An interesting paper conducted by Masson et.al (1998) has shown the impacts of major variables affecting domestic private savings in developed and developing countries. In

this study<sup>21</sup> developed and 40 developing countries were examined by employing a time series data that covered the period 1971-93 and 1982-93 respectively and cross sectional data. According to this study, both GDP growth rate and level of per capita income had positive impacts on the private savings of developing countries. On the other hand, variables such as terms of trade, public saving and foreign saving affects negatively. Though the coefficient for interest rate is negative, it was found insignificant for developing countries. However, interest rate and terms of trade were found as positive determinants of private saving in developed countries.

Authukoral and Sen (2004) have examined the determinants of private savings in the case of India. The study applied a regression analysis using general to specific modeling procedure. Using annual time series data from 1954–1998, the study found that private saving rate in India rises with the level and growth rate of disposable income, interest rate, spread of banking facilities and inflation rate. The study also found that public saving and terms of trade have negative impacts on private saving in India. This implies that public saving has crowding out effect on private savings in India. The study reveals that Keynesian absolute income hypothesis and lifecycle /permanent income hypothesis explains saving behavior in India. Moreover, the study showed that Ricardian equivalence hypothesis do not hold for the case of India's private saving.

Agrawal et al (2007) also analyzed the long run saving functions for the case of India by using a time series data that covered the period from 1960-2004 and by applying different methodology. The study applied dynamic OLS (DOLS) procedures of co integration test. This procedure is important in that it provides unbiased and asymptotically efficient

estimates of long run relation, even in the presence of endogenous regressors. The study revealed that while higher income per capita and improved accesses to banking facilities significantly improve saving in India, foreign and public savings have negative impacts on private and household savings. In this study, interest rate was found as a negative determinant of both private and household savings in India. Though most of the findings of this study are consistent with the findings of Authukoral and Sen (2004), the two studies found a contradictory result on interest rate.

A study conducted by Kwack and Lee (2005) using time series data have tried to identify the major determinants of domestic saving for the case of Korean domestic saving. According to this study aggregate saving is positively affected by the moving average of the growth rate of income and variance of income growth. The young and older age dependency ratios were also found having a negative impact on aggregate saving rates in Korea. The study also concluded that foreign saving has negative impact on domestic saving. The results of this study supported the lifecycle hypothesis that advocates growth rate of income and demographic factors are most important determinants of domestic saving.

Baharumshah et al (2002) have made an empirical investigation to identify the major factors that influence saving behaviors in the fast growing Asian economies-Singapore, South Korea, Malaysia, Thailand and Philippines. The study used time series data that covered the years between 1960 -1997. This study conducted both short run and long run estimations for each country and found that domestic saving is related to income, interest rate, dependency ratio and foreign capital inflow. The result indicates economic growth is

a key positive determinant of domestic saving in the case of Singapore, South Korea, Malaysia and Thailand. The impact of foreign saving (capital inflow) was found negative in the short run in all Asian Countries except Thailand. However, the evidence is mixed in the long run. The impact of interest rate is also inconclusive. While interest rate has both a short run and long run negative impact in the case of Thailand, its impact is negative in the case of Singapore, Korea and Malaysia.

Keho (2011) have tried to investigate the long run determinants of saving behaviors in WAEMU (West African economic and monetary union) member countries for the period between 1970 to 2006. This study applied an ARDL bounds testing approach to analyze the long run determinants of saving. The advantage of this approach is that it can be best used to analyze long run relationships when variables are integrated of different orders. This method is also important since it can endogenously detect the time of structural breaks in the study period. This study has shown that demographic structure plays an important role in explaining the long run savings behaviors in Mali, Benin, Burkina Faso and Senegal. While dependency ratio has a positive impact on long run saving in Mali, it has a negative impact in Benin, Burkina Faso and Senegal. The result also revealed that growth rate of income has a positive impact in Burkina Faso, cote d'ivoire and Senegal. Even though financial depth has negative effect in Benin, Senegal and Togo, it has no statistically significant effect in the case of cote d'ivoire, Mali and Niger. However, it affected positively in the case of Burkina Faso. Interest rate also affects the long run savings of Benin and Burkina Faso positively. However, the impact is negative in the case of Mali. Inflation has a strong positive long run effect on domestic savings in Benin,

cote d'Ivories and Togo. But, inflation discourages domestic saving in the case of Mali. While the impact of foreign saving is found positive in the case of Mali, it negatively affects long run saving in the case of Niger and Togo. This study proves that the impacts of long run determinants of saving vary across countries.

Touny (2008) have empirically examined the factors that determine the saving performances of Egypt using a time series data from 1975-2006. The study applied Engle-Granger co-integration test and ECM to analyze the long run relationship among variables. This study indicated that growth rate of per capita income, development of financial market, real interest rate, and inflation rate are significant positive determinants of domestic saving in Egypt. On the other hand, budget deficit ratio, and current account deficit affects domestic saving ratio negatively. This study can show that lifecycle hypothesis holds true to Egypt. Moreover, the negative impact of external saving proxied by the current account deficit indicates foreign saving acts as a substitute to domestic private saving in the case of Egypt. The less proportional negative impact of budget deficit also showed there is no support of full Ricardian Equivalence in the case of Egypt.

Some of the determinants of national saving in Uganda were examined by Obwona and SSentamu (2010) by employing a time series data from 1984-1993. According to this study both real GDP and growth rate of GDP have a strong positive impacts on Uganda's domestic saving rate. This study reveals that interest rate did not have a significant impact on the domestic savings of Uganda. That means, the response of savings to real



interest rate change is very limited. Transfer of foreign capital in to the economy is also found as negative determinant of domestic saving for that economy.

Adeyemi et al (2007) have examined the factors that determine domestic saving behaviors of ECOWAS (Economic community of West African state) member countries using panel data, for the period from 1980 - 2008. The conclusion of this study was that growth rate of gross domestic income and financial development have insignificant impacts on domestic saving in all member countries. To the contrary, the impacts of income per capita, interest rate, and government budget position are found negative. Uncertainty variables such as Inflation and terms of trade also have negative impacts on domestic saving. Finally, this study can show that the impacts of per capita income and growth rate of income were not found consistent with the results found by Masson et al (1998) for the case of developing countries. Moreover, these results do not support the Keynesian as well as lifecycle hypothesis.

The major determinants of private saving in Turkey were also examined by Ozcan et al (2003) by using a time series data that covered the period from 1968- 1994 and applying OLS estimation technique. According to this study, growth rate of income did not have statically significant impact on Turkey's private saving. But, the impact of current income is found positive. It is reported that financial depth, inflation and terms of trade are factors that positively determine private savings in Turkey. In this study government saving and life expectancy were found as negative determinants of private saving. But, the impact of government saving on private saving is found less than the proportionate

change in the government saving. This implies Ricardian equivalence hypothesis does not hold strictly for the case of Turkey. Moreover, the study revealed that private saving rates have a strong inertia in the case of Turkey. One more important implication of this study is that Keynesian absolute income hypothesis holds true for Turkey's private saving.

Nwachukwu and Egwaikhede (2007) analyzed the determinants of private saving in Nigeria using error correction model by using annual data from 1970-2005. Results of this analysis revealed that saving rate rises with the level of disposable income but falls with the rate of growth of disposable income. This study also indicated that external terms of trade, inflation rate and external debt service ratio are positive determinants of private saving. On the other side, public saving and real interest rate on bank deposit were found significant negative determinants of private savings of Nigeria.

In the Ethiopian context, Abu (2004) has conducted a times series analysis for the period that covered the years between 1960/61 to 2003/04. In this study growth rate of income, lagged growth rates of income, level of current per capita income, inflation and financial depth are identified as significant positive determinants of aggregate domestic saving in Ethiopia. Foreign saving captured by the current account deficit is also another variable that positively influences domestic saving. In this study, the impact of public consumption expenditure and terms of trade shock were found negative. The positive impact of current income (per capita income) and growth rate of income shows that Keynesian absolute income hypothesis and Lifecycle /permanent income hypothesis holds true in the case of Ethiopia.

Another study conducted by Worku (2010) also investigated the major determinants of domestic saving in Ethiopia. This study applied Engle-Granger co-integration test and Error-correction model to analyze the long run relationship of variables using time series data that covered the year from 1960/61-2003/04. The findings of this study showed that per capita income, growth rate of income and export are positive determinants of domestic saving in Ethiopia. On the contrary, lag government consumption and current inflation rate affects negatively. The study also found statically insignificant impacts for population growth, nominal interest rate, import ratio and remittance. The results of this study confirmed that Keynesian and lifecycle hypothesis holds true in the case of Ethiopia.

One more recent working paper by Kidane (2009) also tried to identify some evidences on the determinants of domestic saving in Ethiopia using co-integration and error correction modeling by using time series data from 1971-2009. The outcomes of this study revealed that growth rate of per capita income and tax growth rate has positive impacts on domestic saving. The other findings of this study shows that, Inflation rate, dependency ratio and lagged domestic saving affected domestic saving negatively. Current per capita income is also among the negative determinant of domestic saving in the long run and turns to be insignificant in the short run. This negative impact of per capita income on domestic saving is neither consistent with the Keynesian absolute income hypothesis nor the findings of previous studies in Ethiopia and Masson et al (1998) for developing countries in general. In this study, interest rate and financial depth

were found statically insignificant factors. Unlike the case of per capita income, this result is consistent with the results of Masson et al (1998).

### **2.3. Research Gap**

This study can complement the previous studies in Ethiopia in at least the following three ways (i) It uses the longest time series data (ii) unlike previous studies that used Engle-Granger single equation co-integration test, this study applied Johansen maximum likelihood co- integration approach (iii) since studies in the area of saving were very few in number, the study also helps to further investigate the impacts of important variables such as income, dependency ratio, and degree of financial depth for which inconsistent results were found in the previous studies.

## CHAPTER THREE

### METHODOLOGY AND DATA SOURCES

#### **3.1. Variable Description**

The discussion of literature review suggests a number of factors, which might be important in determining domestic saving behavior in Ethiopia. However, taking into account data constraints, this study aims to examine the importance of per capita income, growth rate of income, dependency ratio, interest rate, financial depth, government consumption, inflation, and foreign aid to explain domestic saving in Ethiopia. A more detail description of the relationship between these variables and domestic saving are presented below.

##### **1. Per Capita Income (GDP)**

Keynesian absolute income hypothesis is the base to consider current income as an important explanatory variable of domestic saving. According to Keynesian absolute income hypothesis, saving is a stable, linear function of current income. Hence, because marginal propensity to save is constant over time, higher level of current income leads to higher domestic saving.

Per capita income difference is one of the factors that explain the wide range of saving rates in developing countries. While saving rate is low when per capita income levels do

not exceed the subsistence level, saving rate rises with per capita income. But, the size of saving rate might decline as per capita income rises to higher level and may even become negative for rich countries where investment opportunities and growth are relatively lower (Masson et al, 1998). However, the impact of per capita income on domestic saving in developing countries is expected to be positive.

Similar to other saving literatures, the impact of current income, in this study of saving, is captured by the real per capita income of Ethiopia for the considered period.

## **2. Income (GDP) Growth**

LCH and PIH showed that growth rate of income (GDP) highly determines domestic saving. According to life cycle hypothesis, with unchanged saving rates by age group, higher rate of income growth raises the aggregate income of active workers relative to those not earning labor incomes. When the income of active workers rose, it also raised lifetime resources on which consumption and saving depends. Thus, faster growing countries should have a higher aggregate saving rate (Modigliani, 1986). But, Tobin (1967 as cited in Ozcan et al,2003) argued that the assumption individual saving rate remains unchanged only works if future income is not anticipated. If future income is anticipatable, forward looking individuals will expect higher income in the future and individuals may want to consume more today. This in turn reduces the saving rate of working individuals and may offset the greater effect of higher growth rate. Therefore, the effect of income growth on saving depends on which cohorts benefit the most from

income growth, how steep their earning profiles are, and the extent to which borrowing constraints apply (Modigliani and Cao, 2004).

Similarly, Permanent-income hypothesis shows that increased growth would imply higher anticipated future income, which would urge people to dissave against future earnings. In this case, higher income growth also reduces aggregate saving. Therefore, the effect of GDP growth on domestic saving can take negative or positive value. Since income growth can be proxied by gross domestic product (GDP) (e.g. see Kolapo and Adaramola, 2012), this study uses real GDP of the country to examine the impact of economic growth on domestic saving.

### **3. Dependency Ratio**

One broad implication of the life cycle hypothesis is that there is a relationship between saving rate and the age structure of the population. People, on average, consume more than they produce during childhood and old age results lower saving. During middle ages, people produce more than they can consume. At this time, they tried to save more in order to consume in the latter ages and to pay back what they dissave during their early age. Therefore, the economy wide saving rate rises when the proportion of the middle (working) age population exceeds the dependant category. But, when there are too many people to support, consumption increases and saving decline (Modigliani, 1986).

Though the way dependency ratio treated was not similar across studies, the proportion of population below 15 and above 65 years old is considered to represent dependency ratio

in Ethiopia<sup>1</sup>. Since dependency ratio is expected to be high in most developing countries due to their high population growth rate, it is expected to be an important variable to affect saving behavior in Ethiopia. Due to this dependency ratio is taken as independent variable in this study.

#### **4. Interest Rate**

Theoretically, interest rate changes are subject to potentially offsetting positive substitution and negative income effects. The substitution effect is that a higher interest rate raises the current price of consumption relative to future price. This can impose a pressure to lower current consumption and increase saving. On the other hand, if the household is a net lender, an increase in interest rate will increase lifetime income, and so increase present consumption. This effect is called income effect and has a negative impact on saving. If the substitution effect out ways income effect, aggregate saving will rise. But, if the income effect out ways, aggregate saving will decrease.

The other view regarding the impact of interest rate on saving is the wealth effect. A higher real interest rate reduces the present value of future income streams from human capital or fixed-interest financial assets. Consequently, consumption can be depressed even if the substitution and income effects cancel out each. In this case, the net effect will

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<sup>1</sup>While Some researchers used the dependant population category as those below 20 and above 64 years of age (Berg, 1996), Agrawal (2001) used below 15 and above 64 years of age.



be increase in domestic saving. Therefore, the effect of interest rate on domestic saving can be positive or negative.

Considering its impact on domestic saving, this study incorporates nominal deposit interest rate to explain domestic saving in Ethiopia.

## **5. Financial Depth**

Financial depth or financial market development, which shows the range and availability of financial assets, accessibility to banking facilities, and extent of credit opportunity is very important factor to promote or discourage the domestic saving rate. The range and availability of different financial assets that suit savers interest can help to promote saving. Similarly, expansion of bank branches and improvement in the accessibility to banking facilities could motivate individuals to save by reducing the cost of banking transactions. On the other hand, if financial institutions are not well organized and stable, savings will be kept in non monetary terms and this may discourage saving.

Saving may also be discouraged if availability of credit increased relaxing domestic liquidity constraints, particularly credit for consumption. This prediction is well supported by the empirical evidence of Loayz et al (2000), which shows that a 1 percentage-point increase in the ratio of private credit flows to income reduces the long-term private saving rate by 0.74 percentage point.

In most studies financial depth is proxied by the degree of monetization of the economy which is captured by the ratio of broad-money (M2) to national output (Ozcan et al,

2003). Hence, this study uses the ratio of M2 to GDP to represent the degree of financial depth (financial sector development) in Ethiopia. As stated above, the potential impact of financial development on saving can be positive or negative.

## **6. Foreign Aid**

In many saving models, foreign aid (both grants and loans) is used to analyze the impact of foreign saving on domestic savings. In other words, it is used to capture the impact of foreign capital inflow on domestic savings.

There are two main theories regarding the impact of foreign aid on domestic saving. On the one hand there are theories that advocate foreign aid plays an additive role to domestic saving (Chenery and Strout, 1966). On the other hand, there are theories that argue the impact of foreign aid on domestic saving is negative (For example; Griffine, 1970). This argument is based on the notion that foreign aid can be a substitute for domestic saving and a large fraction of it is used for increasing consumption instead of investment and thus it will have crowding out effect on domestic saving.

Since Ethiopia is one of the most aid recipient countries for long periods, inclusion of this variable in the model is believed to be important. However, the effect of foreign aid on domestic saving can be negative or positive.

## **7. Inflation**

Inflation may affect saving behavior in several ways. The first groups of views advocate that inflation can rise domestic saving. On the one hand, higher inflation leads to higher nominal interest rates and hence higher measured household income and saving.

On the other hand, the buffer stock saving theory predicts that greater uncertainty would rise saving since risk averse consumers set resources aside as a precaution against possible adverse changes in income and other factors (Modigliani and Cao, 2004). Direct empirical tests of the precautionary saving motive have been hampered by the difficulty of obtaining estimable closed form solutions to models with this motive. However, some empirical estimates suggest that precautionary saving may account for a substantial fraction of household wealth (Carroll and Samwick, 1995).

The second group of views emphasize that higher inflation reduces domestic saving. If interest rate is not adjustable to inflation rate changes, a rise in inflation rate will reduce real interest rate. Moreover, if inflation rate exceeds the nominal interest rate, real interest rate will be negative. Hence, a declining or negative real interest rate causes fall of confidence in the financial system and acted as a disincentive to save in financial assets. As a result, people preferred to save in tangible assets rather than bank deposits. This shows shift of preferences to non financial form of saving due to higher inflation.

Moreover, if incomes are not indexed, unanticipated higher inflation will erode the purchasing power of money and cause unanticipated reduction in the real income. In this case, because the inflation fails to reduce consumption by as much as the loss of

purchasing power of the initial nominal assets, it immediately reduces the ability to save (Modigliani and Cao, 2004).

Since the model used in this study is a log-linear model, consumer price index (CPI) is used as a proxy for inflation rate. In empirical literatures on saving and growth, inflation is used as a popular proxy for (macroeconomic) uncertainty (Loayza et al, 2000). As clearly shown above, the impact of inflation on domestic saving can be negative or positive.

### **8. Government Consumption**

Government consumption affects domestic saving from two directions. The first direction is that increase in government consumption reduces the amount of saving directly through reduction in government (public) saving and fueling inflation and reducing purchasing power of money kept for consumption (Corbo and Hebbel, 1991). In this case, higher government consumption has a negative impact on domestic saving. The second direction is that when government Consumption increases on developmental projects, people of the country can get more jobs. When employment increases as a result of the increased government spending, it can increase domestic saving in the long run (Chaudhry et al, 2010). In this case there is positive relationship between government consumption and domestic saving. Since government consumption is high in developing countries like Ethiopia, it can affect domestic saving significantly. However, the sign of government consumption on domestic saving can be positive or negative.

### 3.2. Functional Relation and Model Specification

Based on the selected major variables discussed above, the functional relationship between the dependant variable and explanatory variables as well as the expected signs can be presented as follows:

$$\text{GDSR} = f(\text{PGDP}, \text{GDP}, \text{IR}, \text{CPI}, \text{DR}, \text{GCR}, \text{FADR}, \text{DFD}) \dots \dots \dots (1)$$

$$(+), (+/-), (+/-), (+/-), (-), (+/-), (+/-), (+/-)$$

Based on the above functional relationship (shown in equation (1)), the following simple log-linear econometric model can be specified to measure the average impacts of each explanatory variable on the dependant variable.

$$\text{LGDSR}_t = \beta_0 + \beta_1 \text{LPGDP}_t + \beta_2 \text{LGDP}_t + \beta_3 \text{LIR}_t + \beta_4 \text{LCPI}_t + \beta_5 \text{LDR}_t + \beta_6 \text{LGCR}_t + \beta_7 \text{LFADR}_t + \beta_8 \text{LDFD}_t + U_t \dots \dots \dots (2)$$

Where  $u_t$  represents random white noise error term.

Description of abbreviations:

Variable name	Description
LGDSR	Logarithm of annual gross domestic saving ratio
LPGDP	Logarithm of annual per capita real GDP
LGDP	Logarithm of real GDP
LIR	Logarithm of annual depositing interest rate
LCPI	Logarithm of consumer price index
LDR	Logarithm of annual dependency ratio
LGCR	Logarithm of annual government consumption ratio
LFADR	Logarithm of annual foreign aid ratio
LDFD	Logarithm of degree of financial depth

### 3.3. Source and Methods of Data Collection

This study used secondary data collected from National Bank of Ethiopia (NBE), Ministry of finance and economic development (MOFED), World Bank (WB), International financial statistics (IFS), and OECD. The sources of data and unit of measurement for each variables used in this study are presented in the table below.

Variable name	Data source	Measurement of variables
GDSR	NBE	Domestic saving in millions of birr as a ratio of nominal GDP in millions of birr
PGDP	NBE	The ratio of real GDP in millions birr at the 1999/2000base year price to total population of the country
GDP	NBE	Real GDP of the country at the 1999/2000 base year price
IR	IFS	Average annual deposit interest rate
CPI	WB	consumer price index computed based on the 2005 base year price
DR	OECD	The ratio of population below 15 years old and above 65 to the total population
GCR	NBE	Government consumption expenditure in millions of birr as ratio of nominal GDP in millions of birr.
FADR	MOFED	Foreign aid in millions of birr as a ratio of nominal GDP in millions of birr.
DFD	NBE	Broad money (M2) in millions of birr as a ratio of nominal GDP in millions of birr.

### 3.4. Methods of Data Analysis and Estimation Techniques

This study applies both qualitative (descriptive) explanations and econometric analysis. Since this study use a total of 42 years time series data, co-integration and Vector error correction procedures are applied to examine both the long run and short run determinants of domestic saving in Ethiopia.

In order to examine the existence of long run relation ship among variables of interest, this study applies the Johansen maximum likelihood co-integration technique. Since co-integration test requires non stationary variables at level but stationary when differenced once, unit root test is the first step in the Johansen procedure.<sup>2</sup> Hence, Augmented Dickey- Fuller (ADF) unit root test is applied both at levels and first differences of variables. This step is important to identify order of integration. Order of integration answers the question how many times the series needs differencing to become stationary. If a non-stationary variable gets stationary after differencing “d” times, the series is called integrated of order “d” or I (d) (Harris, 1995). Since co-integration tests are applied for variables that have same order of integration, ADF test is, therefore, the most important step of long run analysis.

Johansen maximum likelihood co-integration test is used only for I (1) variables. Therefore, once all variables are found I (1), Johansen co-integration test can be applied

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<sup>2</sup> a) A variable is called non-stationary or has a unit -root, if the mean, variance, and covariance of the variable depend on time.

b) A variable is called stationary or has no unit-root, if the mean, variance, and covariance of the variable is time invariant (constant)(Maddala,2001).

to determine the number of co-integrated vectors with in the system. In other words, it helps to examine whether variables of interest have long run relationship or not.

Lastly, depending on the Johansen co-integration result, if co-integration is found, a vector error correction model (VECM) will be constructed. The idea behind applying VECM is that though the Johansen co- integration test assures that variables are co - integrated ,in the short run their might be deviations from their long run equilibrium path. Therefore, VECM is applied to capture both the short run and long run dynamics of the whole system. That means, it is important to capture both transitory (short run) and long run effects.

However, if no co-integration is found, the analyses will be based on the regression of the first differences of the variables using a standard VAR model (Maddala, 2001).





## CHAPTER FOUR

### DESCRIPTIVE ANALYSIS OF SAVING AND ITS DETERMINANTS

#### **4.1. Performance of Domestic Saving and Its Determinants in Ethiopia**

Analysis of the performance of domestic saving in Ethiopia can be made easier by first examining the behaviors of its determinants during the considered period (i.e, from 1969/70 - 2010/11). This can help to easily justify the possible reasons for the observed saving performances in Ethiopia in any particular period.

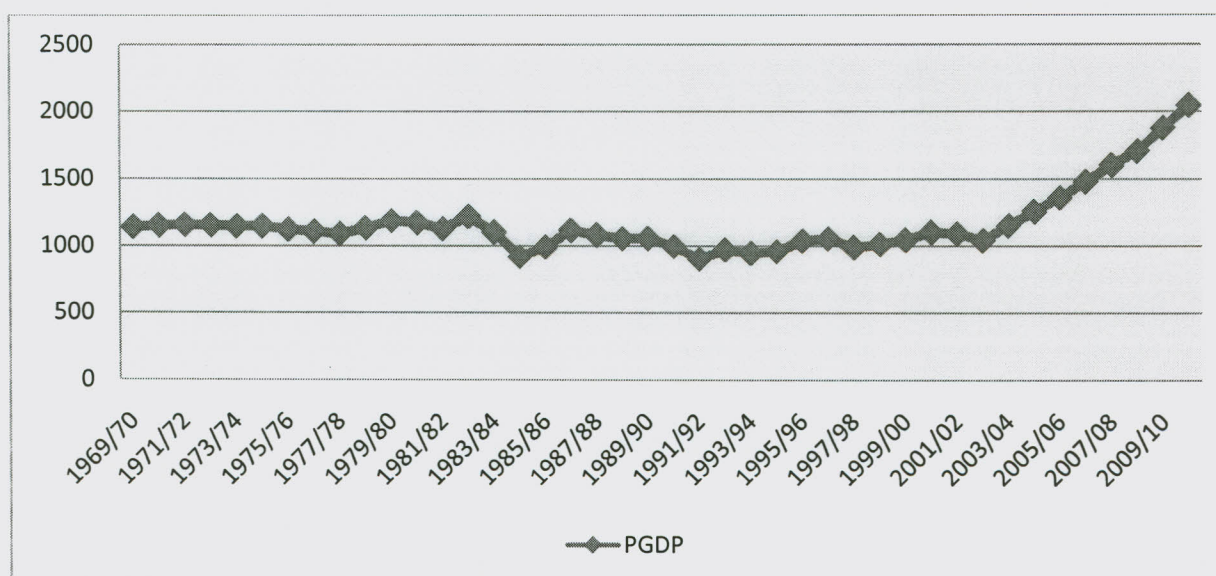
##### **4.1.1. The Performance of Determinants of Domestic Saving**

###### **Per Capita Income (GDP)**

The trend of per capita GDP depends on the growth rate of gross domestic product and the population growth rate. During the Imperial era, the average population growth rate was around 2.1 per cent (see table 4.1). At this time, growth rate of economy exceeds the population growth rate which contributed to higher per capita income. During this period the average per capita income was 1349.5. During the Derg regime (1974/75-1990/91), while the average population growth rate was 2.5 per cent per annum, average economic growth rate was 1.9 per cent. As a result average per capita income has declined to the lowest level of birr 1109.3 per annum.

As shown in figure 1 below, per capita income changes were not sustainable during the period between 1972/73 to 2002/03. However, a positive and sustainable per capita income changes have been observed since 2003/04. As summarized in table 4.1, average per capita income in Ethiopia has increased from birr 1036.5 between 1991/92 - 2002/03 to birr 1619.7 from 2003/04-2010/11. This shows a 56 per cent increment in the average per capita income within 8 years by changing the previous declining trend.

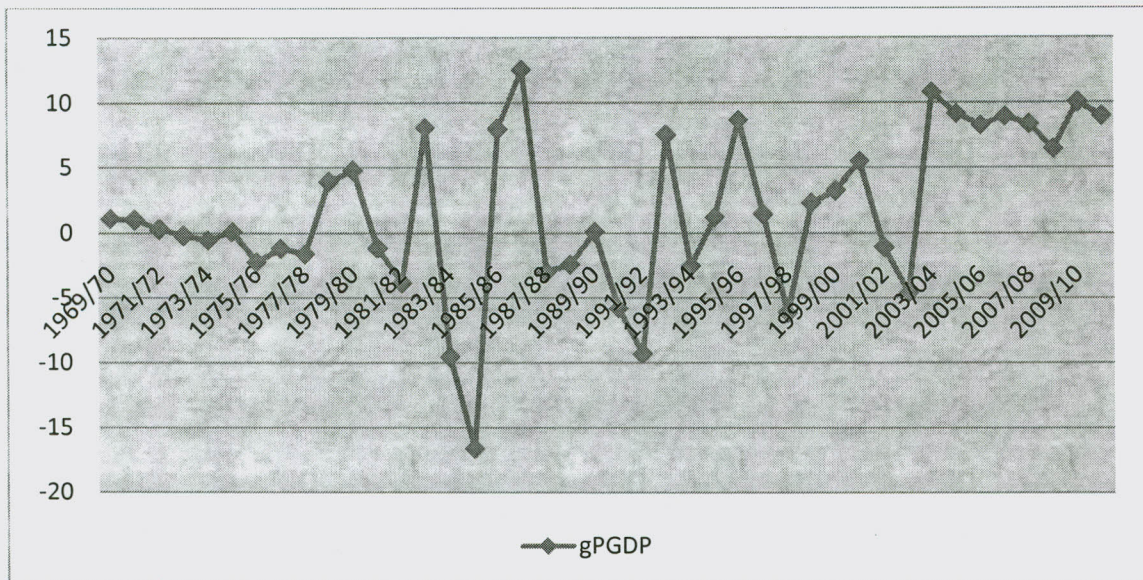
Figure 1: Trends of Per capita income (GDP) of Ethiopia (1969/70-2010/11)



Source: Own computation

### Growth Rate of Income (GDP)

Figure 2: Trends of growth rate of GDP in Ethiopia (1969/70-2010/11)



Source: Own computation

Growth rate of income (GDP) is one of the key indicators of macroeconomic performance. In Ethiopia, GDP growth has been disappointing for most of the decades. As indicated in table 4.1, the average GDP growth rate between 1969/70-2010/11 was around 4.3 per cent and GDP growth rate has been significantly varied across the three regimes of Ethiopia. Though growth rate was relatively highest in the Imperial era, it reached to the worst level during the Derg regime. Both the highest and the lowest growth rates were observed in this period. Negative 16.6 per cent being the lowest during 1984/85 and 12.5 per cent in 1986/87. While the lowest economic growth was caused by severe drought in that year, the highest growth was caused by good harvest during that time. This shows that growth in Ethiopia was highly swayed by the performance of the agricultural sector. In this regard, Alemayehu (2001) stated that, since Ethiopia is a country in which more than 85 per cent of the population lived in the agricultural sector,

the sector has been contributing more than half of the GDP and hence, economic performance was largely determined by what happens in the agricultural sector.

Available data's in general show that GDP growth rates were highly unsustainable until 2003/04. A high income growth in one period is followed by a high fall (sometimes negative) in the growth rate in the following years. During the imperial era, growth rates were positive and relatively stable. But, it became highly unstable in the post Imperial era.

Though average growth rate showed reviving trend in the post-1990/91, it was not in a sustainable manner. A high and sustainable growth rates were observed after 2003/04. From 1991/92-2002/03, the average growth rate was 3.5 per cent. However, the average growth rate has increased to 11.4 per cent during the period between 2003/04 and 2010/11. This high growth rate, in fact, has contributed to the rise in the average growth rate of GDP to around 7.5 per cent for the whole period of 1991/92 to 2010/11. The movements of GDP can also be seen in figure1 above which reflects a sustainable economic growth since 2003/04.

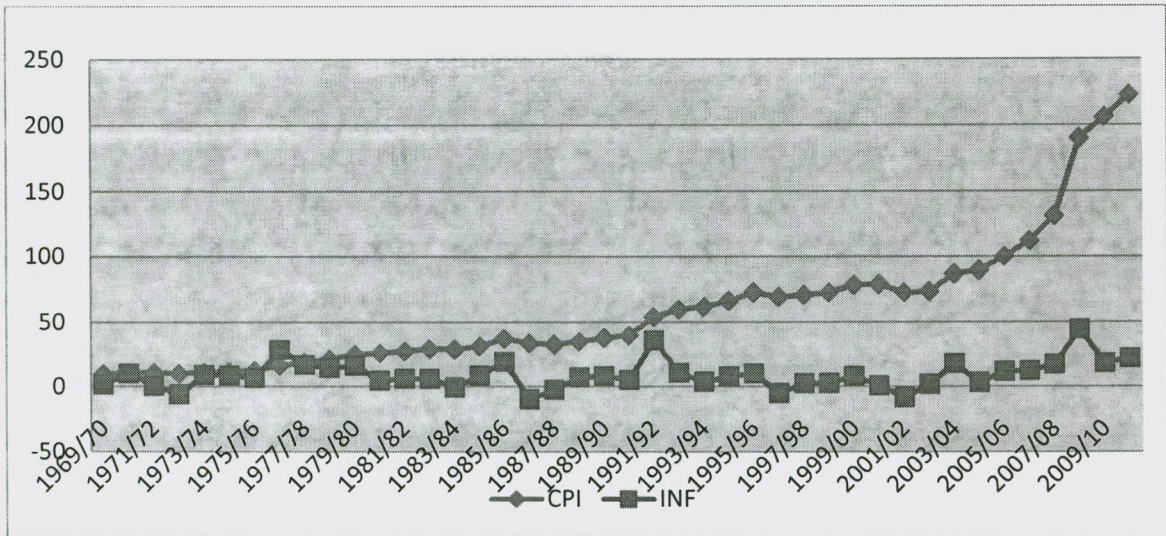
### **Inflation Rate**

Maintaining price stability is one of the key macroeconomic objectives of any government. In Ethiopia, though some higher level price shocks have been observed during some low harvest years, regime changes, and war periods, price levels were relatively stable until recent periods. While the high rate of inflation observed in 1976/77 was due to Ethio-Somali war, the 1991/92 was caused by regime change. Since the

regime change was violent, the high government spending for defense increased the money supply that contributed to high inflation (Alemayehu, 2001). As can be seen from table 4.1, average annual inflation rate for the whole period of study was 8.8 per cent and this can not be taken as high inflation. Alemayehu also stated that one of the reasons for the relatively stable price level was the regulated nature of market prices during the whole period of the Derg regime.

But, higher and some what challenging price stability has been observed since 2005/06. During this time, average inflation has increased from the lowest level of 5.8 per cent per annum between 1991/92 -2004/05 to 18.8 per cent between 2005/06 to 2010/11. As can be seen from figure 3 below, annual inflation rate skyrocketed in 2008/09. Available data shows that annual inflation rate has reached 44.4 per cent in that particular year. This unstable and high inflation might negatively influence the macro economic performance of the country in general and domestic save in particular. The reason is that since inflation erodes the purchasing power of money, low income people might not be encouraged to save.

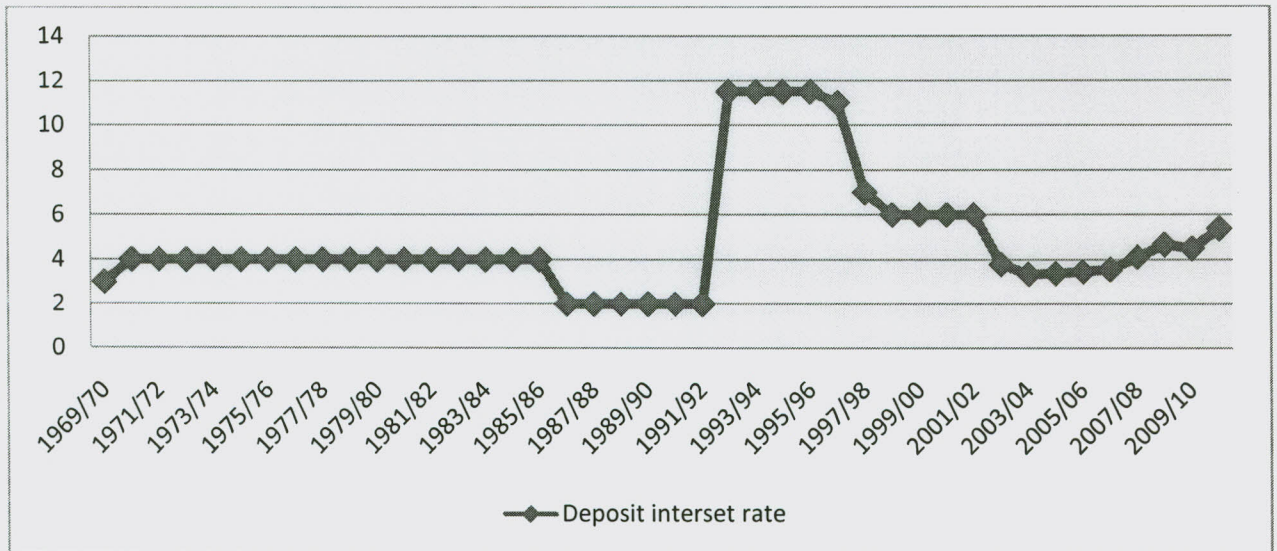
Figure 3: Trends of consumer price index and inflation rate in Ethiopia (1969/70-2010/11)



Source: Own computation

### Deposit Interest Rate

Figure 4: Trends of deposit interest rate in Ethiopia (1969/70-2010/11)



Source: Own computation

In the pre-reform period (i.e., before 1991/92), deposit interest rate was deliberately set at a very low level by the government. Table 4.1 shows a uniform deposit interest rate for

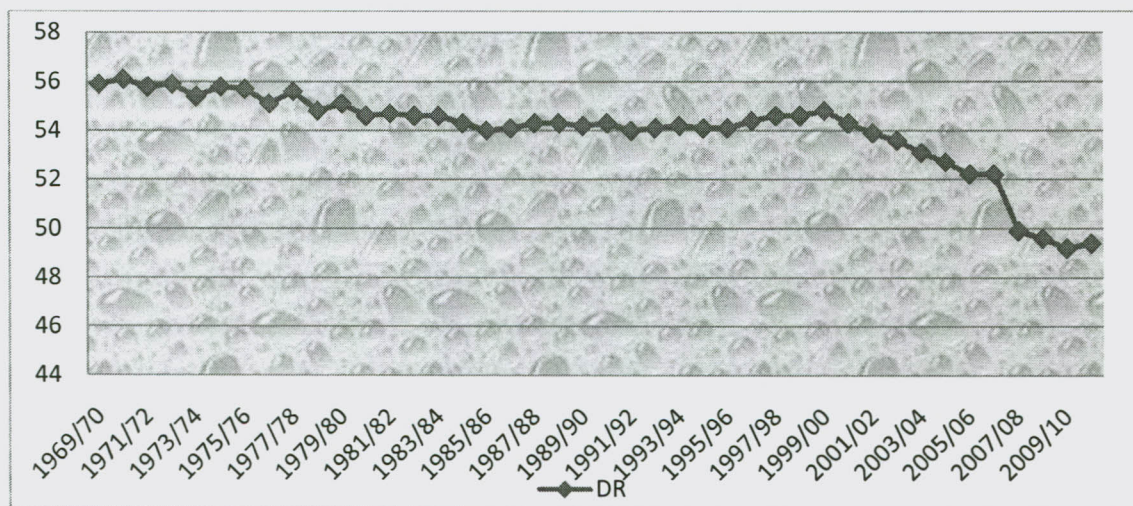
more than a decade. That means, deposit interest rate was 4 per cent per annum for the whole periods between 1970/71 - 1986/87 and 2 per cent for the remaining years until the reform period.

When EPRDF came to power, some reforms were made to improve the way interest rate could be determined. The government allowed all interest rates except deposit interest rate to be determined by market forces. In the case of deposit interest rate, the floor is allowed to be determined by NBE (Alemayehu, 2001).

In the post reform period, the deposit rate raised to around 11 per cent per annum. However, the deposit rate was also made to decline to lower level since 2002/03. But, it again increased in 2010/11 in order to encourage domestic saving (EEA, 2011).

### Dependency Ratio

Figure 5: Trends of dependency ratio in Ethiopia (1969/70-2010/11)

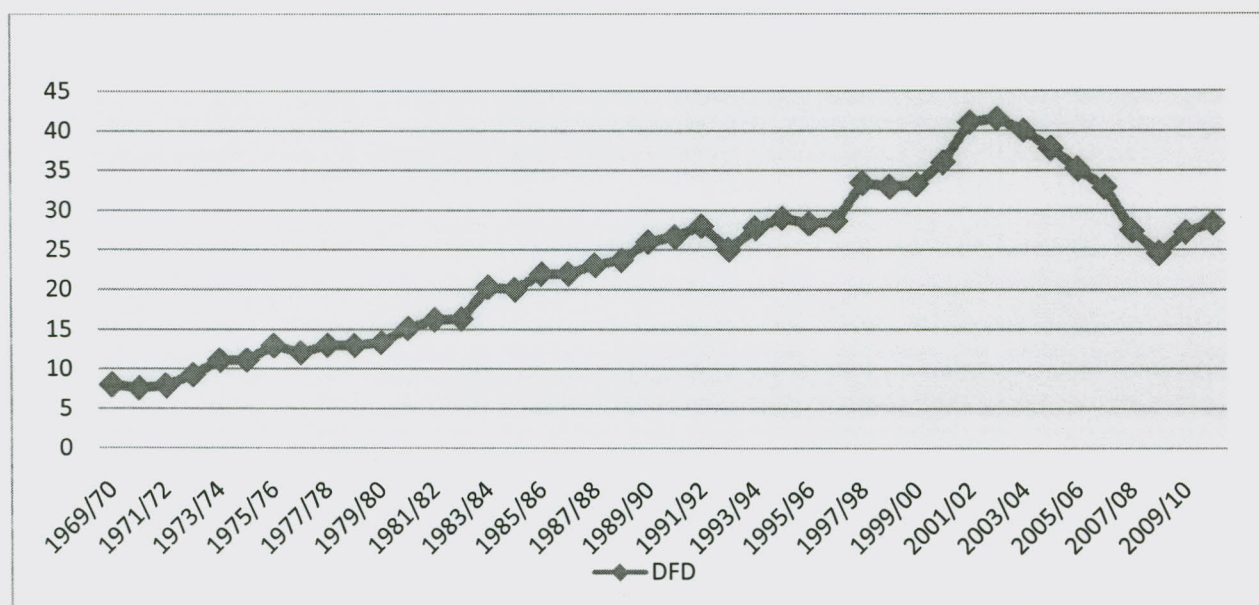


Source: Own computation

Available data from OECD shows that dependency ratio was very high in developing countries. In Ethiopia, the average dependency ratio from 1969/70-2010/11 is around 54. As can be seen from table 4.1, average dependency ratio has declined from 55.8 in pre-1974/75 to 51 during the period between 2003/04 and 2010/11. Figure 4 above also depicted that dependency ratio has followed a sustainably declining trend in the study period. Though declining, dependency ratio is still very high in Ethiopia. i.e., dependency ratio in 2010/11 is around 49. This very high dependency ratio in Ethiopia was the result of high population growth rate and it might have had an adverse effect on domestic savings.

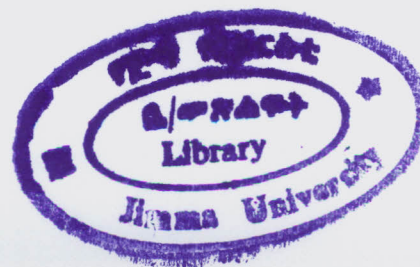
### Degree of Financial Depth (M2/GDP)

Figur6: Trends of Broad money (M2/GDP) in Ethiopia (1969/70-2010/11)



Source: Own computation

Broad money (M2) supply is a policy variable. As depicted in table 4.1, M2 as percentage of GDP from 1969/70-1973/74 was on average 8.7 per cent. The average supply of



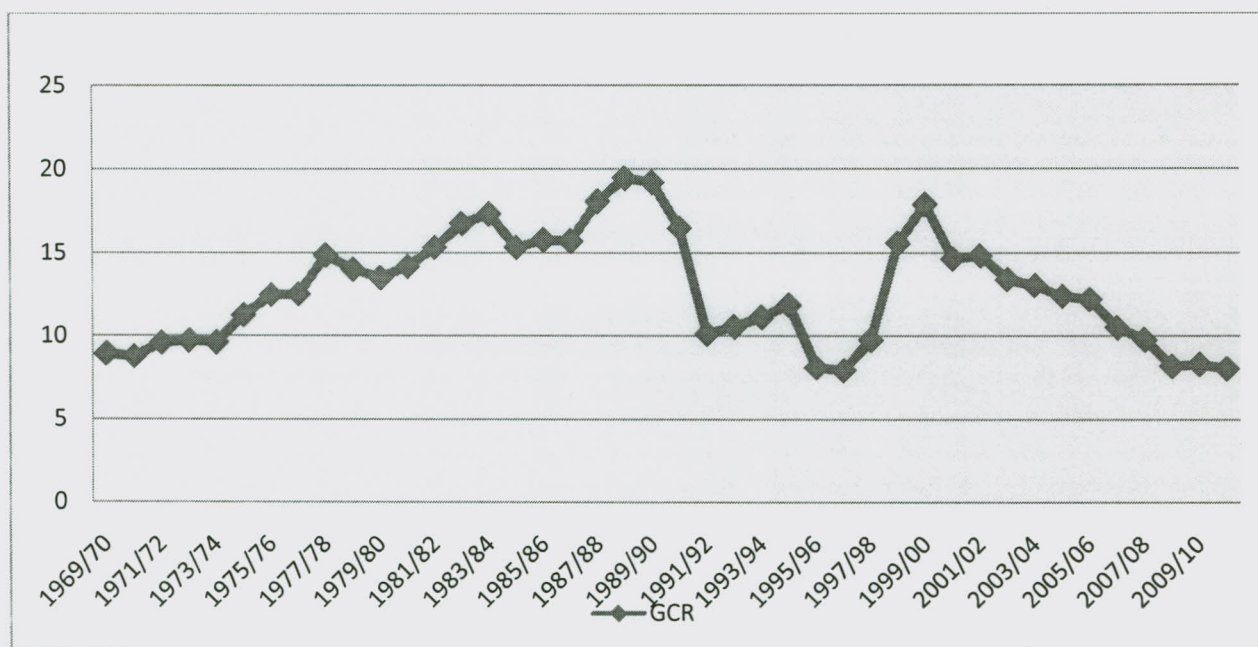


M2/GDP increased to 18.06 and 31.9 per cent during 1974/75-1990/91 and 1991/92 - 2010/11 respectively. On average, the growth rate of M2/GDP was higher in pre-1974/85 and the average growth rate declined continuously till 2010/11. The average growth rate of M2/GDP reached to negative 4.3 between 2003/04 and 2010/11. Figure 6 shows that the supply of M2 as a percentage of GDP has been declining since 2003/04 to 2008/09. However, it showed a sign of revival in 2009/10 and 2010/11.

While an expansion in the ratio of M2/GDP may show an improvement in the financial sector development, small ratios of M2 may indicate the existence of weak financial sector development that can adversely affect domestic saving.

### Government Consumption Ratio

Figure 7: Trends of government consumption ratio as percentage of GDP in Ethiopia (1969/70-2010/11)



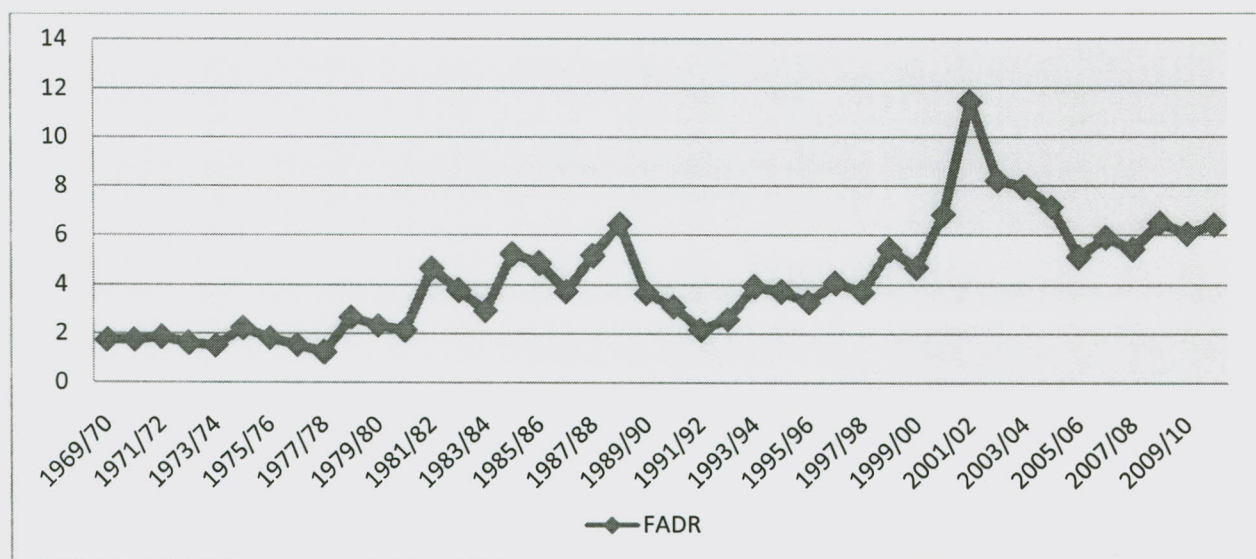
Source: Own computation

As a policy variable, the extent of government consumption ratios in Ethiopia has varied among the three different regimes covered under this study. Average government consumption ratio was the highest during the Derg regime. This was due to the economic system of the government in which government was the main actor of the economy.

As figure 7 above indicates, government consumption had relatively increasing trend during the Imperial and Derg regimes. However, it showed an average declining trend since 1991/92. Average government consumption has failed from 12.2 per cent of GDP to 10.3 per cent for the period 1991/92-2002/03 and 2003/04-2010/11 respectively. The graph also depicts a sustainably declining trend since 2003/04. This might be due to the economic reforms made to reduce government consumption expenditures and to encourage the role of the private sector in the economy.

### Foreign Aid Ratio

Figure 8: Trends of foreign aid ratio as percentage of GDP in Ethiopia (1969/70-2010/11)



Source: Own computation

Table 4.1 below indicates that, average foreign aid (including grants and loans) had an increasing trend in the whole periods of study. Figure 8 above, depicts the same thing till 2004/05. But, a substantial decline in the foreign aid ratio was observed between 2005/06 - 2007/08. However, foreign aid ratio started reviving since 2008/09. According to Abeba (2002), external assistance (foreign aid) in Ethiopia was significantly used to finance government capital expenditures. During the period from 1966/67-1973/74 and 1974/75-1990/91, on average, 45.2 and 44.5 of the government budget to finance capital expenditure was covered from external assistance respectively. In addition, this figure has only decreased to 37 per cent between 1991/92 -1999/00. This shows that a substantial per cent of capital expenditures in Ethiopia were financed from external assistance.

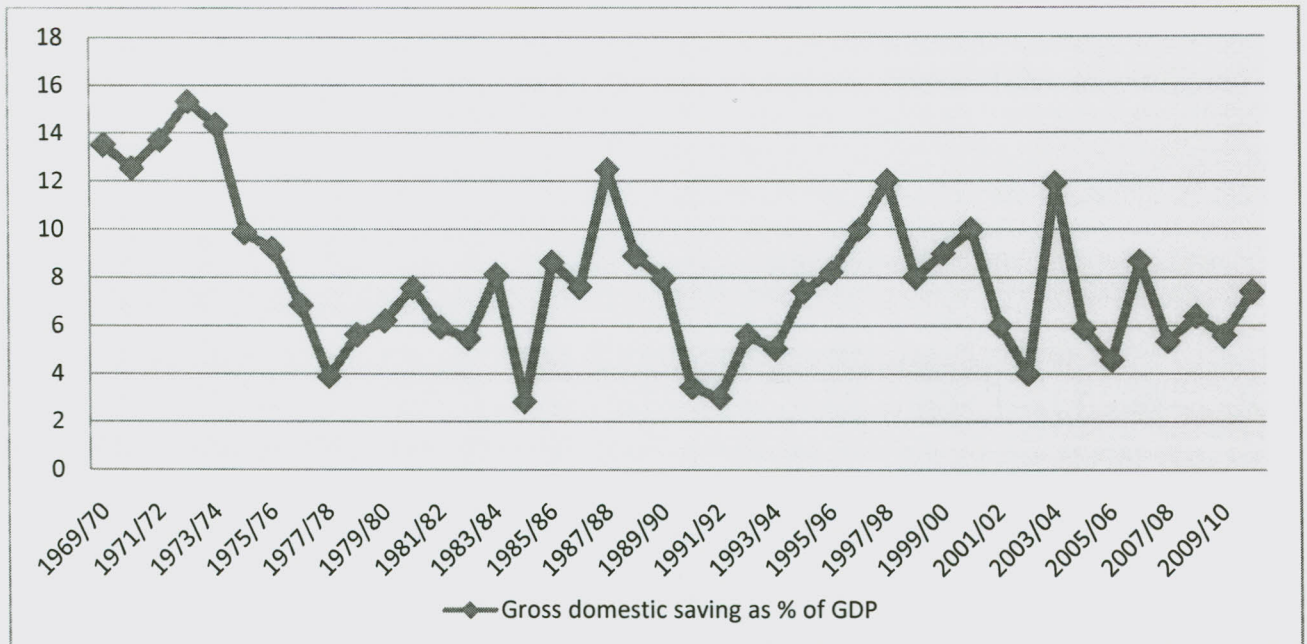
Table 4.1: Average trends of domestic saving and its determinants in Ethiopia

Variables	1969/70- 1973/74	1974/75- 1990/91	1991/92- 2002/03	2003/04- 2010/11	1969/70- 2010/11
Domestic saving	13.8	7.09	7.4	7.1	7.9
per capita GDP	1349.5	1109.3	1036.5	1619.7	1214.3
Growth rate of GDP	3.04	1.9	3.5	11.4	4.3
Consumer price index	10.2	27.2	69.2	142.5	62.3
Inflation rate	3	8.3	5.8	18.3	8.8
Depositing interest rate	4	3.4	7.8	4.0	4.9
Degree of financial depth	8.7	18.06	32.1	31.7	23.6
Growth rate of M2	9.0	5.5	4.0	-4.3	3.6
Government consumption ratio	9.3	15.4	12.2	10.3	12.8
Dependency ratio	55.8	54.7	54	51	54
Foreign aid ratio	1.7	3.4	5.0	6.3	4.2
Population growth rate	2.1	2.5	3.0	2.3	2.4

Source: Authors own computation based on NBE, MOFED, WB, IFS, and OECD data

#### 4.1.2. The Performance of Domestic Saving in Ethiopia

Figure 9: Trends of domestic saving ratio as percentage of GDP in Ethiopia (1969/70-2010/11)



Source: Own computation

Prior to 1974/75, the performance of domestic saving in Ethiopia was relatively good. As shown in table 4.1 above, average domestic saving as percentage of GDP during the Imperial era was 13.8. As can be seen from figure 9, domestic saving rate reached peak during 1972/73 and 1973/74. During this period, saving rate was 15.3 and 14.3 per cent of GDP respectively.

As discussed above the performance of most of the determinants of domestic saving such as average growth rate of per capita GDP, level of per capita GDP, inflation, foreign aid, and government consumption was relatively good during the Imperial era. While average

growth rates of GDP and per capita GDP were relatively higher, variables such as inflation, foreign aid, and government consumption were relatively lower compared with the Derg regime. This fact might contribute for the higher domestic saving achieved in that period.

Figure 9 reflects that, since 1974/75 saving as percentage of GDP showed a significant fluctuation which in turn shows an average declining trend compared with the Imperial era. During this period the performance of the determinants of domestic saving discussed above were not good. For example, in 1984/85 because of severe drought in the country the growth rate of GDP, per capita GDP and other determinants were not in a good position. As a result, the lowest domestic saving (i.e, 2.8 per cent of GDP) was registered in the same period. Average domestic saving as a ratio of GDP was also continued its declining trend in post -1991/92. During most of this time tremendous fluctuations in the performance of determinants of domestic saving have been observed. Consequently, average domestic saving has failed from 7.4 per cent in the periods from 1991/92-2002/03 to 7.1 per cent for the periods between 2003/04 and 2010/11 respectively.

Since domestic saving rates were declining for about four decades, domestic saving rate in Ethiopia has remained at a lower level by any standard. For example, during the period between 1980/81 - 2009/10, the average domestic saving rate in Ethiopia was only 8.6 per cent of the GDP. But, in the same period the average was 17.2 per cent of the GDP for sub-Saharan Africa countries (WB, 2011). This can show how much domestic saving in Ethiopia was very far from the average saving rates of Sub-Saharan Africa.

As a result of low and declining saving rates, domestic saving in Ethiopia has been very insufficient to finance domestic investment. Table 4.2 below depicts the saving investment gap for the period from 1974/75- 2009/10.

Table 4.2: Average domestic saving, domestic investment and saving-investment gap as percentage of GDP (1974/75-2009/10)

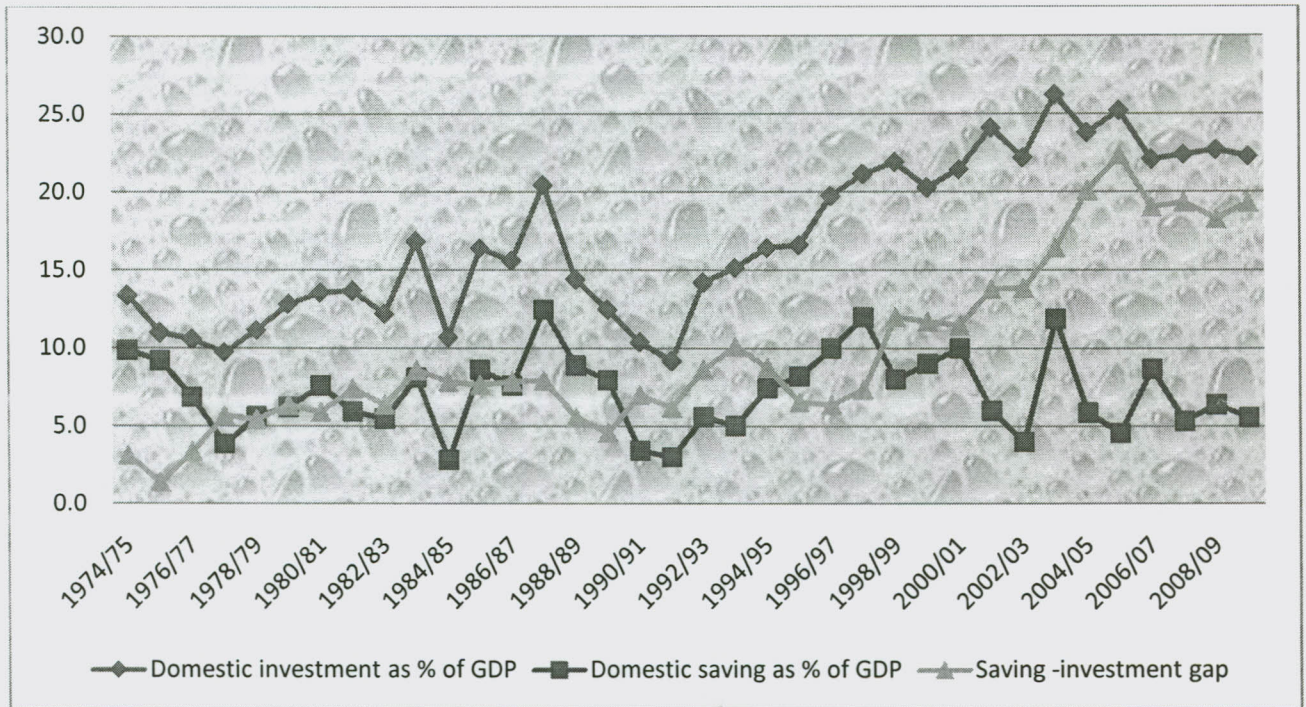
Variable	1974/75- 1990/91	1991/92- 2002/03	2003/04- 2009/10	1974/75- 2009/10
(1)Domestic saving	7.09	7.4	6.9	7.1
(2)Domestic investment	13.2	18.5	23.5	17
(1)-(2)	-6.11	-11.1	-16.6	-9.9

Source: Authors own computation based on NBE data

As can be seen from table 4.2, average saving investment gap from 1974/75-2009/10 was 9.9 per cent of GDP. Disaggregating the data in to short periods also showed that the gap was rising between these periods. While the gap as a ratio of GDP was 6.11 per cent from 1974/75 to 1990/91, it rose to 11.1 from 1991/92 to 2002/03. The average gap also raised to 16.6 per cent between 2003/04 and 2010.

Figure 10 below depicts that, on average, the saving investment gap was continuously rising. But, one can see that, before 1991/92, the gap was not that much wider. However, the gap became very wide since 1991/92. This was due to large and sustainable improvement in the domestic investment while domestic saving rates were going to the opposite direction.

Figure10: Trends of domestic saving, investment and saving investment gap as percentage of GDP in Ethiopia (1974/75-2009/10)



Source: own computation

## CHAPTER FIVE

### DISCUSSION AND ESTIMATION OF RESULTS

#### 5.1. Unit Root Test

The first step in co-integration analysis involves testing the presence of non-stationarity (unit root) and look for the order of integration. The existence of unit root in a time series data implies that the mean, covariance and variance of the variable is time variant. As a result, the variable could have more than one trend in the series and might cause a spurious result when simple OLS is used. A regression result is said to be spurious when the regression provides statically meaningful relationship while there is no true relationship in fact (Gujarati, 2004).

In practice, most time series data's are expected to have a unit root. Due to this reason, unit root test is considered as the first and basic step in time series analysis. A number of tests is available in the literature to check the existence of the unit root problem. The Dickey Fuller (DF) test is applicable if error terms are uncorrelated. However, in case error terms are correlated, DF test is useless. Augmented Dickey Fuller (ADF) test takes care of this problem by augmenting the equation(s) of DF test by adding the lagged values of the dependent variable(s). As a result, the commonly applied test of unit root property is the Augmented Dickey Fuller test (ADF) (Maddala, 2001).



In ADF procedure, the null hypothesis of non-stationarity is tested against the alternative hypothesis of stationarity. The test is conducted by comparing the t-ratios with the ADF critical values. The general guideline is that, if the absolute t-ratio is less than the critical values, the null cannot be rejected (*Ibid*).

**Table 5.1: Results of ADF test**

Variables	ADF results at their level form		ADF results at the first difference form		
	With drift only	With trend & drift	With drift only	With trend & drift	Order of integration
LGDSR	-2.816	-2.723	-5.766*	-5.793*	I(1)
LPGDP	1.786	1.490	-4.653*	-6.007*	I(1)
LGDP	-2.790	-0.729	-3.456*	-4.556 *	I(1)
LIR	-2.302	-2.339	-4.096*	-4.035*	I(1)
LCPI	-3.592	-3.647	-8.049*	-7.956*	I(1)
LDR	1.576	0.211	-3.258*	-3.560*	I(1)
LGCR	-2.521	-2.649	-4.616*	-4.835*	I(1)
LFADR	-1.644	-2.866	-6.755*	-6.675*	I(1)
LDFD	-1.675	-1.187	-3.523*	-3.786*	I(1)

\*\* And \* denotes rejection of the null hypothesis at 1% and 5% level of significance respectively.

The ADF test statistics presented in table 5.1 depicts that all variables have unit root at their level. That means, the null hypothesis of there is unit root cannot be rejected for all variables at the conventional 1% and 5% significance level. Hence, all variables are said to be non stationary in their level form.

However, the ADF test of variables in their first difference shows that the null hypothesis of there is unit root can be rejected at the conventional 1% and 5% significance level. Because these variables become stationary after differencing once, they are said to be (I (1)) variables (Maddala, 2001).

Since the ADF test confirmed that all variables are I(1), a co-integration test can be applied to examine the existence of co-integrated vector(s). The idea of co-integration is that if variables are non-stationary at their level form and stationary after differencing once, their linear combination at level can be stationary (Harris, 1995). In other words, if co-integration exists among variables, even though individual variables are non-stationary at their level, their linear combination at level can be stationary.

## **5.2. Co-Integration Test**

Co-integration implies that variables found in the system have some long run equilibrium relationships. That means, if variables are co-integrated, they do not drift too much apart and are tied together by some long run equilibrium relationships.

The advantage of Co-integration test is, therefore, that it makes regressions involving integrated of order one (i.e., I (1)) variables potentially meaningful without the need to differencing. This procedure is important since it avoids the loss of potential information about long run relationships that could be otherwise lost when other techniques that require differencing is applied (Harris, 1995).

In Johansen co-integration procedure, the first task is to determine the appropriate lag length of the system. Information criteria such as LR, AIC, SC and HQ are usually applied to determine optimal lag length. However, because of their relative consistency, this study uses the lag length determined by SC and HQ as the optimal lag length of the whole system (see appendix-2). Moreover, when information criteria suggest different lag length, Johansen et al.(2000 as cited in Harris, 1995) note that it is common practice to prefer the HQ criterion. According to the information criteria, the lowest value provided by the information criteria is taken as optimal lag length of the system. Therefore, since SC and HQ criterion choose lag length one as the appropriate lag length of this system, lag one is used in the Johansen co-integration test and VECM.

The second step in Johansen co-integration procedure is to determine the number of co-integrating vectors and to get the resulting estimates of  $\alpha$  and  $\beta$ . In this case, two other scenarios can be noted to determine the existence of long run relationship between variables. In the first case, if the rank  $r$  of a matrix is 0, then there is no co-integration since  $\Pi$  ( $n \times n$ ) is a null matrix. This shows that, there is no long run relationship between variables. In the second case, when there is a reduced rank i.e.,  $r \leq n-1$  co-integrating vectors in  $\beta$ , the rank of matrix  $\Pi Y_{t-p}$  should be stationary to have long run relationship (Harris, 1995).

Johansen (1988) identified two methods to determine the number of co-integrating vectors in the long run model: Trace static and maximum-Eigen value test static. With this tests, the decision to reject or not to reject the null hypothesis is made by comparing

the computed trace and maximum eigenvalues with given critical values at the 5% level of significance. The null hypothesis in this case is that there is no co-integration with in the whole system. Therefore, if the computed value of the test statistics (given by the column of test statistic in each of the tables below) is greater than the critical values, the null hypothesis is rejected. Table 3 below, shows the result of the Johansen co-integration test.

Since assessment of multi-co linearity test found high correlation between GDP and CPI with correlation coefficient of 0.9753 as well as per capita GDP (LPGDP) and GDP with correlation coefficient of 0.7024, LPGDP and LCPI are dropped from the final analysis.

Table 5.2: Johansen's Co-integration Test (Trace static)

Hypothesized	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.735579	139.2696	125.6154	0.0056
At most 1	0.574844	86.06114	95.75366	0.1925
At most 2	0.417494	51.84920	69.81889	0.5561
At most 3	0.316218	30.23257	47.85613	0.7071
At most 4	0.189468	15.02794	29.79707	0.7783
At most 5	0.145561	6.625346	15.49471	0.6216
At most 6	0.008288	0.332917	3.841466	0.5639

Trace test indicates 1 co integrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level \*\*MacKinnon-Haug-Michelis (1999) p-values

Table 5.3: Johansen's Co-integration test (Maximum -Eigen value static)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigen value	Statistic	Critical Value	Prob.**
None *	0.735579	53.20845	46.23142	0.0078
At most 1	0.574844	34.21194	40.07757	0.1974
At most 2	0.417494	21.61663	33.87687	0.6373
At most 3	0.316218	15.20463	27.58434	0.7319
At most 4	0.189468	8.402592	21.13162	0.8774
At most 5	0.145561	6.292429	14.26460	0.5760
At most 6	0.008288	0.332917	3.841466	0.5639

Max-eigenvalue test indicates 1 co integrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level \*\*MacKinnon-Haug-Michelis (1999) p-values

In table 5.3 and 5.4 above, both the trace static and Max-Eigen static proofs that the null hypothesis of no co-integrating vector (i.e.  $r=0$ ) is rejected at 5% significance level. The test statics also showed there is only one co-integrating vector in the whole system.

When a single co-integrating vector is obtained, it means, there is only one linear combination of variables which is represented by the first row in  $\beta$  matrices. The standard alpha coefficient is also represented by the first column of alpha matrices. The standardized  $\beta$ -coefficient matrices and the standardized  $\alpha$ -coefficient matrices are presented in table 5.4 and 5.5 below respectively.

Table 5.4: Standardized  $\beta$  coefficients

LGDSR	LGDP	LIR	LDR	LGCR	LFADR	LDFD
1.0000	2.300999	0.184153	2.156031	2.602296	-1.37998	0.009854
0.15222	1.0000	1.070484	4.664109	1.628246	1.626133	-2.5414
2.292627	-4.95614	1.0000	-56.1266	1.70185	-0.98327	1.917034
0.1436	-0.06858	-0.16627	1.0000	-0.37815	0.129808	0.000277
-2.99163	11.17776	4.040284	35.01188	1.0000	-8.91908	-6.64882
-8.47914	-5.94422	-9.5909	65.92488	3.509498	1.0000	-4.9564
-17.644	61.01424	-2.38287	16.467	-21.7512	11.45273	1.0000

Table 5.5: Standardized  $\alpha$  coefficient

LGDSR	-0.240786	0.006322	-0.066269	0.099157	0.067445	0.003796	-0.018772
LPGDP	-0.017157	-0.007501	-0.014103	0.001387	-0.003129	-0.009583	-0.007957
LIR	0.032005	-0.136148	-0.054411	-0.015382	0.033076	0.043904	-0.018183
LDR	-0.002961	-0.001380	0.004519	0.000180	0.000603	0.000706	-0.000316
LGCR	-0.035743	-0.027110	0.016158	-0.050467	0.033529	-0.016091	0.005826
LFADR	0.085333	-0.055018	0.011442	0.065671	0.078556	-0.047113	0.006050
LDFD	-0.003327	0.035055	0.021765	-0.005900	0.015603	0.010336	-0.002378

Based on table 5.5 above, we can say something about the speed of adjustment in the long run. The  $\alpha$  coefficient that measures the rate of feedback effect of the disequilibrium in co-integrating relation is -0.240786. Since  $\alpha$ -coefficient is negative and less than one, the speed of adjustment is as theoretically expected. If the  $\alpha$ -coefficient is large in magnitude and negative, it means that disequilibrium will fade away in the long run. The feed back effect (speed of adjustment) in this case shows that around 24 per cent of the disturbances are adjusted towards the long run steady state every year.

The next step is to know the validity of the results obtained through Johansen co-integration procedure. In order to perform this, there is a theoretically determined restriction which is tested on the co integrating vectors. While imposing a zero restriction on  $\beta$  -coefficient helps to know the significance of the long run parameters, imposing a zero restriction on  $\alpha$ -coefficient allows us to identify weakly exogenous and endogenous variables.

Table 5.6: Test of weak exogeneity (test for zero restriction on  $\alpha$  coefficients)

Variables	$\alpha$ -Coefficients	LR test of restrictions: Chi <sup>2</sup> (1)	Probability Value
LGDSR	-0.240786	16.37226	0.000052*
LGDP	-0.017157	3.713043	0.053989
LIR	0.032005	0.438271	0.507958
LDR	-0.002961	4.041550	0.044393
LGCR	-0.035743	2.240763	0.134415
LFADR	0.085333	3.373416	0.066256
LDFD	-0.003327	0.058424	0.809004

\*denotes rejection of the null hypothesis at 1%level of significance.

As shown in table 5.6, the null hypothesis of weak exogeneity can be rejected for LGDSR at all conventional levels of significance. This shows that, LGDSR is weakly endogenous. On the other hand, the null hypothesis of weak exogeneity can not be rejected at the 5% level of significance for most of the remaining variables except LDR. However, the null of LDR is still not rejectable at 1% level of significance. Therefore, all variables except LGDSR can be treated as exogenous variables. Thus, the relevant single equation model with the estimates of the long run coefficients can be constructed as:

$$\text{LGDSR} = -40.76 - 2.3\text{LGDP} - 0.18\text{LIR} - 2.16\text{LDR} - 2.6\text{LGCR} + 1.38\text{LFADR} - 0.01\text{DFD} \dots \dots \dots (1)$$

**Multivariate diagnostic test**

Vector AR 1-2 test: F (98, 97) = 1.1653 [0.2258]

Vector Normality test: Chi<sup>2</sup>(14) = 48.720 [0.0000]\*\*

Vector hetero test: Chi<sup>2</sup>(392) = 404.74 [0.3178]

The multivariate diagnostic test above shows the adequacy of the long run saving model. This is confirmed by the non rejection of the null hypothesis of no serial correlation and homoscedasticity at the 5% level of significance. However, the null hypothesis of normality can be rejected at the 1% level of significance. But, according to Gonzalo (1994 as cited in Wondwosen, 2003) Johansen procedure is robust even with non-normal vectors. Therefore, the domestic saving model constructed above is reasonably acceptable.



Once the long run relationship is established, the next step is to determine which variables uniquely constitute the co-integrating vector. In other words, this is a test of the significance of long run parameters (coefficients). This test can be conducted by imposing a zero restriction on the  $\beta$  coefficients. The result of the test along with their respective probability values are reported in table 5.7 below.

Table 5.7: Test of zero restriction on the long run Parameters (significance of long run coefficients)

Variables	$\beta$ -Coefficients	LR test of restrictions: Chi <sup>2</sup> (1)	Probability Value
<b>LGDP</b>	2.300999	13.66106	0.000219**
<b>LIR</b>	0.184153	0.788690	0.374496
<b>LDR</b>	2.156031	0.129440	0.719014
<b>LGCR</b>	2.602297	19.48316	0.000010**
<b>LFADR</b>	-1.379979	13.63134	0.000222**
<b>LDFD</b>	0.009854	0.000615	0.98021

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

The significance test on the long run coefficients in the above table revealed that LGDP, LGCR and LFADR are statistically significant explanatory variables of gross domestic saving ratio (LGDSR) in Ethiopia. On the other hand, deposit interest rate (LIR), dependency ratio (LDR), and financial depth are found statistically insignificant explanatory variables at the conventional 5% significance level. Table 5.8 below separately presents the relevant variables that constituted the long run model of domestic saving with their respective standard errors and t-ratio.

Table 5.8: Long run determinants of domestic saving

<b>Variables</b>	<b>coefficients</b>	<b>Standard error</b>	<b>t-ratio</b>
<b>constant</b>	-40.76	-	-
<b>LGDP</b>	-2.300999**	0.41356	5.56392
<b>LGCR</b>	- 2.602297**	0.32044	8.12095
<b>LFADR</b>	1.379979**	0.21252	-6.49335

\*\* denotes significance of the coefficient at 5% level of significance.

The long run model result indicates that LGDP, LGCR and LFADR are statistically valid determinants of domestic saving in Ethiopia. According to this finding, while gross domestic product and government consumption have adverse effects on domestic saving, foreign aid has a positive impact on domestic saving. Moreover, all variables are found with the expected sign.

Though the negative impact of LGDP is not consistent with the lifecycle hypothesis and most empirical literatures, it is consistent with PIH. According to PIH, since increased growth can cause higher anticipated future income, it would encourage people to dissave against future earnings. Since low income people may not fulfill much of the necessities due to long term poverty, income growth might cause positive anticipation about future earnings and lead to more consumption spending today. This finding is inconsistent with the previous studies in Ethiopia. However, it is found consistent with the result reported by Nwachukwu and Egwaikhide (2007) in the case of Nigeria's private saving.

The negative impact of government consumption implies that a rise in government consumption reduces domestic saving. This result is inline with the a priori expectation and consistent with the results of the two previous studies conducted by Abu (2004) and Worku (2010).The result is also consistent with one of the argument that advocate high government consumption has a negative impact on domestic saving either by directly reducing government saving or by causing inflation. The result may not be surprising as Ethiopia was under command economic system for 17 years in which government consumption expenditure was too big and the role of the private sector was very limited.

The positive impact of foreign aid also assures that foreign aid does not crowd out domestic saving or is not a substitute to domestic saving in Ethiopia. This result is consistent with one of the earliest arguments of foreign aid that conclude foreign aid has an additive role to domestic saving through financing domestic investment. The positive impact of foreign aid on domestic saving might be due to the fact that Ethiopia was covering a substantial amount of its capital expenditure from foreign aid for several decades. As discussed in the descriptive part of this study, during the Imperial as well as Derg regimes, a round 45 per cent of the government capital budget was covered from foreign aid. The situation is also similar during the period of EPRDF. Abu (2004) also reported that foreign saving has a positive impact on domestic saving in Ethiopia. But, he used current account deficit instead of foreign aid to capture the impact of foreign saving on domestic saving.

On the other hand, this study found that deposit interest rate, broad money and dependency ratio are statistically insignificant determinants of domestic saving in the

long run. This result confirms that the financial sector in Ethiopia was not properly working to encourage domestic savings. The result is consistent with the results reported by Masson et al (1998) for the case of developing countries and Kidane (2009) in the case of Ethiopia.

The results obtained for deposit interest rate and financial depth in this study might not be surprising for several reasons. On the one hand, since bank service in Ethiopia was only limited to urban areas where only 15 per cent of the population resides, around 85 per cent of the population who live in rural areas did not have access to bank services. The other reason might be, since deposit interest rate was deliberately made lower by the government for several decades, bank interest rate was not encouraging even to the urban population where banks were available. Voluntary long term saving instruments such as bond was not fairly expanded with a relatively encouraging interest rate. In this regard, the only available saving instruments so far were T-bills and government bonds in which the participation of low income people might be low.

The insignificant impact of dependency ratio in this study is not consistent with the negative impact reported by Kidane (2009). However, it is consistent with Bilsborrow (1979). One of the justifications is that since the proportion of population which saves are small, changes in the age distribution has no significant impact on domestic saving in LDCs.

### 5.3. Vector Error Correction Model (VECM)

Once the numbers of co-integrating vectors are determined, the next step is to estimate the VECM which captures both long run and short run relationships (Harris, 1995). The weak exogeneity test has revealed that all variables except LGDSR are weakly exogenous at the 1% and 5% level of significance. Hence, LGDSR is used as the only endogenous variable in VECM and all weakly exogenous variables which are considered in the long run are entered in to the right hand side of the model by differencing once.

Table 5.9: Results for the Dynamic Equation (Dependent Variable DLGDSR)

Variables	Coefficient	Std.Error	t-value	t-prob
<b>VECM_1</b>	-0.585743	0.132284	-4.427933	0.0001
<b>D(LGDSR-1)</b>	-0.228380	0.149114	-1.531577	0.1358
<b>D(LGDP-1)</b>	1.484867	1.241001	1.196507	0.2406
<b>D(LIR-1)</b>	-0.236847	0.187655	-1.262143	0.2163
<b>D(LDR-1)</b>	3.794730	6.966842	0.544684	0.5899
<b>D(LGCR-1)</b>	0.691835	0.457617	1.511820	0.1407
<b>D(LFADR-1)</b>	-0.359724	0.208756	-1.723179	0.0948
<b>D(LDFD-1)</b>	-1.173837	0.858101	-1.367948	0.1812
<b>Constant</b>	-0.008780	0.090939	-0.096551	0.9237

R-squared = 0.56093      F-statistic = 4.950134      prob (F-statistic) = 0.000523

Single equation diagnostic tests

Serial correlation LM test (AR1-2)      F (1, 30)      = 2.564540 (0.1198)  
 ARCH 1-1 test:      F (1, 37)      = 0.482051 (0.4918)  
 Normality test:      Jarque-Bera      = 1.333311 (0.846491)

The short run model of gross domestic saving reveals that all variables tend to be insignificant in the short run. However, the coefficient of the error correction term that captures the speed of adjustment towards the long run equilibrium is found with the correct sign and magnitude. The speed of adjustment is -0.585743 showing that each year the gross domestic saving of Ethiopia adjusts itself towards the long run equilibrium by 58%. This shows that once the disequilibria happened, it will take almost two years to adjust itself towards the long run steady state path.

The single equation diagnostic tests indicate that the null of no serial correlation and homoskedasticity can not be rejected at any conventional significance level. The Jarque-Bera normality test also indicates the null hypothesis of normally distributed residuals can not be rejected. Moreover, the F- statistic confirmed the adequacy of this saving model.

The model stability test using cumulative sum (CUSUM) control chart also confirmed that the null hypothesis of parameter stability cannot be rejected at the 5% critical bound (see appendix 3). This implies that, the parameters of the estimated saving model do not suffer from any structural instability over the period of study.

## CHAPTER SIX

### CONCLUSIONS AND POLICY IMPLICATIONS

#### **6.1. Conclusions**

This study has examined the determinants of domestic saving in Ethiopia, covering the period between 1969/70 - 2010/11 using annual data. While the model specification process was based on the Keynesian, lifecycle and permanent income hypothesis, the estimation procedure takes in to consideration the recent developments in time series modeling.

As far as the performance of domestic saving in Ethiopia is concerned, one can understand that domestic saving in Ethiopia was not only characterized by lowest level but also declining trend for more than three decades. Average domestic saving was relatively higher during the Imperial era. But, it continuously declined in the subsequent periods.

With respect to the determinants of saving, both the level of income and growth rate of income have shown almost similar trends with domestic saving. On average, they were relatively better before 1974/75(i.e, during the Imperial era) but reach to lowest level during the time of the Derg regime. A sustainable improvement in the growth rate of GDP and per capita income was observed only after 2003/04. In addition, inflation, government consumption, and foreign aid has shown an increasing trend for the periods

between 1969/70 - 1990/91. Since 1991/92, while average foreign aid ratio continued increasing, government consumption ratio declined on average. On the other hand, the performance of inflation after 1991/92 was highly unstable. Though, on average, inflation declined between 1991/92-2002/03 compared with the Derg regime, it highly increased between 2003/04 and 2010/11. Regarding the financial sector development, average broad money supply and deposit interest rate increased until 2002/03. However, both declined since 2003/04.

The empirical part of this study applies Johanssen co-integration procedure and VECM. Accordingly, the main empirical findings of this study are the following:

- Gross domestic product (GDP) is a significant and negative long run determinant of domestic saving in Ethiopia. This implies that economic growth has no the desired impact on domestic saving in Ethiopia. This might be due to the low level of income as a result of high level of poverty in the country for long periods.
- Government consumption has negative impact on domestic saving in the long run. The implication of this result is that higher government consumption reduces domestic saving.
- Foreign aid is a positive determinant of domestic saving in the long run. The implication of this result is that foreign aid has an additive role to domestic saving in Ethiopia.
- Degree of financial depth (financial sector development), interest rate and dependency ratio do not have significant impacts on domestic saving in Ethiopia. The likely implication of this result is that the financial sector was underdeveloped to mobilize domestic saving. For example, in the absence of bank



services in rural areas, rural households might be forced to save their assets in kind. That means, in the form of crop produce, livestock etc.

- The short run impacts of all the variables included in the model are found to be statistically insignificant.
- Speed of adjustment or error correction term has value 0.585743 with negative sign. This shows the convergence of the domestic saving model towards long run equilibrium. That means, about 58 percent adjustments would be taken place in each year towards long run equilibrium.

## **6.2. Policy Implications**

This study has shown some stylized facts about the performance of domestic saving and empirical evidences about the determinants of domestic saving in Ethiopia. The empirical results found in this study can highlight a number of useful policy and theoretical implications for sustainable development in Ethiopia.

One immediate implication of the analysis is that growth rate of income (GDP) has not the desired impact on domestic savings in Ethiopia. But, according to the modern consumption and saving theories (i.e, lifecycle and permanent income hypothesis), income growth is a strong positive determinant of domestic saving. This implies an urgent need to raise the level of income in a sustainable manner so as to reduce the level of poverty in Ethiopia. Otherwise, saving can not be encouraged in the presence of high level of poverty. Therefore, the current strategies to eradicate poverty through efficient

utilization of resources, human resource development and infrastructure development should be strengthened.

The negative impact of government consumption on domestic saving tells the need to effectively control government consumption expenditures. This can be accomplished by intensifying the private sector participation more and reducing the participation of government in the areas that the private sector can participate. Selective privatization of government owned institutions also reduce government consumption expenditures.

The insignificant impact of financial depth clearly indicated the need to urgently reform the financial sectors of the country so as to effectively mobilize domestic savings. The first important remedy should be strengthening expansion of formal financial intermediaries. Easy access to convenient and safe savings vehicle can increase savings significantly. So, expanding bank and micro finance branches to reach the poor rural households is the first important step to mobilize rural savings. In addition to expanding branches effort has to be made to create a competitive environment in the financial sector. It is competition that creates advances in management skills and application of new technology. Finally, gradual preparation for financial sector liberalization is also important to increase domestic saving.

### **6.3. Areas for Further Research**

Because of data and multi-co linearity problems, this study could not examine the effects of terms of trade, remittance, social security, per capita income and inflation. So, this study can be further extended by examining the impacts of these important variables.

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# APPENDICES

# Appendix-1

## Summery of data

	LGDSR	LGDP	LPGDP	LIR	LCPI	LDR	LGC
Mean	1.994144	10.91619	7.076955	1.455507	3.729505	3.988557	2.515418
Median	2.049452	10.77609	7.088251	1.386294	3.655000	3.994524	2.525499
Maximum	2.729053	12.04144	7.623204	2.442347	5.407172	4.027136	2.967674
Minimum	1.039297	10.37658	6.636209	0.693147	2.247025	3.895894	2.074279
Std. Dev.	0.423238	0.443090	0.223674	0.479928	0.874061	0.032765	0.265279
Skewness	-0.325862	1.002418	0.322707	0.493031	-0.076843	-1.647036	-0.103916
Kurtosis	2.571011	3.070671	2.890470	3.177846	2.186576	5.158050	1.843497
Jarque-Bera	1.065356	7.042630	0.749973	1.756911	1.199237	27.13916	2.416212
Probability	0.587031	0.029561	0.687299	0.415424	0.549021	0.000001	0.298763
Sum	83.75406	458.4800	297.2321	61.13130	156.6392	167.5194	105.6476
Sum Sq.Dev.	7.344363	8.049496	2.051241	9.443559	31.32331	0.044015	2.885285
Observations	42	42	42	42	42	42	42



## Appendix-2

### VAR Lag Order Selection

At lag 1:

Lag	LogL	LR	FPE	AIC	SC	HQ
0	59.42081	NA	1.83e-10	-2.557113	-2.264552	-2.450578

At lag2:

Lag	LogL	LR	FPE	AIC	SC	HQ
0	60.22190	NA	1.65e-10	-2.661095	-2.365541	-2.554232
1	286.6273	362.2487*	2.41e-14*	-11.53137*	-9.166935*	-10.67646*
2	328.4789	52.31443	4.33e-14	-11.17394	-6.740635	-9.570999
1	292.6096	375.3771*	2.37e-14*	-11.54193*	-9.201445*	-10.68966*

At lag 3

Lag	LogL	LR	FPE	AIC	SC	HQ
0	61.20646	NA	1.46e-10	-2.779818	-2.481230	-2.672687
1	278.4578	345.3739	2.73e-14	-11.40809	-9.019388*	-10.55105*
2	323.8829	55.90777	4.21e-14	-11.22476	-6.745942	-9.617800
3	401.7048	67.84479*	2.04e-14*	-12.70281*	-6.133876	-10.34593

## Appendix-3

### Diagnostic Test Results

#### 1) Heteroskedasticity test: ARH

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F-statistic	0.482051	Prob. F(1,37)	0.4918
Obs*R-squared	0.501573	Prob. Chi-Square(1)	0.4788

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#### 2) Breusch-Godfrey Serial Correlation LM Test

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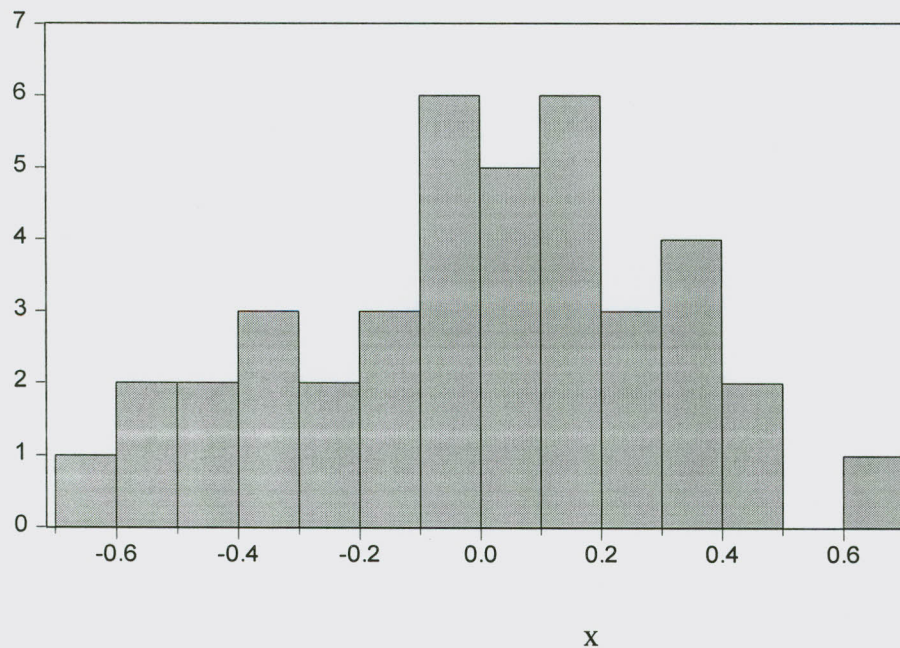
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F-statistic	2.564540	Prob. F(1,30)	0.1198
Obs*R-squared	3.150101	Prob. Chi-Square(1)	0.0759

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#### 3) Normality test

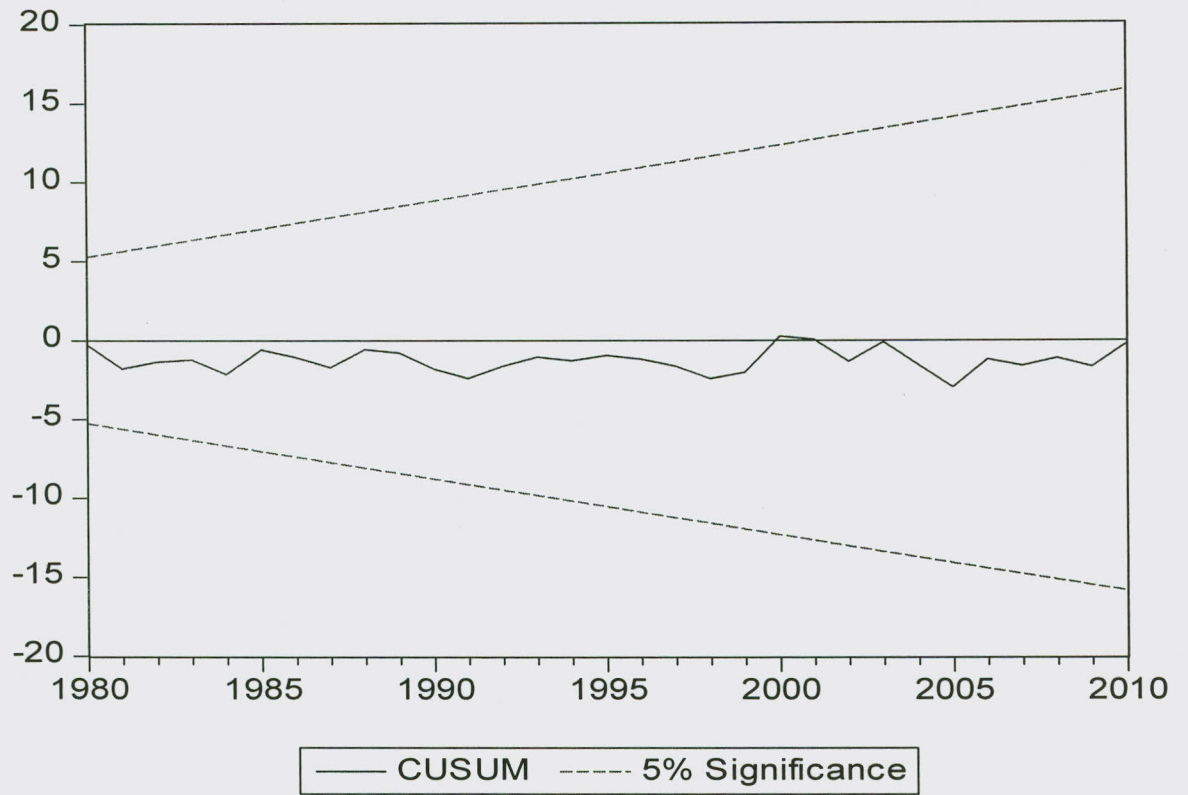


Series: Residuals  
Sample 1971 2010  
Observations 40

Mean 1.09e-15  
Median 0.038549  
Maximum 0.699892  
Minimum -0.649133  
Std. Dev. 0.306626  
Skewness -0.162286  
Kurtosis 2.692365

Jarque-Bera 0.333311  
Probability 0.846491

#### 4) Model (Parameter) Stability Test





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