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THE DETERMINANTS OF GROSS NATIONAL SAVING: THE CASE OF ETHIOPIA

By

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Abstract

Saving is becoming a pervasive agenda as decreed in African Union Regional agenda and it is also part of global agenda as enacted in UN resolutions for the nations to develop sustainable finance for financing sustainable development. The objective of this paper was to investigate the determinants of gross national saving in Ethiopia using annual time series data from 1981-2019. The study used Autoregressive Distributed Lag (ARDL) modeling and bounds test for co-integration. Estimated results revealed that percapita income, current account balance and bilateral aid are found to have a statically significant positive effect on the saving rate, or gross national saving as a percentage of GDP in Ethiopia. Urban population growth rate however found to affect national saving negatively in the long run. On the other hand, deposit interest rate and inflation are found to be statistically insignificant effect on national saving rate in the long run. In the short run, current account balance is found to have a negative effect on the rate of gross national saving at 5% level of significance. These findings imply that creating an enabling environment for percapita income growth and expansion, improving current account balance (by stimulating exports and substituting imports),strengthening global-partnership for foreign-bilateral capital generation and other technical co-operation, and regulating population growth by speeding up demographic transition, controlling rapid urban growth through expansion of urban services to rural areas for inclusive growth, reducing poverty and improving the level of employment and reducing non-productive public expenditure and maintain macroeconomic stability in long run help to raise saving in Ethiopia.

Key words: gross national savings, time series analysis, ARDL bounds co-integration test, Ethiopia

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Acronomys

AAAA----------Addis Ababa Action Agenda for sustainable development

ADB----------Asian Development Bank

AIC----------Akakie information criteria

APC----------Average Propensity to Consume

ARDL----------Autoregressive Distributed Lag

CSA----------Central Statistical Agency

CAB ----------Current Account Balance

DHS----------Demographic and health survey

DAC----------Development Assistance Committee

DC----------Domestic Credit

EC----------Error Correction

ECA---------- Economic Commission for Africa

FDI----------Foreign Direct Investment

GDP----------Gross Domestic Product

GDS----------Gross Domestic Saving

GNS----------Gross National Savings

GTPI----------Growth and Transformation Plan (first)

hhs----------House Holds

ICOR----------Incremental Capital Output Ratio

IMF----------International Monetary Fund

LCM----------Life Cycle Model

LCH----------Life Cycle Hypothesis

LDCS----------Less Developed Countries

MFI----------Micro Finance Institution

MDG----------Millennium Development Agenda

MoFED----------Ministry of Finance & Economic Development

NBE----------National Bank of Ethiopia

NFDI----------Net Foreign Direct Investment

NGDP----------Nominal Gross Domestic Product

NPC----------National Planning Commission

ODA----------Official Development Assistance

OECD----------Organization for Economic Cooperation and Development

OLS----------Ordinary Least Square

PIH----------Permanent Income Hypothesis

SBIC----------Schwarz's Bayesian Information Criterion

SSA----------Sub Sahara Africa

TFR----------=--------Total Fertility Rate

TFP----------Total Factor Productivity

UN----------United Nation

VARSOC----------Vector Auto Regressive Specification Order Criteria

UNCTAD ----------United Nation Conference on Trade and Development

WB----------World Bank

1. INTRODUCTION

1.1 Back ground of the study

National resource mobilization, combined with the right use of such resources increases the policy space available to the country and enable the country to define its own development goals and the means to attain them. The increase in own resource mobilization boost ownership of the development agenda and strategies that enable to focuses on those sectors where investment is most productive and make nation profitable (UNCTAD, 2007).

Two important United Nations resolutions adopted by world leaders in July 2015 are the Addis Ababa Action Agenda (Developing sustainable Finance for Financing for Sustainable Development for years to come) and 2030Agenda for Sustainable Development, and the Agenda 2063 of the African Union – that intend to fully fund African development , are all intend for enforcing and strengthening domestic resource mobilization (savings),which is considering construction from a model focused on official development assistance (ODA), these interconnected programs have become increasingly important for domestic financing (savings) for sustainable development (UNCTAD, 2016)

Low rate of saving is one of the structural problems that had far reaching implications on the growth and prospects of poverty reduction in Ethiopia. Gross domestic saving as percentage of GDP was 11% on average during the imperial era, declined to 7% from 1976-1986 and averaged to 4 % during Derge regime become less than 1%, of GDP during the last period of derg regime due to increasing government expenditure mainly on military (Ghebru 2014) . According to World Bank: 2013 , gross domestic Savings declined from 10.5 percent to 6.1 percent of GDP from 1980s to 2000s, over the same period , Investment rose from 15.7 percent to 23 percent of GDP .This is an evidence for saving to lag behind investment in range of finance gap 5.2% of GDP in 1980s to 16.9%GDP in 2000s.

Ethiopian National bank annual report (2019/20 and 2018/19) shows that saving (GDS) was in range of 10-25% of GDP while investment is in a range of 23.6 - 47.7% in between 2000 to 2019/2020. Gross domestic saving rate (GDS) was 15 % of GDP by 2000, 16.9% of GDP by 2003 at start of encouraging economic growth, and become 22.3 % of GDP by 2018/19. Domestic fixed investment rate became 23.6%, 29 % and 47.7% of GDP over the same period. Hence the gap

between saving and investment in which saving has been lagging behind by 15% by 1987 went to 8.6 % by 2000 and become 25.4% of GDP by 2018/19.

According to World Bank statistics (1981-2019) Ethiopia is home to about 115 million population, and is the second-most-populous nation in Africa. According to NPC 2015/2016 report the DHS 2015/16 shows only 42% of Ethiopian women using family planning (NPC: 2015/16) might be potential cause for high average fertility (6.33), high young population (45%), high young age dependency (85%), large population (about 36 million in 1981) with annual average growth rate of 3%, made short doubling period (25years), large labor force (52.77%), high unemployment (20-30%), fastest urbanization rate (4.8%) and this made Ethiopia among the highest urbanization rate by sub-Saharan Africa rate (4%) and the world (1.887%). the downward trending of rural population though it was still above 2% annually in average of 39 years. Hence the finance gap is severe when one sees in light of rapidly growing population and poverty.

According to the World Bank (2020), Ethiopia Economic growth averaging 9.8% a year from 2008/2009 to 2018/2019, with the share of the population living below the national poverty line declining from 38% to 24% over the same period. According to NPC report the percapita income was 377 USD in 2009 increased to 691 USD in 2015, and estimated poverty were down from 45 % in 1995, to 38.7% in 2004/5, become 29.6 in 2010/11 and decreased to 23.5% in 2015/2016 with estimated inequality index (Gini index) of 0.3 as reported by government planning commission from (2015-2019) (NPC: 2015). The high poverty and associated rapid rate of population growth has potential effect on frequent actual and potential occurrence of Malthusian trap in Ethiopia that might have caused saving to decrease.

Report from first gross and transformation plan (2010-2015) reveals an annual average aid of 3.9 billion USD with estimated percapita 37.1 USD of ODA has been injected to Ethiopia. According to World Bank data from (1981-2019) an average of, 9.25 % of national GDP ODA finance supply was coming to Ethiopia over four decades annually. Given the twin deficit (two gaps) in Ethiopia, aid was used with domestic finance in economy. However, there was controversy on its effect on national saving . Studies also shows mixed effect (due to size of aid, project type, use traps, management of aid etc) of ODA on national saving due to heterogeneous factors (Schmidt-Hebbel et al., 1996).

In an economy, appropriately coordinated and joint efforts of economic agents is complementary and important to develop national source of loanable fund for sustainable development through mobilizing finance and efficient utilization of mobilized finance for sustainable Development .

1.2 Statement of the problem

Faster and sustainable development of countries, among other things, depends on the extent to which they unleash their resource potential by pulling private capital and deploying innovative financing mechanisms while wisely managing public expenditure. The amount of investment required to have sizeable and at the same time sustainable economic progress depends on the country's ability to have adequate savings.

There are different directives enacted to encourage and reinforce national saving. 1)The Ethiopian Home Grown Economic Reform plan that indicates the existence of the resource gap and the need for narrowing it down on one side and the Ethiopian civil servant Proclamation No 1064/2017 that has an indirect incentive for child bearing with no limit for the frequency of birth - Article 42(3) 2), The regional and global environment that tends to push countries to look for domestic sources of financing necessitates one to ask a question as to where to press for developing sustainable source of finance for financing sustainable development in Ethiopia.

In Ethiopia While there is good reason to be optimistic about growth performance since millennium and about the future of the country there are still important challenges. One of the Many pressing issues, is how to tackle the sustained poverty (24%) , Unemployment (over 25%) with sustainable finance gap from inside parallel to maintain AAAA that is an integral to 2030 agenda with existing sustained large finance gap (25%) as of 2018/19 data between saving and investment can truly constrain to gauge sustainable investment and have potential to expose country to shocks. .

Many empirical works have been done so far on the determinants of savings in Ethiopia. Most of the earlier studies used domestic saving (GDS) and have not used national saving (GNS) as dependent variable. Abu (2004) made a study on the determinants saving in Ethiopia and found saving rate has been too low and has also been declining over time in which he found Fiscal, monetary policies, the investment regime, and external factors determine saving performance of

Ethiopia. However according to NPC, 2015/16 in the first growth and transformation plan ,there are several policy measures under taken to improve saving trends in Ethiopia and the improvements in trending of saving is expected. Geda and Kibret: 2006 made study on saving in Ethiopia and found that saving is negatively related to macroeconomic instability, foreign aid, and age-dependency ratio but positively related to income level or growth, rate of investment, and short-run changes in terms of trade. However, the effect of foreign sector on national saving now felt under controversies as recent literature in studies following the "Paris Declaration on aid Effectiveness 2005" that enacted for agreements on an increase in volumes of aid & other development resources and a significant increase in aid effectiveness to achieve [MDG] goals . Studies post Paris declaration such as by (Shields 2007) over many developing countries, (Kumar & Saleh, 2021) on 22 SSA countries, (Mascagni, 2016) in Ethiopia, Workneh (2013) found complementary effect of aid on national saving but study by Girma (2017) found irrelevant effect of aid on saving in Ethiopia. These controversies with aid effect on saving invites for the study.

More over as other external factor the effect of trade gains proxied by current account balance on national saving were found positive as studied by Ghebru (2014) whereas Ayalew, (2013) and others found reveals irrelevant effect of current account balance on saving in Ethiopia , This mixed effect of current account balance over time invites for the further study using dynamic data over time.

Government Ethiopia among other lists of basic direction planned to take measure to increase national saving by reducing inflation and narrowing down the gap between deposit interest rate and inflation rate (NPC:2015/16) but reducing the gap was not seeming successful rather and studies also shows irrelevancy of these variables on saving as many studies like (Ghebru :2013), Girma (2017), Tedla: 2017) and many others shows and now the gap between inflation rate and deposit rate is becoming severely increasing due to increasing rate of inflation and invites for the study .

At the same time demographics issues are missing from basic national policy directions as the right of way area to gauge up saving and the irrelevant effect of dependency ratio on saving as few recent studies in Ethiopia like (Ghebru: 2013), (Tedla: 2017) reveals necessitates for the study on effect of demographics using urbanization rate as better proxy variable of demographics in Ethiopia that is uniquely highest by African average while age dependency ratio is characterized

by paradox of dependence. As one proxy variable of demographics rapid rate of urbanization becoming uniquely high in Ethiopia by African average. Urbanization which seems sign of modernization on one side today increasing rapidly and happening before urban itself develop to absorb potential surge of population to cities or happen before economic structural transformation was realized and brings challenges and opportunities together and this study use to assess the effect of such controversial element on national saving too.

Besides the mixed and inconclusiveness in the findings on important variable s and the recent ongoing national, regional and global agenda to have sustainable sources of funds for years to come makes this kinds of studies to be very important. In this study we need to answer basic question such as how saving is trending over time in Ethiopia? How much do policy direction on (poverty reduction, deposit interest rate ,inflation rate, trade, foreign bilateral aids-as it is relatively better in utilization set up), urbanization rate as better explaining variable than dependence ratio for rapid demographic growth and expansion has affected saving?, Thus, encourages one to study the causality between national savings; and, percapita income (ln GDPp) as measure of productivity or rate of graduation from poverty, bilateral aid (ln aid % GDP), current account balance (cab %GDP), deposit interest rate (DIR) , general inflation (CPIE) and the effect of urban population growth rate as a demographic factor, as these variables helps to gauge the right of way in the process of national saving .

1.3. Hypothesis of the study

There are many variables that determine the level of saving in a given country. As theory and many empirical studies in Ethiopia and elsewhere shows as income increases national saving increases. Thus factors affecting income also affects savings. In this particular study, Gross National Saving (ln GNS % GDP) is the dependent variable. The researcher, based on theory, and empirical works set the following hypothesis on the impact of six explanatory variables on the rate of gross national saving.

1. Percapita Income : Gross domestic product is often considered the best measure of how well the economy is performing and it measures the total income of everyone in the economy, and real GDP per person measures the income of the average person in the economy. It is also used as a proxy variable for productivity growth or rate of graduation from poverty .An increase in percapita income has an expected positive effect on national saving.

2. Deposit interest rate is the rate at which money saved grows in a real terms. It is a monitory policy instrument enacted by government that is a value driven by deducting inflation from nominal interest rate. This has an expected positive effect on saving.

3. Bilateral aid as share of GDP measures Aid provided to government by government directed to specific purpose that has defined goal and has an element of relatively better follow up than multilateral aid and used to ease the financial constraints that governments face in due process of investment for development and has an expected positive effect on national saving.

4. Urban population growth rate: This measures the rate at which urban population is growing in Ethiopia. The rapidly growing of urban population comes from rapid increase in fertility , youth, and rapid rural to urban migration of young for job search and growth of population in general .This has an effect of current overconsumption & in absence of job for many young population has an over-crowding effect of urban economy in particular and the whole economy in general and has an expected negative effect on national saving.

5. General Inflation derived from consumer Price Index that tracks the rate of change in price of a relatively fixed bundle of goods (‘‘market basket’’ of a typically urban family) over time, For this study it is a general rise in price (inflation)of commodities in Ethiopia was taken and has an expected negative effect on national savings.

6. Current account balance as share of GDP is a measure of national account balance as percentage of GDP explaining net return of external finance flows from trade, net transfers and income received from abroad by nationals. Hence it is the sum of net exports of goods and services, net income, and net current transfers. This value was usually low and characterized by deficit nature and has an expected negative effect on national savings.

1.4. Objectives of the study

1.4.1General objectives

The general objective of the study was to investigate determinants of national saving and its long and short-term economic linkages of the same in the case of Ethiopia.

1.4.2. Specific objectives

- To examine the trend in Gross national savings and explain the status in finance gap in Ethiopia.

- To assess the effect of foreign aid, percapita income, Deposit interest rate, urban population growth rate and inflation ,current account balance on national savings and to identify the short run, the long run determinants of national savings in Ethiopia;

- To examine demographics effect on national saving in Ethiopia and on the basis of the findings to draw policy implications.

1.5. Significance of the study

This research uses recent data to explain national savings in light of the current national, regional and global agendas. The study use to relieve contradictory findings of the effect of aid , and current account balance and the effect of rapid urbanization that is better than dependency paradox to represent demographic factor makes this study important . Most study use young dependency as proxy for effect of demographics but in Ethiopia age dependency represents young dependent on other unemployment dependent groups(20-30%)showing paradox of dependence and remain a problem to explain appropriate effect of demographics in many studies. This research contribute in identifying the direction and magnitude of the effect of these variables on national saving in addition to average income ,inflation and deposit interest rate to recommend right area of interventions to sustain finance in line with current global ,regional and national directives and adds knowledge and policy input to the existing literature on savings for sustainable development.

1.6. Scope of the study

This paper discuss about the determinants of national savings in Ethiopia using data range between 1981 and 2019. The researcher wanted to see the effect of six explanatory variables such as1) percapita GDP, 2) Bilateral aid as share of GDP, 3) Deposit interest rate 4) urban population growth rate 5) general inflation as presented by consumer price index) and 6) current account balance as share of GDP on national saving. The study has the scope of fiscal , monetary, demographics, foreign, financial intermediary effect and issues of macroeconomic instability or un certainty effects and income growth effects in Ethiopia from 1981-2019.

1.7. Limitation of the study

Because of inconveniences due to corona various pandemic, collecting data and rechecking the inconveniences associated with data by frequently moving to national office was a challenge. There was also difficulty to easily access national time series data online from national offices. It has to be noted that examining saving both at macro and micro level would have provided a better result however, there is a serious data problem; in terms of consistency, availability and time-horizon for compatibility of estimation. There were problems associated with data quality and relevance.

It is difficult to get all data from the same source. Data sources do not have data compatible to period of study example credit provided for private sector and employment. The difference in a value of data by difference source for the same variable erodes confidence in using data's. In the Most reliable sources of data like CSA, there is no complete time series data for all as required. In national offices like MOFED and NBE it is common to encounter a difference in the values of data from one report to other report or even from one page to next pages on same data (example investment and GDS). There is no easy way to get time series data from national sources online like other international organization as World Bank, or International Momentary Fund and others..

The problems of non stationarity and related conditionality push us to reject some important variables from analysis, like urban population as percent of all population , Young dependence ratio, financial development (M2%GDP) and exchange rate suffer from non-stationarity problem at 5% level of significance. Some important explanatory variables of interest like irrigation farm contribution and land and labor productivity, time use data, participation and employment of labor force are missed or available with certain range of interruption from the expected sources like WB, IMF, and NBE and CSA. Variables like labor productivity was constrained to calculate due to lack of complete data on participation rate and employment rate data (missed from 1981 to 1990).

Concerning institution, relevant variables like number of MFI, number private pensions -schemes, diaspora bonds, housing schemes, were excluded due to compatibility problem. However, I was tried to complement the study using some descriptive statistics for the role of MFI on saving using the available information from NBE. Regardless of these limitations, I attempted to address the study using the available means and relatively important variables that has policy relevance to address the determinants of national savings.

1.8. Organization of the study

The remaining part of the study is organized in five parts. Chapter two reviews the theoretical and empirical literature related to saving. Chapter 3, deals with model specification, estimation procedures, data type and sources. In chapter 4, description of Ethiopian socio-economy characteristics, chapter five reports of econometric analysis and the sixth chapter summary , conclusion and policy recommendation.

CHAPTER TWO

2. LITERATURE REVIEW

This chapter begins by explaining saving , and measurement problems associated with saving , followed by a review of both theoretical and empirical works on gross national savings rate, of which the first part deals with reviewing of theoretical literatures, which have either of a direct or indirect relevance on the area of gross national savings whilst the empirical literature, section reviews few important works at the international level with main emphasis on lesson from Asia, Africa and reviews on what has been done in Ethiopia concerning national saving to the best of the researcher's knowledge.

2.1 Definition of concepts and measurement problems with savings

Consumption and savings are studied together in savings and consumption theories. Saving is important in both theoretical analysis and policy design in both developed and developing economies, because of the direct theoretical link to future economic growth and current expenditure levels via its link to consumption. Early theories of economic growth emphasized the role of saving as a source of capital accumulation and hence growth. Similarly the aggregate demand based theory of Keynesian economics also focused on aggregate expenditure which has a direct implication to saving. The emphasis on saving was relatively neglected in the 1980s in many African countries. But the focus on economic growth and hence on saving seems to have resurfaced in the 1990s and after((Schmidt-Hebbel et al., 1996).

The interest for high saving is partly due to the belief that one of the reasons for slow growth in Africa is the low rate of saving relative to other developing regions as cited in (Geda and Kibret 2006).This is in particular true in Ethiopia when one sees the rate of saving relative to best growth performing nation or when one see in light of the lag of saving behind investment in Ethiopia.

Moreover saving is now becoming pervasive agenda with due emphasis of transforming the world towards developing sustainable finance as enacted in global agenda or AAAA (UN: 2015) that is an integral to sustainable development agenda-2030, and increasing saving to fully financing own development ass decreed in African union regional agenda-2063, and now part of Ethiopian national agenda in order to ascertain own sustainable investment growth and development from inside sources in the years to come.

National saving provides countries with the much aggregate needed capital for investment and related economic activities which, in turn, increases economic Transformation. The transformation of an initial growth spurt in to sustained expansion of output through productive employment requires the accumulation of capital and its corresponding financing growth brings savers and borrowers together to link productivity growth and reduce menial servants of smith (1776) through employment growth , reduce external dependence ,build resilient economy that with stand persistent shocks, in turn, sets in motion a self re enforcing process by which the anticipation of growth encourages investment, investment support growth and increased income raises national saving. Indeed, a steady flow of savings is essential for a sustainable economic growth and also for maintaining inter-generational equity (June, K. (n.d.).

Theoretical analysis of the role in saving is made under the smooth consumption hypothesis, parallel with discussion of saving relation in growth, transformation in dominant sector in particular and the whole economy in general , external economic sectors (AID and trade) i.e saving related to increase net trade gains and reduce aid dependence so to build resilient economy. Government policy also create an enabling environment for saving growth , population growth that can increase current excess demand on one side is a challenge but the large demographic increase in the presence of productive employment is opportunity in capital formation as productivity growth performance that in one way or another related to national saving.

In the assessment of savings and its determinants, the term saving can be referred to any of the three economic agents; individuals, companies and government save for future investment and expenditures. The saving of companies is basically the undistributed corporate profit; and the one of government is basically tax revenue minus public expenditure. These savings have different denominations; personal saving for individuals or household, business saving for companies or business sector and public saving for government or public administration. The sum of these three

savings constitutes the national saving. It can also be simply considered as the sum of Private and public saving .But for the interest of this study the term gross national saving equals the part of income that is not spent as final consumption expenditure by nationals was taken directly from IMF data set.

Data problems in the study of saving behavior both at the macro-economic(its derivation from aggregate of expenditure and income) and micro-economic levels(households poor concepts on saving) , particularly in developing countries are common and presented in the literatures by many scholars like (Deaton, 1991) , (Summers and Heston, 1991) , (Srinivasan, Gersovitz, and Paxson(1993) , (Schmidt-Hebbel et al., 1996) , (Aryeetey and Udry, 2000), (Geda and Kibret, 2006), many other researchers and remained un resolved issue.

At micro level, the standard household survey well understate saving due to several reasons ranging from concept and definition to measurement errors. The concept of income is complex, most people in LDCs do not distinguish between business and personal transactions and also non-financial assets dominate their asset portfolios which in essence are used to smooth out consumption over time. Household savings dominate national savings. The flow-of-funds perspective in which the capital expenditures of households are added to their acquisition of financial assets and changes in their liabilities are subtracted from it used to yield their gross personal saving or (Saving=capital expense + asset acquired - liabilities) as cited in (Deaton, 1991) are important to capture important aspects household of saving .

At macro level the main problem is that savings estimates are not actually measured but derived from production and expenditure data that themselves had a problem of under estimation and reconciliation and that are themselves quite unreliable (Summers and Heston, 1991), (Aryeetey and Udry, 2000). The illegal capital outflow (via over-invoicing of imports and under-invoicing of exports) are cause for underestimates of saving .The issue related with over and under invoicing affect trade gains (Geda and Kibret, 2006).

This enforces one to question the reliability of data and implies also the problem of reliability of the inferences. The policy implication and recommendation of such problem would be encouraging to have well established, highly decentralized data Centre, from conception to collection, editing,

analysis , under strong supervisory and auditing body of data before publication of reports for the use by stakeholders.

2.2. Theoretical literature

2.2.1 Consumption smoothing behaviour

Hypothetically, there are many factors that determine the saving performance of a country. Of which the most important factors that have been documented in many studies are those related to income, fiscal policy (i.e., government total final consumption expenditure), current account balance, macroeconomic stability (i.e., inflation), monetary policy instrument (deposit interest rate), and foreign saving (aid) , demographic variables among other candidates play a role in saving. In economics, there are different theories which are being supposed to explain the area of savings. Amongst which the most widely used can be viewed onto the following categories. These are Absolute Income Hypothesis (AIH) by Keynes (1936), Relative Income Hypothesis (RIH) by Duesenberry (1949), Fisher (the theory of interest), Permanent Income Hypothesis (PIH) by Friedman (1957), and Life-Cycle Hypothesis (LCH) by Modigliani (1950s) and Hall Random walk hypothesis.

Consumption has macro and micro dimension and current expenditure part and future parts known as saving. The economist Smith (1776) on his book entitled as an Inquiry in to **the** Nature and Causes of the Wealth of Nations point, that the "nature" of wealth is the material fulfillment of life.

> "Consumption is the sole end and purpose of all production; and the interest of the producer ought to be attended to, only so far as it may be necessary for promoting that of the consumer." (Smith :1776)

[1]Keynes (1936): Explained consumption play an important role in macroeconomic analysis. Marginal propensity to consume increases as income increase by less than increase in income and both MPC and APC lies between zero &one, APC is greater than MPC. Keynes also held that income is prime determinant of consumption and role of interest rate is secondary.

[1] 1 $C = \tilde{a} + cYd,\ APC = \frac{C}{yd} = \frac{\tilde{a}}{yd} + c$ and $0 < \frac{\Delta Cw}{\Delta Yw} = MPC < 1,$ and $APC > Mpc$ and $Yd = C + S$,, $a > 0,\ 0 < c < 1,$,

"The fundamental psychological law states that men are disposed, as a rule and on the average, to increase their consumption as their income increases, but by less than an increase in their income" (Keynes, 1936).

$$C = \tilde{a} + cYd, APC = \frac{c}{yd} = \frac{\tilde{a}}{yd} + c \text{ and } 0 < \frac{\Delta Cw}{\Delta Yw} = MPC < 1, \quad APC > Mpc$$

Using data on consumption and income dating back to 1869(1869-1933) in the 1940s , Kuznet examined whether average propensity to consume falls as income rise as hypothesis of Keynes and Kuznet found with increase in income, the ratio of consumption to income was not changing over long time. Keynes' function is short-run, 'Kuznets' function is long-run function. Keynes's conjecture appeared not to hold in long run.[2] The failure of the secular-stagnation (depression of indefinite duration due to high saving hypothesis) and the findings of Kuznets both indicated that the average propensity to consume is fairly constant (APC =MPC=c) over the long periods of time (June, K. (n.d. p.435).

In addition to income Keynes objective factors , the wage unit, windfall changes in capital, the rate of time-discounting, (in the ratio of exchange between present goods and future goods), changes in fiscal policy, expectation of income and Keynes subjective factors such as unforeseen contingencies, interest rate and appreciation, independence, bequeath a fortune, miserliness, are as psychological characteristics of human nature and are social practices and institutions that do not change over a short period of time except in abnormal or revolutionary circumstances determine propensity of consumption(Keynes, 1936).

[3] Duesenberry (1949) in his relative income hypothesis explains consumption as a social process, and depend s not just on its own current level of income, but on consumer income relative to those population with in which consumer identifies itself . The present consumption is influenced by present levels of absolute income, relative income, and by levels of consumption attained in a previous period. Thus, poor households within the group will consume a larger share of their

[2] $c = cYd$, $APC = \frac{C}{yd} = c$ and $0 < \frac{\Delta Cw}{\Delta Yw} = MPC < 1$, $and\ APC = Mpc = c,$ $in\ long\ run$ $and\ Yd = C + S$ „ $a > 0,\ 0 < c < 1,$ marginal propensity to consume and average propensity consume out of income are equal in long run (LR)

[3] $0 < \frac{Ct}{Yt} = a - \frac{bYt}{Yo} < 1$, $S_t/Y_t = a\ y_t/Y_0 + b$, given Ct = Real per capita consumption of year t , Yt = Real per capita disposable income of year t , Yo =Previous peak of real percapita disposable income a, b > 0

income while households with high incomes relative to the group will save more and consume less (Duesenberry, 1949).

[4]Irving Fisher explains how rational forward looking consumers choose consumption for the present and coming to maximize their life satisfaction. An individual's desirousness depends on his income racecourse; the size, the rate of time discounting or real interest rate , the composition and menace and other human behaviour related factors; foresight, complexion-control (self -control), habit, contemplation of life, and heritage motive (or concern for lives of others) that determine a person's desirousness which in turn determines his time preference (Fisher1930).

In the 1950s, Franco Modigliani and his collaborators Albert Ando and Richard Bromberg showed that life-changing income laid the foundation for his life-cycle hypothesis. The main idea of the life cycle theory of consumption planning is to realize stable consumption by saving in the high-income period and not in the low-income period. One of the important reasons is that income varies with age. Most people quit their jobs around the age of 65 and are expected to lose their income when they retire. However, they do not want a sudden drop in living standards when measured by consumption. To sustain consumption in retirement, people need to save during their working years (15-64 years old). .[5] Wealth and income both increase and consumption is stable in the long run (June, K. (n.d.) p.447).

The 1957 Milton Friedman PIH integrated Modigliani's LCH. Milton Friedman (1957). His book, titled The Theory of Consumer Functions[6] suggested that, people should adjust their spending according to their fixed income. Temporary changes in income are not changes in consumption, but (accidentally) accumulated in assets. Transitory and fixed consumption is independent of transitory income, and transitory consumption in any period is independent of income. Thus, planned consumption C^P depends on fixed income, and unplanned consumption C^T is totally independent of income. Therefore, the focus of the permanent income model is to estimate the relationship between permanent consumption and permanent income that measures consumption stability (Friedman, 1957) .

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[4] $S1 = Y1 - C1\,, C2 = (1+r)S1 + Y2 \;\; and\; C1(1+r) + C2 = \; Y1(1+r) + Y2,\; and \;\; C1 + \frac{C2}{(1+r)} = Y1 + \frac{Y2}{(1+r)}$

[5] C/T = (1/T)W +(R/T)Y = α W+ βY, APC =C/Y= α W/Y + β over years a is the marginal propensity to consume out of wealth, and b is the marginal propensity to consume out of income through the life time T. $Modiglani\ and\ his\ collaborators\ model$ $ence\ is \;\; C = \alpha W + \beta Y \;\; is\ consumption\ over\ time$.

[6] $Y_M = Y^P + Y^T,\; C_M = C^P + C^T \;\; , C^P = f(Y^P),\; C^T\ is\ residual\ not\ depend\ on\ any\ income -. Friedmann$ 1957,

Changes in consumption reflect shocks about life-time income. If consumers are optimally using all available information, consumers surprised only by events that were entirely unpredictable. There-fore, changes in their consumption should be unpredictable as well. The combination of the permanent-income hypothesis and rational expectations implies that consumption follows a random walk(Hall n.d.). Macroeconomic probation on consumption has been devoted to testing the scattered walk theory and explaining its divergences from the scattered walk theory and explaining its divergences from scattered walk property. The three branches of literature developed to explain divergences from scattered walk are endurance of consumption , liquidity constraints, hoped constant real interest rates attempts to explain why divergences from the scattered walk in terms of inter temporal transaction(Hall, 1987).

2.2.2. Saving and growth

Standard macroeconomic theories have little to say about the impact of saving on growth. But the area has got its initial explanation in early times by the _father of classical economics‘, called Adam Smith (1776).through his implicit postulation about the division of labor. Saving is the addition of capital from the annual income or the company's capital as individual saves to get increase in employment through lending for interest. Thus, national saving increase and can help to create productive hands and reduce unemployment by employing borrowers and the savers themselves (Smith :1776)

Lewis treated capital accumulation, technical progress and the growth of the supply of skilled workers as a “single phenomenon” and explains economic growth, in the sense that both the application of education of qualified workers and new technical knowledge were essentially determined by the availability of capital or saving growth(Lewis :1954). The fundamental fact about economic growth is the growth of output per head of population, lies, in an increase in investment. It is only an increase of rate of investment that can increase the national income. The increase in the rate of investment means a corresponding increase in the rate of savings. It is usually considered difficult for a poor country to achieve high rates of saving because of its poverty(Lewis, :1955).

[7] In Harrod's own terms "balance of growth depends on a comparison between the natural rate of growth which depends, in the absence of technological change, on the increase of the labor force, and the merited rate of growth depends on the saving and investing habits of households and firms". According to Harrod – Domar growth model, fixed proportion of capital stock and labor explained growth and growth does not spontaneously correspond to full employment (natural rate of employment). Poverty of labor led to (inflation) or a lacuna of capital led to (joblessness) in the providence. Balanced growth was possible only if, the providence remained on the "razor's edge equilibrium growth." where the growth of rate of labor equals the growth rate of income (natural rate of growth) and saving growth rate (Solow, 1956).

Kuznets's greatest legacy is the theory of his modern economic growth. His early theory explains the salutary effect of population with assumption of an increase in population increase in saving due to economies of scale, large savers to dis savers, productivity growth but not the case in point in modern periods as population growth is not compatible to capital formation. However the proposition that, sharp changes in the structure of the economy, the high growth rate in per capita income and population and the associated changes in social institutions and culture are a" unique age in human history is a part of the confirmed knowledge of economic science and no longer a theory". These includes high rates of growth of per capita product and of population , rise in productivity, rate of structural transformation of the economy , structural transformation of society and its ideology ,the increased power of technology in transport and communication, the spread of modern economic growth so to increase capital and economic growth (Kuznets , 1971).

[8] Solow growth models were emphasizing on capital accumulation to bring economic growth; whereby showing us as higher saving is a prerequisite to fostering growth by the reason that higher savings would imply higher economic growth. It analyzes changes in the savings rate, population growth rate and the rate of technological progress in which technological growth is assumed exogenous are cause for changes of output over time. The model has constant-returns to scale in

[7] Δ y/y = s/c where: c=K/Y =ΔK/ΔY , S=I, , s/c =ΔY/Y., Δ y/y is growth rate of is output , S and I saving and investment respectively, s saving rate (1/c) rate of productivity

[8] $the\ discrete\ time\ version\ of\ the\ model\ f(kt,nt) = C_t + I_t\ ,\ K_{t+1} = K_t + I_t\ \ ,I_t\ = d(f(kt,nt),$ $C\ consumption, I\ investment\ , k\ capital, n\ labor\ \ d\ is\ \ fraction\ of\ output\ invested, f\ is\ the\ neo\ classical\ aggregateproduction\ function\ \ over\ time$

production function with substitution between two inputs, capital and labor. If the factors are paid the respective marginal product , given capital (k) and labor (n) over time t, the model assumes constant fraction of output is invested. Since model can determine capital stock for date t+1, the model can be used to generate times series which can be compared with Simon Kuznets that assume smooth consumption (Prescott, 1988).

Both the incremental growth approach of the post Keynesian tradition and the catching up thesis of neoclassical spin off are not suitable to view for the top stylized information of relative remunerative growth separately. Notwithstanding a pooled cross section, that integrates these two approaches is developed and tested by the authors over the period for a group of nine OECD countries, for a group of nine Latin Americans countries, and for a group of seven east Asian countries . The catching up effect is initiate to be apropos in explaining productivity growth in the OECD area, and in East Asia but not in Latin America .This discriminational corollary finds explanation in terms of the relative strength of dynamic productivity returns as main determinants of growth(Targetti & Foti, 1997).

[9]Romer explains long run growth in which knowledge is endogenous input in production that has an effect of increasing marginal productivity of factors of production, physical capital and labor determine economic growth. It is essentially a competitive equilibrium with endogenous technology change in contrast to model on Diminishing Returns , growth rates can be increasing over time .The effects of small disturbances can be enlarged by action of private agents and large countries may always grow faster than small countries (Romer, 1986).

(Hall & Jones, 1999) Explains the differences in physical capital and educational attainment partially explain the variation in output per worker and the differences in capital accumulation, productivity, and therefore output per worker are driven by differences in institutions and government policies (Solow residual), which can be called social infrastructure that is endogenous and determined by location and other factors captured in part by language .

According to Gersovitz (1988) most saving and developments related theoretical side hypotheses was derived from work done to explain savings in the developed countries and the notions peculiar

[9] $Y = AK$ A *is technology, and* K *includes both physical and human capital*

in the context of developing countries are family structures, the prominence of agriculture, the self-financing of investment, borrowing constraints; uncertainties, roles of education, health and nutrition, and non-linearity's in the saving function and the relationship between the distribution of income , the associated problem of the motivation behind bequests, determine aggregate level of savings (Gersovitz, 1988).

2.2.3 The Rural Economy and Institutions in Saving

.[10] Agriculture has a myriad of roles in the economy. Despite the important role of agriculture in national development, the African government has repeatedly failed to create the conditions for an agricultural uprising that will spur industrialization and social development on this continent. For Africa to be self-sufficient, reduce poverty and become competitive in the global market, government policy must undergo fundamental changes in agriculture (Cheru, 2008).

Simon Kuznets summarized agricultural contributions as "market contributions" and "factorial contributions". A "factor contribution" occurs when there is a transfer or loan of resources from one sector to another. So, as agriculture itself grows, it contributes to products, trade with others contributes to the market, and moving resources to other regions reduces those resources gap. Factors of production, contributes to factors (Kao, 1965).

Kuznets predicted an inverted-U relationship between development or percapita growth through changes in the structure of production and inequality. The main aspects of structural transformation were the declining share of agriculture in total output, and migration from the low income agriculture sector to the high-income industry sector. Over time, the process of structural transformation grew into a diversified features or problems (Paul, 2018).

> "Distinctions must be kept in mind between quantity and quality of growth, between its costs and return, and between the short and the long term. Goals for more growth should specify more growth of what and for what." Simon Kuznets, the creator of GDP, in 1962.

[10] *"It is in the agricultural sector that the battle for long-term growth will be won or lost" (Gunnar Myrdal, Nobel laureate in economics on(Todaro & Smith, 2012, p. 416)).*

(Ndulu & Chakraborti, 2007)Africa is a home to 10 percent of the world's population but confounding 30 percent of the world's poor. These slower growth in Africa caused by poor shocks management, large slower productivity growth performance from that of the rest of the world. Lower levels of investment and lower returns from it ,poor policy and governance , growth with trading partners '(competitiveness and barriers to trade), delayed demographic transition , geographic isolation and fragmentation, as well as natural resource dependence. This analysis then leads to a set of four specific pillars areas in which action is needed to accelerate growth, these four pillars are critical but not comprehensive are investment climate, infrastructure, innovation, institutional capacity.

Economic commission for Africa (2006) on book Entitled as Capital flows and development financing in Africa, explained Productivity increases in farming is the starting point for juicy conversion and this could not come in Africa because agrarian productivity per worker has not changed over time. Among the reasons for this low productivity is lowest use of technology in agriculture. For instance, the use of tractors per worker has yea diminished in Africa over time; in 1961, 417 agrarian workers shared one tractor compared with 806 in 2002. Over the same period, in South Asia has been multiplied by 25 times (ECA: 2006 p. 131).

The agricultural families are important in saving optimization. Angus Deaton (2005) on book entitled as Franco Modigliani and the life-cycle theory of consumption argue that as a higher and higher fraction of people that are with high saving ratio are those who depend on a temporary basis of activities , with high transitory income. That is why saving rates rise more rapidly with income among households who are farmers or small-business proprietors, whose income tends to be relatively volatile(Deaton, 2005 p.6)

Severe extent of malefactions and dispositions in the available data on income and saving are important to determine domestic saving in developing countries. The absence and bad functioning of credit and insurance markets or poor financial intermediation constitute to determine saving in less developed countries(Srinivasan et al 1993).

2.2.4 Saving, Twin Deficit and External Sector

[11] (Todaro & Smith, 2012) emphasized that improvement in poor people's incomes mainly comes from inside growth however in presence of good governance in economy foreign aid has positive role to play .The two-gap models assume the savings gap and foreign-exchange gap are unequal in magnitude and that they are essentially independent and one of the two gaps will be "binding" for any developing economy. In an economy if the savings gap is dominant, growth is constrained by domestic investment. Foreign savings use to supplement domestic savings. In a country with a shortage of savings decision-makers may be unable or unwilling to divert purchasing power from consumption goods to capital goods, as a result, excess foreign exchange, including foreign aid, spent on the importation of luxury consumption goods and retards national saving (Todaro & Smith, 2012 P.702).

The extended Harrod-Domar growth model shows saving as function of income growth & percapita of trade returns. Developing countries were characterized by trade deficit. Hence foreign aid or foreign investment was enabler for LDCs to get the required foreign exchange for importing capital goods and raw materials so that more investment than domestic saving can occur to achieve target growth rate. Hence knowing the effect of increasing investment under two gaps to further explain the effect of foreign capital inflows is important.

$$Extended\ \ H-D\ growth\ model\ ,\qquad \frac{\Delta y}{y}=\frac{s}{c}\ +\ \frac{(x-m)/Y}{k}=\frac{s}{c}+\frac{nx}{k}$$

$$\frac{s}{c}=s=\quad \frac{\Delta y}{y}\ -\ \frac{nx}{k}$$

Studies shows mixed effect of current account balance on saving: (Nagawa et al., 2020) published book on the Official Journal of economic structure and International Finance of the Pan-Pacific Association of Input-Output Study, on Determinants of gross domestic savings in Uganda: reveals trade balance found negative effect on saving, (Ayalew: 2013) **:** Published book on Determinants

[11] NX = X-M =(S-I) + (T-G) , Nx net trade balance x export, m, import, S-I ,net private saving , T-G, net national saving .

"We, Ministers of developed and developing countries responsible for promoting development and Heads of multilateral and bilateral development institutions . . . , recognize that while the volumes of aid and other development resources must increase to achieve these [MDG] goals, aid effectiveness must increase significantly as well. —Paris Declaration on Aid Effectiveness, 2005"

of domestic saving in Ethiopia: published on journal of economics and international finance and the result shows , current account balance found insignificant on saving in Ethiopia, Ghebru (2014) **:** Study on the Determinants of Gross National Saving in Ethiopia, published by Addis Ababa University, Current account Balance found to be positive on national saving.

(Kumar & Saleh, 2021) on book entitled as Foreign aid and sectorial growth in , major recipients of foreign aid , in 22 sub- Saharan Africa made explanation on controversial debate whether foreign aid can promote growth and investment by filling the savings gap and the foreign exchange gap or whether foreign aid may have an adverse effect on growth and investment due to moral hazard issues and disincentives associated with the strategic interactions among recipients and donors , and its negative effect on the tradable sector and the competitiveness of the economy through the Dutch Disease. The study found aid has a heterogeneous effect on sectoral output and prices (on tradable output and on non-tradable output, inflationary effect, a deflationary effects). The study do not find evidence of Dutch disease. Aid does not lead to reduction in the terms of trade for tradable goods in these countries.

(Schmidt-Hebbel et al.1996): in his book entitled as saving and investment paradigms, puzzles and policies explained the mixed effect of aid on saving. The effect of foreign aid on saving (and of foreign saving in general) vary widely with samples, model specification and empirical methods used .Second the extent of resource fungibility is critical determinant of the extent to which non concessional external loans and foreign aid are channeled into higher domestic consumption or investment (Schmidt-Hebbel et al., 1996 p.101).

2.2.5 Saving and Macro Economic Policies

David Laibson on book entitled as a Cue theory of consumption, Psychological experiments demonstrate that recurrent pairings of a cue and a consumption create cue-based complementarities. The presence of the signal raises the marginal utility derived from consumption and such behavior is characterized by endogenous cue sensitivities, costly cue-management, commitment, and cue-based spikes in impatience and explains preferences change rapidly from moment to moment (Laibson, 2001).

Human behaviour is far from rational , preferences of consumers is time-inconsistent, and consumers are imperfect decision makers & the insufficiency in saving is related to pull of instant

gratification or lack of patience of consumers. There are various approaches of inertia in people's decision making, for getting people to save more. For example attitudinal changes, enrolling employees in a company's retirement plan rather than requiring employees to "sign-up" for the plan in advance, control the desire for instant gratification like programs that offer workers saving a portion of any future raise in salary (PF) ,action to control credit provision(Laibson n.d).

As a general rule, government policies can have a potentially significant impact on national savings, either by increasing public savings directly or by implementing policies that increase private savings. These policies include "income policy (fiscal structure, fiscal incentives), spending policy (income transfer, redistribution), and levels of public savings" (Dayal Gulati and Thimann, 1997), p. 7). Government policies focused on financial and pension reform can affect private savings in addition to the aforementioned means by which governments can influence national savings (Geda and Kibret, 2006 p . 23).

The rise in private and public saving is made possible by lowering corporate tax rates, customs duty, and interest rates along with elimination of policy distortions and financial sector Development ,demographic trends, precautionary saving are important in saving. Study from china and Philippines reveals urban households' saving increase due to lack of access to credit to purchase durable goods (automobile ,TV etc), precautionary saving as a hedge against risks of illness , financial markets development, and public spending to increase social transfers, reform pension systems, and universal health care insurance and education, appear top priorities for saving to grow(Jha et al., 2009).

Government can expand national sources of funding(saving) by expanding bond markets ,attracting large-scale FDI, genuine free trade in agricultural products(the developed countries must scrap subsidies they pay to their farmers) and enabling poor countries to increase their earnings from primary product exports), encourage financial intermediation(spread of microfinance institutions) , grant the inhabitants of shanty towns the legal title to their homes , so that these can be used as collateral for business can help to increase national saving(Moyo, 2009 p.9-10).

2.2.6 Saving Motives, Labor Productivity and Demographics

Malthusian theorized that populations grew in geometric progression (common ratio) and food production increases in arithmetic progression (constant or common difference) hence, he concluded that populations grow faster than the supply of food and lead to a shortage of food due to the law of diminishing returns (Malthus, 1798)**.**

> "Once the population exceeds what food supplies can support , advancement in technology , create higher levels of fertility, which lead to food shortages because the higher population needs to live on land that would have previously used to grow crops. The higher levels of food production created by more advanced agricultural techniques also creates population growth and creates a Malthusian crisis with widespread famine as well as rampant disease is termed as Malthusian population Trap" (Malthus, 1798).

According to Romer (1990) growth is driven by technological change that arises from international investment decision made by profit maximizing agents. Technology as an input neither a conventional good nor a public good .Technology is not purely public good (It is a non –rival good, partially excludable good) , the equilibrium is one with monopolistic competition and that having a large population is not sufficient to generate growth(Romer, 1990).

Kuznets was impressed more by the beneficial effects of rapid population growth than by its negative effects in early times. His early assumption was that large population growth increase per capita income because it increased the number of contributors to useful knowledge, increase savings both because it increased the ratio of savers to dis-savers, larger populations promoted economies of scale and the responsiveness to new products. Lately, however, he recognized that the sharp acceleration in the populations of less developed nations, brought about by sharp declines in death rates, sometimes overwhelmed the economies and impeded growth in per capita income. The modern economic growth meant accelerated rise not only in product per capita but also population and it does not imply that the population growth was the necessary condition for the income (Kuznets, 1967).

Borja Mortano (2020) Published book entitled Malthusianism of the 21st century on journal of environmental and sustainability Indicators .This explains Technology has played a fundamental

role in the increase in the level of wealth per capita. However world would return to the scenario described by Malthus problem of population growth, If technology were not able to maintain production growth rates higher than the population growth rates(Elsevier, n.d.) .

Countries menu of demographic options helps in joining the demographic dividend means, empowering women and girls by improving their health, enhancing their human capital through increased investment in education and skills, and providing them with greater market, and social decision-making power. Hence rapid demographic Transition benefitted most developing nation (Canning et al., 2015)

According to (Canning et al, 2015) the determinants of whether a country will capitalize on its demographic opportunity relate to how flexible the economy is and how well it can absorb a rapidly increasing labor force, In Africa fertility has declined, from 6.5 children per woman in 1950–55 to 5.4 in 2005–10, but it is less than in other regions . Fertility declined from 5.6 to 1.6 over the same period in East Asia. The increase in transition by East Asia closely parallels its economic takeoff. About one-third of the increased growth during the East Asian "economic miracle" can be attributed to the demographic dividend (Canning et al, 2015. p7-9).

According to (Lewis, :1958) rapid population growth aggravate food deficit, and it put stress on the balance of payments and savings potential. It led to rapid urbanization, which is extremely expensive in terms of infrastructure .Rapid population growth also made the problem of urban unemployment insoluble.

> "The normal way to cope with urban area unemployment is to provide work, but this is no solution in some case and it merely aggravates the problem. Because the more people will drift into the towns as the more work you provide in the towns, and there is no certainty that you can win the race. No one ought to say that he knows how to cure unemployment in this situation except insofar as the solution is to make more jobs in the countryside" (Lewis, , 1958).

[12].Productive efficiency is better captured by labor productivity because a number of national residents do not work. Labor productivity is explained by time use, employment, participation rate, and several other factors (institutional factors, growth and expansion of technology, growth of manufacturing industries, innovation, and efficiency in production, financial intermediation , investing in R&D, by increasing provision of tractors etc) (Bénassy-Quéré, 2010, p. 442) .

There are two types of labor in which one sort of labour adds to the value and there is another labour which has no effect of adding a value. The labor produces a value called productive labor but unproductive labour is termed **a menial servant**, adds to the value of nothing (Smith:1776).

In summary, investment, government expenditure, trade balance disposable income, income growth rate ,percapita income, interest rate, money supply, culture, expectation, uncertainty like inflation ,credit, wealth, productivity, population ,dependency , urbanization , technology or innovation, FDI, ODA, efficiency of public budget happened to affects national saving.

2.3 Empirical Evidence

There are numbers of empirical works which have been done on determinants of saving in both developed and developing countries. The studies deployed different methodological approaches. Most used co-integration and error correction models, while some others have been used panel data estimation procedures, on the other hand, with respect to factors which have been incorporated in the arena of savings behaviors, some focused on savings and demographic variables, while majority of others have paid much attention on the macroeconomic variables including, income, real interest rate, inflation, terms of trade and current account balance. And not few studies have also been come through looking at both of the macroeconomic and demographic variables in determining behaviors of savings. This study review those empirical works which are at most relevant factors in determining gross national savings with Major emphasis on Asia, Africa & Ethiopia and helps to study how saving are determined in an economy to the best of the researcher‘s knowledge.

[12] A fraction (1 − x) of the population (children, students, retirees, but also adults excluded from the labor market such as invalids, house wives, etc) does not participate in the labor market. x is the participation rate. The labor force is L= xPop. Un employed (u) and employment is N = (1 − u)xPop,. each employee works on average d hours. The total number of hours worked is therefore H = d(1 − u)xPop. labor productivity = $\frac{Y}{H} = \frac{1}{1-U} * \frac{1}{d} * \frac{1}{X} * Y/POP$ (Bénassy-Quéré, 2010, p. 442)

(Aryeetey & Udry, 2000) study on Saving in Sub-Saharan Africa presents that gross domestic savings in Africa is low and in its declining trend averaged only 8 % of GDP in the 1980s, compared to 23 % for Southeast Asia and 35 % in the Newly Industrialized Economies. African low saving was due to measurement problem (saving is residual of expenditure and production data that are themselves quite unreliable). Savings are dominated by household savings that is primarily in the form of nonfinancial assets and households save in informal markets and institutions. The range of transaction costs, formal financial markets, coupled with the risk management strategies and production activities of households (income) in Africa account for the patterns of low saving and portfolio allocation.

(Deaton & Paxson, 2000) : Made study on saving among Individuals in households and heads of households **.**The lifecycle theory predicts that changes in rate of economic growth will affect aggregate saving rate by changing the lifetime resources of younger relative to older people. However, studies that track the saving behavior of cohorts of household heads & individuals in group is not the same. Multigenerational households are common and the age-saving profile of cohorts is different from the age-saving profiles of individuals that make up households. The individuals in households age-saving profiles (data from Taiwan and Thailand) are more favorable to the lifecycle model than cohorts of household heads. The rate of Economic growth have large effects on the aggregate saving rate. However, the size and sign of effects depends on the rate of economic growth and the rate of population growth, and in many cases the effect of growth on saving is small.

Average income could be important in saving growth as range of theories in smooth consumption thesis like Permanent income hypothesis, lifecycle hypothesis explains. From empirical views studies also presents role of income in saving. However income is not sufficient condition for saving growth. According to WB: 2018/2019 statistics Gabon with 15,000USD Percapita has saving 52.2%GDP whereas Republic of Congo with per capita income of 3400 USD second world class saving nation with average saving of 61.4%GDP. In same way UAE with per capita income of 70,000USD average saving was 47.8% saves less than Gabon with relatively lower percapita income than UAE. And China with 17,000 USD per capita saves less proportion of her GDP (44.9%GDP) in comparison to Republic of Congo with 3400 USD percapita saves (61.4% GDP) . Singapore is now sixth world class nation in saving (53.8%GDP) and with percapita income of

101 000 USD whereas Qatar third world class saving nation with 96,000 USD percapita saves 58.1% GDP.

(Agrawal et al., 2010) made study on determinants of savings and causality between savings and income per capita in India using times series analysis and the result shows income per capita significantly improves savings in India. (Gebeyehu, 2010): Investigated determinants of saving in the case of Ethiopia using a time series and the results shows Growth of income has a positive effect on rate of saving, and statistically insignificance causality between saving and investment in either direction . (Ogoe,2009); made study on the causal relationship between gross domestic savings and economic growth in Ghana (1961-2008 using time series analysis and results showed that there was bi-directional causal relationship between growth rate of real per capita GDP gross domestic savings in Ghana. (Nindi, 2014) made on savings and investment in Malawi: a causality test in Malawi during the period of 1973-2011 using time series shows, in short-run bidirectional causality between savings and investment however in the long-run unidirectional causal flow from investment to savings,

(Abasimi & Martin, 2018); explored the determinants of GNS (national saving) in four West African countries, namely, Togo, Burkina Faso, and Cote d‟ Ivoire, Ghana, in the period of 1997-2016 and the long run results disclose that gross domestic product, per capita income has a statistically significant positive bearings on gross savings . In the short run gross domestic product and per capita income is positive significant bearing on GNS (gross national savings). (Hayashi, 1989) examines evidence on Japan's wealth accumulation using time-series over the last one hundred years. Growth before war in Japan was hampered by harmful effects of misguided government policies. The study indicates that the high Japanese saving rate is limited to the high-growth era of 1965-1975.

Studies also shows importance of income on saving. (Tedla: 2017) investigated the determinants of gross domestic saving in the Ethiopia, Kenya, Mozambique, Rwanda, Tanzania, and Uganda using annual panel data sets form 1991-2012 and revealed that GDP per capita growth are the significant determinants of GDS in the region. However Ghebru, (2014): study on determinants national saving in Ethiopia using time series annual data form 1970/71-2010/11 and results reveals, gross national disposable income, found to be statistically insignificant in the long run

but in the short run, gross national disposable income, found to have statistically important determinants of gross national saving in case of Ethiopia .

Demographics are important factors in determining saving. (Faruqee & Husain, 1998) study , the long-run pattern of saving in , Malaysia, Singapore , Indonesia, and Thailand, these countries have maintained saving levels that are currently among the highest in the world, and have also experienced a sustained increase in their rate of private saving over the past twenty years. The findings suggest that demographic shifts have been important factors underlying regional saving trends, with broadly similar long-run impacts across countries. (Hayashi, 1989) examines evidence on Japan's wealth accumulation or saving using micro evidence about consumption and saving by age can be more easily explained by the dynasty model/culture of society/ than by the lifecycle hypothesis.

(Abasimi & Martin, 2018); explored the determinants of GNS (national saving) in four West African countries, namely, Togo, Burkina Faso, and Cote d‟ Ivoire, Ghana, in the period of 1997-2016 and the long run results disclose that age dependency ratio has un important effect on GNS (gross national savings). (Kudaisi, 2013) made study the determinants of gross domestic saving of West Africa from 1980-2006 and results shows Dependency ratio, have insignificant effect on the level of domestic saving in west Africa. (Kwakwa, 2013) made study on the Ghana's national Savings using data from 1975- 2008 and found dependency ratio, have a negative impact on savings in long run but, in short run Dependency ratio have an insignificant impact on savings.

However Study from Ethiopia. for example Girma (2017) made study on gross domestic saving in Ethiopia using time series data for the period between 1980 and 2014 and results of the study shows age dependency ratio, play a substantial negative role in determining the gross domestic savings in Ethiopia and also study by (Geda and Kibret, 2006);. found that saving is negatively related to age-dependency ratio.in Ethiopia .However Ghebru, (2014): made study concerning determinants national saving in Ethiopia using annual time series data form 1970/71-2010/11 and results reveals dependency ratio, found to be statistically irrelevant both in the long run and in short run in case of Ethiopia .

(Tedla: 2017) investigated the determinants of gross domestic saving using panel data in the Ethiopia, Kenya, Mozambique, Rwanda, Tanzania, and Uganda using annual panel data sets form 1991-2012 and revealed that proportion of urban population to total population ratio found to affect saving positively and revealed that working age group as a percentage of total population, age dependency ratio to working age, are found statistically in significant in determining saving. But (Juann H. Hung and Rong Qian; 2010) ,made study to identify the reason for high saving rate (72 to 76 percent of national saving rate)in china during 1990-2007 low urbanization, low old dependency relative to productive age group , strong economic growth, and weak social safety net are important factors in saving growth.

Inflation as measure of macroeconomic instability determine saving (Dayal -Gulati & Thimann, 1997): examines determinants of private saving for a sample of Latin America and Southeast Asia over the period 1975-95 and shows that financial deepening, macroeconomic stability and , fiscal policy, (social security arrangements), influence private saving and appear to have been important in accounting for differences in saving behavior between the two regions. (Geda and Kibret, 2006) made study on aggregate Saving Behavior In Africa using a time series: and found that saving is negatively related to macro-economic instability, however (Tedla: 2017) investigated the determinants of gross domestic saving in the Ethiopia, Kenya, Mozambique, Rwanda, Tanzania, and Uganda using annual panel data sets form 1991-2012 and revealed that Inflation rate, are found statistically in significant.

(Gebeyehu, 2010): Investigated determinants of saving in the case of Ethiopia using a time series and the results shows inflation have a statistically significant short and long term determinants of saving rate. Growth of income has a positive effect on rate of saving and statistically insignificance causality between saving and investment in either direction .(Kudaisi, 2013) study the determinants of gross domestic saving of West Africa from 1980-2006 and results shows government budget and inflation rate are found to be statistically negative significant on gross domestic savings. and real interest rate, have insignificant effect on the level of domestic saving in west Africa.

Among many outcomes over time is the gap between interest rate and inflation sustained increasing in Ethiopia. Girma (2017) made study on gross domestic saving in Ethiopia using data for the period between 1980 and 2014 and results of the study shows real interest rates was not a

substantial whereas, inflation rate play a substantial role in determining the gross domestic savings in Ethiopia. Ayalew, (2013) study results revealed positive effect of growth rate of income and negative effect of budget deficit ratio and inflation rate in short run and long run . But, depositing interest rate, were found to be statistically insignificant determinants in the long run.

Deposit interest rate is one of monetary policy instruments. (Kwakwa, 2013) made study on the Ghana's national Savings using data from 1975- 2008 and found the real interest rate have a negative impact on savings in long run but, in the short run interest rate, have an insignificant impact on savings. However (Nagawa et al, 2020) made assessment on the determinants of GDS in Uganda for the period 1980–2017 and finds that Deposit interest rate is found to be statistically insignificant in long run . In the short run, Deposit interest rate have a negative and statistically significant bearings on gross savings. (Abasimi & Martin, 2018); explored the determinants of GNS (national saving) in four West African countries, namely, Togo, Burkina Faso, and Cote d‟ Ivoire, Ghana, in the period of 1997-2016 and the long run results disclose that real interest rate, has a statistically significant positive bearings on gross savings .

Aid is one important area of controversies in determining saving. According Moyo(2009) study on aid reveals that it discourages free enterprises and it is simply resource curse and increases poverty and decrease national saving (Moyo, 2009 p.9-10) , however (Papanek, 1972)**:** has made study on the effect of aid and other Resource Transfers on Savings and Growth in Less Developed Countries and found the effect of aid on domestic saving was additive .The basic assumption was that a unit increase in each dollar of foreign resource would result in an increase of one dollar in imports and investment.

(Shields 2007) made a study on the relation between foreign aid and savings using annual data for 119 countries by running regressions for each country separately. The results of regression reveals that only few countries show evidence of crowding out and for the majority of these countries aid is found to be complementary to domestic saving and, hence, investment. However Basnet (2013) made study on the impact of foreign aid on domestic savings and economic growth in South Asian countries (Bangladesh , India, Nepal, Pakistan, and Sri-Lanka)using time series data from 1960 to 2008 and found that aid has a positive and significant effect on the economic growth rates of the nations studied however , foreign aid appears to deters domestic savings rather than complementing it.

According to (Baharumshah et al., 2003), study on saving dynamics in Asian countries (investigates factors that affects saving behavior in fast growing Asian; economies-Singapore, south Korea, Malaysia, Thailand and Philippines during 1960-1997 based on time series data and the result shows foreign saving deters domestic saving both in short and long run.2)saving does not granger cause economic growth except Singapore. 3) The effect of interest rate, that reflects the extent of financial liberalization adopted in these countries, on saving in Asian countries found in conclusive. (Agrawal et al., 2010) made study on determinants of savings and found foreign savings and public savings have negative impact on private and household savings.

(Elbadawi, & Mwega, :2000) made the study on trends of saving in Africa with specific to SSA and found down trending of private saving from more than 11%, in 1970 decreased to 8% in 1980s, and then to 9% of disposable income in 1990s. Saving lag behind other regions due to high young-age dependency ratio , lower per capita income, and high dependence on aid. Foreign aid granger-causes a reduction in both investment and saving, . Saving rate granger-causes an increase in Investment, Investment granger- causes an increase in foreign aid. .Causality runs from growth - investment (private saving) . The combined factors outweigh Africa's advantage from its lower public saving and higher government consumption.

In Ethiopia Aid effect on saving is mixed as some ranges of literature shows negative , some show no relation with saving. studies also show the positive effect of aid on saving . For example, (Geda and Kibret, 2006); made study on aggregate Saving Behavior In Africa with emphasis on Ethiopia : and found that saving is negatively related to foreign aid in Ethiopia. However other studies like Girma (2017) made study on gross domestic saving in Ethiopia using time series data for the period between 1980 and 2014 and results of the study shows foreign aid was not a substantial to affect saving.

(Mascagni, 2016) : Made study on the effect of aid on public saving in Ethiopia and found positive effect of aid on public saving and aid promote and support tax mobilisation through policy advice, technical assistance etc. The findings of the study shows bearings of a positive relation between aid and tax, that occurs mainly through policy advice and technical assistance in the instance of Ethiopia. Workneh (2013) made study on the impact of foreign aid on domestic saving in Ethiopia. The study has examined the effect of bilateral and multilateral aid on domestic saving in Ethiopia over the period 1981 to 2011 using multivariate analysis and found that while bilateral

aid was better in utilization set up than multilateral aid, bilateral aid has a negative influence on domestic saving whereas multilateral aid has a significant positive impact on domestic saving in the long run.

The other external factor is trade that is relatively endogenous than that of aid .The study on the effect of current account balance on national saving was few in literature and also mixed result found., For example Ghebru, (2014): made study on the determinants national saving in Ethiopia using annual time series data form 1970/71-2010/11 and results reveals Current account deficit is significant determinants of national saving both in the long run and short run in case of Ethiopia. .However Ayalew, (2013) publication on Journal of Economics and International Finance examined the factors affecting gross domestic saving using time series data between 1970/71-2010/11 in Ethiopia and the results revealed negative effect of budget deficit ratio in short run and long run but, current account deficit ratio were found to be statistically insignificant determinants in the long run in Ethiopia.

However, (Nagawa et al, 2020) assesses the determinants of GDS in Uganda using time series for the period 1980–2017 and finds that foreign domestic investments have positive and statistically significant effects on GDS in the long-run, while current account balance have adverse bearings on savings in long run . In the short run, current account balance has a positive and statistically significant bearing on GDS. It is important to relieve this controversial effect of current account balance on saving.

Generally, factors which were important determinants of savings rates in one region would not be successful in another region or from country to country, and over time, due to differences in economic, social, and demographic conditions among regions and/or countries. Some of these factors may be significant in one case, but not in others, and thus they should be carefully examined taking into consideration the characteristics of each case. Thus, this study tries to determine factors that explain gross national savings rate in Ethiopia which the author is hoping to contribute this study, will help for policy makers to formulate policies that enhance national saving rates.

CHAPTER THREE

3. METHODOLOGY OF THE STUDY

This section provides an explanation on the types and source of data, definition of variables, model specification, method of data analysis and model and variable testing procedure is discussed.

3.1 Sources & type of data

It was difficult to get complete national data from single office for time range under consideration. I have decided to use data from global indicators like world economic watch, World Bank and IMF data and also national sources, Accordingly gross national saving data was taken from IMF data set, Real GDP, Aid and urban population growth rate was taken from WB data set, Domestic credit and inflation data was taken from national bank of Ethiopia (NBE), and current account deficit were taken from the (global economy.com) that explained its source is NBE.

3.2. Definition of Dependent and Independent variables

Saving can be represented by gross domestic or gross national saving .Gross national saving is broader aspect of saving. Gross National Saving ratio (lngns as % GDP) is a dependent Variable and it is the sum of private and public savings divided by gross domestic product (GDP). For the purpose of this study, annual time series data was taken from IMF data set.

The independent variables were explained as;

1) Gross domestic Product Per population (ln GDPp). The most important macroeconomic variable is gross domestic product (GDP) and measures a nation's total output of goods and services or the total income of everyone in the economy, and real GDP per person measures the income of the average person in the economy. Nations with a high level of GDP per person have better childhood nutrition to more pleasure per household to enjoy luxury life. The data taken from WB data set.

2). Urban population growth rate **(**Urgr**):** As an important measure of demographic variable, explains the rate at which urban population is growing over years .Urban population growth rate in Ethiopia is currently among the fastest and highest in sub-Saharan average and aggregate world average .The data was taken from WB data set.

3. General Inflation presented by consumer Price Index (CPIE) tracks the rate of change in price of a relatively fixed bundle of goods (price of ‘‘market basket’’ purchased by a typically urban family over time. The Inflation measures the changes in the purchasing power of a country’s currency and explains uncertainty in an economy. The time series data was taken from NBE data set.

4. Bilateral Aid (lnAid % GDP) is Aid from government to government in order to ease the financial constraints that governments faces in due process of developmental activities. The time series data was taken from WB data set.

5. Real Deposit interest rate (DIR) is the rate at which money saved grows in a real terms. It is a monitory policy measure rooted from government monetary policy action that its value can be driven by deducting inflation from nominal interest rate. This has an expected positive effect on saving. The time series data was taken from NBE data set.

6. Current account balance as share of GDP (CAB) is a measure of national account balance as percentage of GDP explaining net return of external finance flows from trade, net transfers and income received from abroad by nationals. Hence it is the sum of net exports of goods and services, net income, and net current transfers. The time series data was taken from global economy.com that explains its source is NBE data set.

3.3 Model specification

An Autoregressive Distributed Lag Modelling Approach to Co-integration analysis developed by Pesaran in 1995, that was modified later in 2001 by Pesaran, Shin and Smith (PSS 2001) (Pesaran et al., 2001) was employed. The autoregressive distributed lag (ARDL) is used and applied when the model contains lagged values of dependent variables ,lagged values of independent variables and current values of independent variables as regressors .In using ARDL model testing for unit root is vital to ascertain that no variables is integrated of order 2(I2).

The ARDL approach was chosen because it has superior advantage of yielding super consistent estimates of the long-run coefficients and can be specified irrespective of whether the underlying regressors are level form stationary or first difference stationary or the combination of both series (Pesaran et al., 2001). For instance, unlike the Johansen approach (VAR) that needs all the variables in the model to be integrated of the same order (I(1)), the ARDL methodology is

applicable (1) irrespective of whether the regressor are I (0) or I (1) or mutually co-integrate and it relieved of the burden of establishing the same order of integration amongst the variables.2) It can distinguish between dependent and independent variables and allows testing the existence of long run and short run relationship between the variables simultaneously and it also results in unbiased estimates in the long run and more efficient in the case of small and finite sample data size.

Long-run relation has been the focus of theoretical and empirical research in economics. The ARDL model of bounds co-integration testing approach was used to identify whether we specify and present the ARDL or ECM (the short and long run regression result at the same time). From the bounds co-integration test result, if the variables are co-integrated, we specify both short run and long run (ECM) models. But, if the variables are not co- integrated we specify only short run ARDL model and no need for ECM. (Pesaran et al.,2001).

The smooth consumption in life time was proven right by many theories developed ranging from the failure of the secular-stagnation hypothesis to the findings of Kuznets., the Fisher model which is base for the two subsequent basic models (LCH and, PIH), Franco Modigliani lifecycle hypothesis in which [13]aggregate consumption depends on both wealth and income) Complementary to LCH , Friedman's permanent-income hypothesis emphasizes that individuals want to smooth their consumption from permanent income , and consumption does not respond much to the transitory changes in income (Friedman, 1957). The model for the research was developed based on above theoretical views of smooth consumption in life time by directly employing Milton Friedman model for consumption analysis.

$$S = Y - C \quad ---------- \quad 1$$

$$Y^m = Y^P + Y^T \; and \quad C^m = C^P + C^T$$

$$Y^m \; and \; C^m, \quad measured \; income \quad and \; consumption \; respectively$$

$$S = Y^P + Y^T \quad -(C^P + C^T) = Y^m - C^m \quad ---------- \quad 2$$

[13] a is the marginal propensity to consume out of wealth, and b is the marginal propensity to consume out of income through the life time T. C = (1/T)W +(R/T)Y over years, ym = Yp +Yt.(Friedman, Milton, 1957) *.,According to Fried man temporary or transitory changes in income will have little effect on consumption and permanent change in income will have large effect consumption .*

$$Y^m = y_t + y_t - y_{t-1} \quad = y_t + \Delta y_t -3$$

$$C^m = \beta Y^P = C_t \quad + (C_t \ - C_{t-1}) = C_t \quad + \Delta C_t \quad - - - - - - - - - - -4$$

$$But, \Delta C_t \ \ is\ small\ or\ approaching\ zero\ in\ long\ run$$

$$S = Y^m - C^m = y_t + \Delta y_t - (C_t \quad + \Delta C_t \quad) = y_t + \Delta y_t - C_t$$

Where β is proportionality of permanent income consumed in the current period, that depends on different variables wealth, demographic and policy variables and stable in long run. Friedman's permanent-*consumption.* .

$$C = \beta Y^P$$

$$S = Y^m - C^p = Y^m - \beta Y^P = Y^P + Y^T - \beta Y^P = \ Y^P - \beta Y^P \ + Yt - Yt - 1$$

$$S = (1 - \beta)Y^P + \ + \Delta yt$$

$$\theta Y^P \ is\ income\ saved\ from\ permanent\ income\ , and\ \theta\ is\ MPs \ \ of\ permanent\ income$$

$$S = \theta Y^P + Y^T -5$$

Due to the smooth consumption hypothesis , an increase in income directly led to proportionate increase saving

$$\frac{S}{Y^m} = \frac{\theta Y^P + Y^T}{Y^m} = APs = \ \ F(\Delta y) - - - - - - - - - - - - - 6$$

$$MPS = f(\Delta Y) -7$$

By augmenting the above model with other empirical findings from literature and the ongoing condition in Ethiopia: given gross national Saving as share of GDP is (ln GNS), GDPp (ln income percapita), urban population growth rate(Urgr) , CPIE(consumer price index) as a measure of inflation, Deposit interest rate (DIR) , Bilateral aid (lnAID as share of GDP), current account balance(CAB) as share of GDP and Ɛt is stochastic error term.

$$lnGNSr = \ f(\ lnGDPp\ , Urgr, CPIE, DIR, lnAID, CAB) - - - - - - - - - - -8$$

Autoregressive Distributed lag (ARDL) Model has explanatory variables on dependent variables and always contain lagged values of endogenous variables, lagged values of exogenous and current values of exogenous variables as regressors .The generalized form of ARDL(p, q) model is specified inform of

$$Yt = \Upsilon oi + \sum_{i=1}^{p} \delta \mathrm{iyt} - i \quad + \sum_{i=0}^{q} \beta \mathrm{i}' \mathrm{Xt} - \mathrm{i} + EJt \quad ----------9$$

Where y't is the vector of dependent variable, and the variables in (X't)' are lagged and current values of exogenous variables, δ and β are coefficients Υ is a constant term, i=1---k ,where i is number of variables in the model; p, q are optimal lag orders, Ejt is a vector of error terms that has unobservable zero mean white noise vector process(serially un correlated or independent).The model employed in this study combine the short run (ARDL) Model and the long run or co-integration model .

3.3.1 The short run auto regressive distributed lag (ARDL) model

If there is no co-integration, we specify the short run model: ARDL is specified as

$$\Delta \mathrm{lnGNSrt} = \mathrm{a_0 1} + \sum_{\mathrm{i=1}}^{\mathrm{p}} \mathrm{a_1}\ \Delta\ \mathrm{GNSr_{t-i}} + \sum_{\mathrm{i=0}}^{\mathrm{q}} (\mathrm{a_2}\ \Delta\ \mathrm{lnGDPp\,t-i}) + \sum_{\mathrm{i=0}}^{\mathrm{q}} (\mathrm{a_3}\ \Delta\ \mathrm{Urgr\,t-i}) +$$
$$\sum_{\mathrm{i=0}}^{\mathrm{q}} (\mathrm{a_4}\ \Delta\ \mathrm{CPIE\,t-i}) + \sum_{\mathrm{i=0}}^{\mathrm{q}} (\mathrm{a_5}\ \Delta\ \mathrm{DIR\,t-i}) + \sum_{\mathrm{i=0}}^{\mathrm{q}} (\mathrm{a_6}\ \Delta\ \mathrm{lnAID\ t-i}) +$$
$$\sum_{\mathrm{i=0}}^{\mathrm{q}} (\mathrm{a_7}\ \Delta\ \mathrm{CAB\ t-i}) + \mathrm{et} \quad ----------10$$

The null and alternative hypotheses are as follows:

H0: a1=a2=a3=a4=a5 = a6= a7=0(No short run relationship exist)

H1: H0 is not true (there is short run relationship between regressor and dependent variable)

3.3.2 The long run bounds co-integration test

In economics the important relationship is the long run relationship. The t –statistics and F-statistics was adopted to check the existence of co-integration among variables. The F-statistics is compared with a computed, F-critical value as stated by (Pesaran et al., 2001) technique. Along with F –statistics we need to check T-statistics for the existence of co-integration in the model. If the computed F-statistics is lower than the critical value of lower bound, I(0) value at mostly 5% level significance, and / or , if T- calculated is greater than I (0) bound critical value at mostly 5%

level of significance, we cannot reject null hypothesis of no co-integration/ no long run relationship/ .

But if F-statistics is larger than I(1) bound and If T-statistics is less than upper I(1) bound at 10,%,5% or 1% level of significance ,at least at 5 % level of significance ,we reject null hypothesis of no co- integration and there is long run relationship. If F-statistics or T-statistics lies between upper I(1) bound and lower I(0)bound critical values mostly at 5% level significance, co integration test is in conclusive .Generally, if the variables are not co-integrated we only specify short run model(ARDL) and if there were co -integration among variables we specify both short run and long run model(ECM) (Pesaran et al., 2001).

The long run relationship between dependent and regressors is specified as

$$\ln GNSr = \beta 1 \ln GDPp + \beta 2\, Urgr + \beta 3\, CPIE + \beta 4\, DIR + \beta 5 \ln Aid + \beta 6 CAB --- 11$$

The null and alternative hypotheses are as follows:

H0: $\beta 1 = \beta 2 = \beta 3 = \beta 4 = \beta 5 = \beta 6 = 0$ (No long run relationship exist)

Against the alternative hypothesis:

H1: $\beta 1 \neq \beta 2 \neq \beta 3 \neq \beta 4 \neq \beta 5 \neq \beta 6 \neq 0$ (long run relationship exist)

3.3.3 The ARDL- ECM (error correction) model

If there is co-integration (long run relationship) the error correction model (ECM) representation is specified .ECM comprises both short and long run. The ECM component of long run are those with no change component whereas short run comprises the equation with change operators and error correction component (ECT). ECT component is extracted residuals from regression of long run equation that captures short run deviation from the long run representation in the model and λ is an adjustment coefficient of ECT, shows the speed of adjustment parameter at which previous errors are adjusted in a current period. The significance level of probability value and negative sign of the ADJ coefficient is vital to confirm that the model is not explosive and stable in the long run equilibrium.

Hence, the model in a complete version and more clear form including short run , long run and ECT, where p and q are optimal lags orders for endogenous and exogenous variables and a1 , to

a7 are short run coefficients of the model, β1 to β6 are long run coefficients and λ is error correction coefficient or adjustment coefficient which is always negative and in arrange of 0 to -1 to confirm the long run convergence or non- explosive and stable nature of the model in theory, is specified as

$$(\Delta lnGNSR)t = ao + \sum_{i=1}^{p} a\,1(\Delta GNSR)\,t-i + \sum_{i=0}^{q1} a2\,(\Delta lnGDPp)t-i + \sum_{i=0}^{q2} a3(\Delta Urgr)\,t-i + \sum_{i=0}^{q3} a4\ (\Delta CPIE)t-i + \sum_{i=0}^{q4} a5\ (\Delta DIR)t-i + \sum_{i=0}^{q5} a6\ (\Delta lnAID)t-i + \sum_{i=0}^{q6} a6\ (\Delta CAB)t-i + \beta 1 lnGDPp + \beta 2\,Urgr + \beta 3\,CPIE + \beta 4\,DIR + \beta 5\,lnAID + \beta 6 CAB + \lambda ECT_{t-i} + et \quad ---12$$

3.4 Method of data analysis

In this study both simple descriptive and econometric methods of data analysis were used. In an attempt to summarize characteristics of some socio –economic variables the tools of descriptive statistics such as tables, and trend graphs were used. For the rest of the research objective the standard econometric techniques in which stata versions 13 as statistical software package for the study were used.

3.5. Stationary or Unit root testing

Studies in empirical macroeconomics almost always involve non-stationary and trending variables, such as income, money demand, trade flows, and exchange rates consumption, the price level . Accumulated wisdom and the studies suggest that the appropriate way to manipulate such series is to use differencing and other transformations to reduce them to stationarity and then to analyze the resulting series (Greene, 2003).To apply standard estimation or testing procedures in a dynamic time series model, it is typically required the variables stationarity. For example, regressing a non-stationary variable Yt upon a non-stationary variable Xt may lead to a so-called spurious regression, in which estimators and test statistics are misleading((Verbeek, 2004).Hence, the primary step should be testing for the stationarity of variables at level form or at its first difference. The variable that was non stationary at level or first difference would be rejected from the study regardless of its importance in regression analysis (Pesaran et al., 2001).

This was done and non-stationary variables were rejected as presented under limitation of the study in chapter one. The stationarity testing was incorporated to avoid the existence of non-sense

regression, using the Augmented Dickey Fuller (ADFt) test. These tests were used to identify the null hypothesis that the time series contains a unit root i.e. non-stationary against the alternative hypothesis of stationary. The time series are stationary, if the test statistics is less than critical values at least at 5% level significance(Pesaran et al., 2001).

3.6. The lags lengths selection and VARSOC

The choice of lag length for model or variable(s) is an empirical issue and no hard and fast rule for the choice decision. The dependence of dependent variable on another independent variable responds to independent variable with lags of time. Lags selection was made from the best alternatives AIC,HQIC, SBIC based on the lags values of information criteria with small values of lags is preferred. Many lags lead to a loss of degree of freedom, serial-correlation and misspecification errors. The lags selection for model and variable is found using command varsoc YX (vector auto regressive specification order criteria). Hence among these information criteria selected for the study was SBIC (Schwarz's Bayesian information criterion) (Pesaran et al., 2001).

3.7 Model stability and diagnostic test

Model diagnosis is a post estimation process. Here model diagnostic checking includes serial correlation or auto correlation, Hetroscedasticity test, model normality and model stability tests. Serial correlation test was done using the command estat bgdfrey,lags(1) or estat durbinalt, or using Watson d-statistics test using command estat dwatson ; Hetroscedasticity test for constant variance by using command estat imtest , white ; model Normality test (Jaque-Bera statistics test) using the command predict resid, residuals , jb resid statistics. For all the above tests chi2 value greater than 5% show that the model depicts that it was good or robust.

The model stability would be tested by applying the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) test. The command cusum6 y x, cs (cusum) lw(lower) uw (upper) given y and x were endogenous and exogenous variables use to test stability of the model. If the plots of the CUSUM and CUSUMSQ statistics stay within the critical bounds of five per cent level of significance, the null hypothesis of all coefficients in the given regression are stable and cannot be rejected. Such tests are recommended for model stability (Pesaran et al., 2001).

CHAPTER 4

RESULTS AND DISCUSSION

4.1 DESCRIPTION OF SOCIO ECONOMIC PERFORMANCE OF ETHIOPIA

4.1.1 Population

According to WB data set from (1981-2020) population of Ethiopia was 36 million by 1981 doubled in 23 years and population become, 72 million by 2003 and grown to about 112 million in 2019 and become 115 million by 2020. It has registered an annual average growth rate of 3% in average of 39 years, ranging from 2.4 % in 1981, increased to 3.64% in 1992 to 2.61% in 2019 which is among the higher growth rate in sub-Saharan African average (2.66%) by 2019.The 39 years average growth rate (3%) made doubling period (70/r) shorter than 25 years.

According to Table 2, population comprises 45% (0 to 14 years) (young population) and 52.77% population in the labor force. This made young dependence average over 85%.The highest fertility rate that was 7.36 in 1981 become 4.2 in 2019 averaging to the level of 6.33 children per women in 39 years. And with this average it was by far higher than sub-Saharan average TFR (4.7) and much higher than Asians Tigers with TFR (1.6) and the 39 years average level of fertility was more than three times higher than the replacement level. Ethiopia with the fertility level 4.2 by 2019 is more than twice of replacement level.

Table2 and Table 3, shows an average of young dependence 88% and over 20 % unemployment dependence all together has a negative output effect on family life to support themselves. The high average fertility level (6.33), young labor force (1/5) dependence on family and low women participation in productive sectors as compared to male as presented on Table 1 summarizes the deleterious effect of growing population on Ethiopian Economy. According to Table 2, the labor force that was well over 52% in all 39 years of study period and the highest level by recent decades (2011-2019) (54%).

Table 1 population participation rate (activity rate)

year	Employment to total population (%)	Participation rate		
	Total	total	male	Female
1981-1990	-	-	-	-
1991-2000	76.24	78.84	89.89	68.07

2001-2010	79.39	81.52	89.68	73.99
2011-2019	78.4	80.17	87	73.38

Source: own calculation and data source WB

According to Table 1 women participation is lower than male counterparts and national average participation in all the decades. The gap in participation between women male averaged to 22% ,16 %, ,14 % from second to 4th decades of study , indicating lower women participation in productive economy as compared to men , though the gap indicates an improvement over years.

Table 2 Average annual population of Ethiopia and characteristics

Years	annual population in million	TFR	0 to 14 yrs % total popn	Young dependence ratio (%)	Labor force (%)total popn	Urban popn % of total popn	Urban popn growth rate	Rural popn growth rate	Popn growth rate	Doubling period= 70/r
1960-1980	25.79	7.0	44.23	83.2	53	8.5	4.67	2.09	2.23	31
1981-1990	41.53	7.4	46.1	90.7	50.80	11.5	5.02	2.85	3.145	22
1991-2000	57.9	6.9	46.58	92.7	50.30	13.87	4.79	2.996	3.296	21
2001-2010	77.6	5.8	47.11	90.9	50.7	15.93	4.41	2.495	2.842	24.6
2011-2019	100.9	4.6	42	78	54	19.45	4.99	2.19	2.77	25
1981-2019	69.5	6.3	45.45	88	52	15	4.8	2.6	3	23
2020	115	4.2	40.3	76.8	56.5	21.7	4.63	-	2.6	26.9

Source : own computation using WB data set

According to Table 2, Ethiopia is among the least urbanized country in sub-Saharan Africa with urban population 10 to 20% from 1981 to 2019 and 21.7% of total population by 2020. This figure was well below the sub-Saharan average (40%) by 2019 and the world about (55%). However, Ethiopia is among the fastest urbanization rate and registered urban population growth rate of 4.63% by 2020 and 4.8% in 39 years average. This made Ethiopia one of the fastest rate of

urbanization by sub-Saharan African average (4%) and the world (1.887%). The rural population growth was in a downward trending though it was still above 2% annual growth rate.

4.1.2 Economic growth performance of Ethiopia

As it was given on Table 3, Ethiopian real GDP was 8.23 billion USD in 1981 and trending to 9.964 billion USD in 1990 and estimated to a double from 1981 in 2004 (15.73billion USD) in 24 years. The GDP was more than triple from 2004(15.73billion USD) to 2015 (48 billion USD) in less than half of the previous doubling period (about 11 years).

Ethiopian economy that was growing by 0.92 % by 1982, registered growth rate of 2.73% by 1990 and become 6.07 % by 2000 and 12.55% by 2010. An annual growth rate registered 10%+ since 2004 were sustained up to 2017 has shown a slight reduction in growth since 2017 and the annual economic growth rate of 6.1% by 2019/2020(NBE). The overall economic growth rate shows significant ups and down in 39 years ranging from negative to positive growth rate over years sometimes falling below population growth until the of 2000's (example :2002/3).

Table 3 GDP and GDP per capita of Ethiopia

year	Average Real GDP in billion $USD	Average GDP growth rate	Percapita GDP in $USD	Employment to total population (%)	Unemployment to total population (%)	Labor percapita in $USD
1981	8.23	-	228	-	-	445
1981-1990	8.96	2.45	216	-	-	426
1991-2000	10.86	3.01	187	76.24	23.76	371.55
2001-2010	19.92	8.75	253	79.39	20.61	498
2011-2019	49.295	9.47	483	78.4	21.6	886

2020	96	6.1%	834	68.61	31.39	1477.5

Source own computation & data from WB data set

As it was given on the Table: 3, gross real GDP increased from the first to fourth decades in gross terms. However, the percapita GDP in last four decade was not progressive as its gross GDP. This might be due to rapid population growth. The real GDP percapita were 216 $ USD in the first decades of the study become 483$USD in the 4th decades making a per capita GDP to double once in about forty years.

According to Table 3, about 76 % of population have got employed in the second decades and implying about (1/4) or 24% population were un employed in the second decades and this figure decreased to 21% and 22 % of population in 3rd and 4th decades. The 2020 indicates 68.61 % are employed and implying about 31% of population got unemployed. As one can pretty well judge from this figure unemployment is progressive in Ethiopia and increased substantially in contrary to 2030 agenda for nation to minimize unemployment by 2020.

Real GDP per labor shows a decrease from 426 in the first decades to 371 in the second decades due to fast population growth in that period (3.66%) . GDP per labor value however shows an increase in 3rd and 4th decades to 498 and 886 respectively and making real GDP per labor increase from 426$USD in 1st decades to 886$USD in 4th decades of study led a doubling of GDP per labor to happen once in forty years while population of the country are doubling in average of 25years. This made doubling years of GDP Per labor and GDP per population was the same implying labor force growth in Ethiopia is not bringing a difference on economy due to large unemployment and forces me to explain increase in population in Ethiopia is not dividend and even not far from disaster.

Table 4 GDP and Employment share of major sectors in Economy

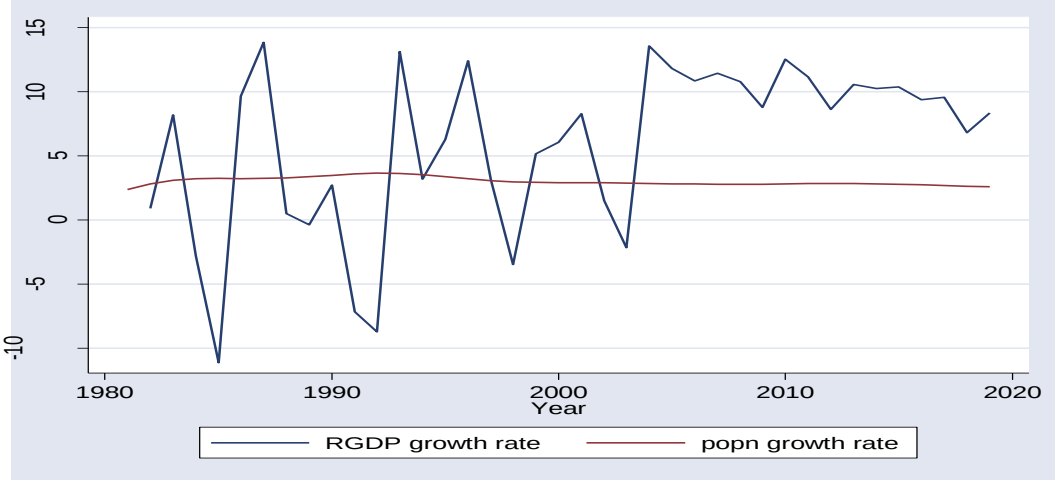
year	Share of GDP (%)			Share of employment (%)		
	agriculture	Service	industry	agriculture	Service	industry
1981-1990	50.94	33.95	15.11	-	-	-
1991-2000	53.15	31.89	14.95	76.67	16.64	6.82
2001-2010	41.54	39.3	19.16	76.69	16.04	7.4

2011-2019	37.2	38.45	24.39	69.24	22	9.17

Source :own calculation data from WB data set

According to Table 4, the GDP that was contributed from economic sectors in last about four decades (1981 to 2019) in decade interval; agriculture(51% , 53%, 41.54% 37.2%) , service (34%, 32%, 39%, 38.45%) and industry(15%, 14.95%, 19% 24.4%) share of GDP in consecutive decades .This magnifies the relative importance of agriculture in GDP share for last many years and were over taken by service share in last decade of the study. The employment contribution of the sectors from second decades to 4th decades ; agriculture(77 %,77% ,69%), service (17%, 16%, 22%) and industry contributes (7% ,7.4% 9%) contributed in the economy respectively. .Hence the contribution of agriculture for Ethiopian economy in GDP(46%) and in employment(3/4) which clearly signifies that it is an agriculture dominating economy and requires to pay more attention to agriculture in graduating from poverty in Ethiopia.

As Graph -1 shows, there is significant fluctuation in the growth of GDP over years ranging from positive to negative but the growth in population is positive and continuous over years .This slow down the growth of per capita income and caused the income of average person to double after long time(40years).



Graph 1. Population vs real GDP growth rate: Source: own Computation using WB data

4.1.3 Investment - Saving gap and the need for sustainable finance

Investment(I) was in a range of 10.6%GDP (by 1992) to 47.7%GDP by 2018/2019 and averaged to 22% GDP, National saving(S) however in a range of 4.95% GDP (by 1991) to 33 % GDP by

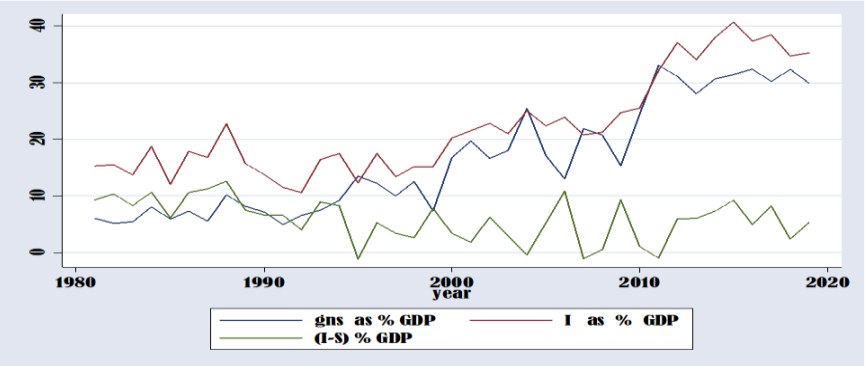
2011 averaged to a 16.44% GDP in last four decades. The figure shows an upward trending in saving from 6.9 % GDP in the first decades to 10% GDP in 2nd decade, 19 % GDP in 3rd decade and 31% GDP in 4th decade. Investment was progressive with a little fluctuation in 2nd decade (16.2% GDP to 15%GDP, 23%GDP, 36.4 % GDP from 1st to 4th decades of study period).

The gap of national saving in relative to the ongoing investment (I-S)% GDP is 9.3% GDP in 1st decades to 5% GDP to 2nd decades. This value went to 4% GDP in 3rd decades and showing an upward trending in finance gap in the 4th decades to 5.44% GDP. This is an evidence for sustaining gap between saving and investment that saving is lagging behind investment in about 40 years. With an annual average national saving 16.44% GDP and investment of 22.3% of GDP in four decades, an average of 6% GDP resource gap confirmed the complementary role of foreign finance to sustain domestic investment.

As Table 5 and Graph 2 shows there is finance gap over last four decades. This gap is only in relative to investment made and the large unemployment in an economy made the investment demand far higher than the actual investment implying the gap is much larger than actual figure in the Table-5.

Table 5 National saving investment gap

year	Investment (I)% GDP	Gross national Saving(S)%GDP	(I-S)% GDP	Characteristics
1981-1990	16.2	6.9	9.3	Saving deficit
1991-2000	15	10	5	Saving deficit
2001-1010	23	19	4	Saving deficit
2011-2019	36.4	31	5.4	Saving deficit
1981-2019 average	22.3	16.44	6	Saving deficit
Source : own computation				



Graph: 2. Saving, investment and their gaps

4.1.4 Budget deficit and foreign AID

Public Budget as component of national saving was persistently negative in last four decades. The Economic Effects of Budget Deficits theoretically categorized into traditional and the non-traditional effects. The "traditional" (Ricardian effect) effect of budget deficit is equal to amount that private saving rises hence national saving is constant. However the "nontraditional" effect of budget deficits has deleterious effect and go beyond the strictly economic realm, and extended to explain the effect of a country's debtor or creditor status and has effect on its international power and influence of nation and affects investor confidence for expanding investment in highly deficit economy. The budget deficit from 1st to 4th decades was ranging from -4.395%, -4.995%, -3.437%, -2.26% respectively and this shows declining public budget deficit over the study periods in Ethiopia.

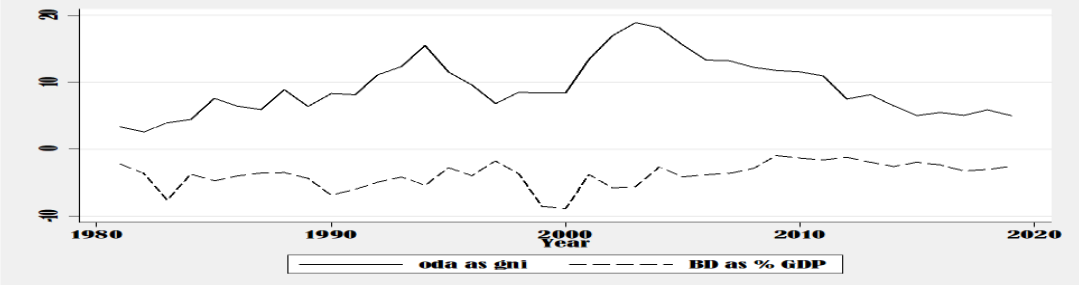
The aid provided to Ethiopia was in increasing trend except in the 4th decades. According to Table 6 Net ODA received (% of GNI) was 5.79 % in the first decades and increased to 10% in second decades and become 14.5% in 3rd decades, reached to 6.63% of GNI by 4th decades of study, and this was reported to 5.046 %GNI in 2019.The overall average ODA received estimated to 9.25% of GNI per year in four decades and it was higher than the gap in saving and investment deficit (6% GDP) presented on Table 5 above.

According to WB data set (1960-2020): The value for Net official development assistance provided (current US$) for Ethiopia was 0.15billion $USD in 1960.The ODA annual average was 0.581, 0.866, 2.3 , 3.93 in billion USD in average from 1st to 4th decades of study periods respectively. This was $4.12 billion by 2017, 4.941 billion by 2018 and 4.81billion $USD in 2019. It shows an increase in ODA is insignificant in amount since its history in Ethiopia.

Table 6 Budget deficit and official development assistance

year	Budget Deficit as % of GDP	Saving – Investment Deficit %GDP	Official Development Assistance (ODA % GNI) for Ethiopia	Official Development Assistance (ODA) annual average in Billion $USD
1981-1990	-4.397	-9.33	5.79	0.581
1990-2001	-4.995	-5.0	10.04	0.866
2001-2010	-3.437	-4	14.54	2.3
2011-2019	-2.26	-5.4	6.63	3.93
Annual Average of 39 years	-3.77	-6.0	9.25	1.92
Gap un covered and covered by ODA in average	Uncovered gap by ODA= -9.77+9.25= -0.52/-9.77=5%, gap covered by ODA= 9.25/9.77=95%			

Source: own computation



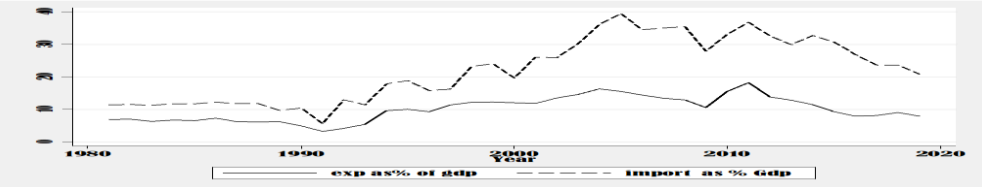
Graph: 3 Budget deficit vs ODA received: Source: Own drawing from WB data set

4.1.5 Export and import as share of GDP

International trade balance is part of GDP in an economy and has played a crucial role in the historical economic growth achievement of Countries. Countries of higher trade balance have faster economic growth than those that has less achievement in international trade. Export as a component of trade balance and a component of GDP contributes positively to the growth of current account balance by paying for imports and contributed for purchasing necessary goods

from outside and also it helps to improve national foreign currency reserves that facilitate transaction with foreign economy.

As it was presented on Table 7, export as share of GDP from 1st to 4th decades of study was, 6.43%, 8.95%,13.87% to 10.97% indicates upward trending except last decades and ,the trade balance was -4.93%,-7.61%,,-18.51 to -17.67 % of GDP in average respectively . This explains that Ethiopia has sustainable negative trade balance as gap between export and import increased from first to 3rd decades of study periods due to large increase in imports .The 4th decades shows a slight decrease of gap due to decrease of import and export where the decrease of import is higher than decrease in exports. Net trade deficit was found 13% of GDP where exports of goods and services was 7.94 %GDP whereas the import was 20.83% of GDP on the same period by 2019/20.



Graph4 . Export and imports % of GDP

Table 7 Export and import as a percentage of GDP

year	Export % of GDP	Import % of GDP	Net export % of GDP
1981-1990	6.43	11.36	-4.93
1990-2001	8.95	16.56	-7.61
2001-2010	13.87	32.38	-18.51
2011-2019	10.97	28.64	-17.67

Source own computation

4.1.6 Inflation in Ethiopia

In 1981, general, food and non- food inflation was estimated 5. 4%, 2.6%, 11.3%respectively .This figure become 45%, 54% , 26.4% by 1991 and become 17.8%, 33.7% and 1.1% by 2003 when encouraging growth starts in Ethiopia. This figure increased to 38%, 45.3%, 27.8 % by 2011. By 2019 general inflation food, non-food inflation was estimated as 15.3%, 19.8%, 10.2%

respectively. The same value was 21.5 %, 23%, 19.4%, by 2020. This can be summarized as rapid increase in a range of inflation in the study period.

Table 6 shows, the national public budget deficit and saving –investment gap that enforces additional demand and signifies the demand for additional credit in the economy or foreign aid. The credit share of public is lower than credit provided for private sector. Public credit due to budget deficit has role in an extra injection of money to the economy. The addition of credit due to deficit has a role to play for further inflation. The share of central government credit declined from 21.31% of GDP ,to ,3.81% GDP from first decades to 4th decades whereas the share of non -central government increased from 13.26 % GDP in first decades to 29.3% GDP in 4th decades respectively. Domestic credit by central government used to complement budget deficit or fiscal balance and that of others sectors explains rate of growth of financial intermediation and expanding economic activities.

Table 8 inflation as NBE (december2016=100) and domestic credit

year	general Inflation rate	food Inflation rate	non-food inflation rate	Average annual domestic credit(DC) from economy in million birr and as %GDP			Characteristics of general inflation
				Central government credit	Non-Central government credit	DC as % GDP	
1981	5.4	2.6	11.3	1,394.6 (10.6%)	1,730.6 (13.1%)	23.7%	walking
1981-1990	4.6	4.6	5	3731.63 (21.31%)	2321.37 (13.26%)	34.57%	Walking
1991-2000	7.4	8.2	4.9	12960.7 (29.9%)	7669.34 (15.8%)	45.7%	Walking
2001-2010	11	13.3	8.8	25721.89 (12.2%)	39237.59 (18.7%)	30.9%	Running /gallopin g

2011-2019	14.8	15.9	13.3	66310.63 (3.81%)	508833.2 (29.3%)	33.11%	Running/ galloping
Note: Based on Cagan, P. (1989) and Kimberly Amadeo :(2018) inflation, categorized by their speed. They are creeping or mild (<3%), walking (3-10) running/galloping (>10%), and hyperinflation (>50%). Per month average							

Source: own computation: (Data source NBE)

As it was presented on Table 8, the first two decades of the study period was characterized by walking (3-10) and the last two decades were in a range of (10-20%) that is characterized as abnormal inflation. The trend on Table -8 shows that inflation and credit to non-central governments are all increasing together in Ethiopia. The intuition behind was that in all periods sustained large money injection in form of credit appeared parallel with rapid inflation was in increasing trend that indicates progressive Macro- economic instability that is also manifests large demand gap in an economy.

4.1.7 Saving and micro finance institution in Ethiopia

An increase in MFI made their services closer to the public and minimizes cost of transaction for intermediation such as deposits, credit and improves competition among institutions. Competition improved efficiency and productivity. This also increased capital of the institution by lending deposits and collect returns from obligation of credit provided. The number of MFI was 16 in 1999 and MFI for which data were available were 26 in 2004 became 37 in 2018.This increased number of MFI has contributed for an increase in saving and capital formation as given on Table 9. The amount of saving in MFI that was 58.9 million $USD in2004 become 2.370 billion $ USD that has increased saving forty fold in 14 years and has increased the institutions capital from 65.7 million $USD to 27billion $USD that increased institution capital more than 400 fold in 14 years. Hence it is beneficiary to have MFI get expanded in Ethiopia so to increase saving (loanable funds) for investments and improves capital accumulation of MFI.

Table 9 saving and capital of MFI(Micro Finance Institution)

Number of MFI	Year	Microfinance in million $USD	
		Saving	capital
26	2004	58.9	65.7

28	2007	168.9	145
28	2008	201.4	166.7
30	2009	206.3	184.3
30	2010	234.5	182.8
30	2011	311.5	214.6
28	2012	588	750
29	2013	830	940
32	2014	1230	11,900
34	2015	1448	15,000
34	2016	1670	18,000
34	2017	2170	21,000
37	2018	2370	27,000
	Source : own computation and data sourced from NBE Note: Number of MFI are for which data is available at time of data collection		

4.2. ECONOMETRIC DATA ANALYSIS, INTERPRETATION AND DISCUSSION

In this section, econometrics results are presented and discussed. Summary of variables, the results of various preliminary tests including pre- tests for checking variables stationarity for co-integration were carried out and discussed . The interpretation for the ARDL joint significance and ECM regression results for the magnitude and direction of relationship between the dependent variable and rest of regressors were analyzed and discussed. The diagnostics test results of post estimation such as serial correlation, hetro-schadasticity, model normality and model stability are presented on Tables and Graphs for discussion.

4.2.1 Summary of the variables in the regression

The central tendency and the extent of dispersion rates of both the dependent and independent variables over the study period are calculated using STATA Version 13 and displayed on Table 10.

Table 10: Summary of the observation and the variables

Summary of endogenous and exogenous variables					
Variables	Observation	mean	Std. Dev	min	max
gns %GDP	39	16.44128	9.748383	4.95	33.06
RGDPp	39	279.7112	124.0612	164.3366	602.6341
Urgr	39	4.800579	.4891599	4.02769	5.507198
CPIE	39	9.310256	13.38378	-11.8	55.2
DIR	39	-3.85641	13.91459	-51.2	19
AID %GDP	39	5.693297	2.798065	1.347431	13.72356
CAB%GDP	39	-3.82	3.706438	-12.66	1.54

Source: Own computation.

As indicated on Table 10: averaging between 1981 and 2019, the gross national saving was in range of 4.95% GDP to 33% GDP implying that saving is in increasing trends and averaged to 16.44%GDP. In light of 22.3% investment average given on Table 5, an average of 6% annual finance gap is observed in Ethiopia during the study period. The Real gross domestic product per capita (GDPp) was fluctuating within a range of 164 USD to 602 USD and averaged to 279.7USD.The annual urban population growth rate was in arrange of 4.03 to 5.51% and average to 4.8%.The average current account balance is -3.82% of GDP is fluctuating between the range of 1.54 to -12.66% GDP . Foreign bilateral aid was in a range of 1.35 percent and as high as 13.72% and averaged to 5.7% GDP) annually during the study period . Deposit interest rate was in range of -51.2 (by 2008 during global financial crisis period) to 19 (by 1996 period of relatively large deflation about -9%) and averaged to -3.85641 annually. The general inflation rate has been between -11.8% (by 1986) at margin of downfall of Derge regime to 55% (hyperinflation) as Cagan, P. (1989) or Kimberly Amadeo : 2018 classification) by 2008 during period of global financial crisis (>50%)) and averaged to 9.3 % during the same period. Implies the gap between deposit interest rate and inflation sustained in economy now 13.17 in which deposit real interest rate is lagging behind inflation.

4.2.2 Testing for stationarity of variables

According to (Pesaran et al., 2001) , the ARDL approach requires stationarity of the variables under consideration either at level or at first difference form (integrated of order one) i.e (I (0) or I (1). Testing for unit root was a matter of concern and helpful to avoid non-sense regression (spurious regression) and presented on the following subsequent tables (Table 11 and Table12).

Table 11 Augmented Dickey-Fuller test for unit root

Variable	test statistics	MacKinnon approximate p-value Z(t) =	Level form critical values			Order of integration
			1%	5%	10%	
lngns	-1.185	0.6800	-3.668	-2.966	-2.616	lngns(0)
lnGDPP	1.163	0.9957	-3.668	-2.966	-2.616	lnGDPP (0)
Urgr	-1.940	0.3133	-3.668	-2.966	-2.616	Urgr(0)
CPIE	-4.253	0.0005***	-3.668	-2.966	-2.616	CPIE(0)
DIR	-3.959	0.0016***	-3.668	-2.966	-2.616	DIR (0)
lnAID	-2.551	0.1036	-3.668	-2.966	-2.616	lnAID(0)
CAB	-2.369	0.1507	-3.668	-2.966	-2.616	CAB(0)

***1%**5% *10% level of significance Source; own computation

As presented on the Table 11, the test statistics, and MacKinnon approximate p-value shows only inflation and deposit interest rate was stationary at level form. The remaining variables were non-stationary at level form and we cannot reject the null hypothesis of unit root problem for these variables at level form and these variables should be checked for stationarity at first difference form.

Table 12 Augmented Dickey-Fuller test for unit root at first difference

Variable	test statistics	MacKinnon approximate p-value for Z(t) =	First difference critical values			Order of integration
			1%	5%	10%	
lngns	-6.686	0.0000***	-3.675	-2.969	-2.617	lngns(1)
lnGDPP	-3.719	0.0039***	-3.675	-2.969	-2.617	lnGDPP(1)
Urgr	-3.493	0.0082***	-3.675	-2.969	-2.617	Urgr(1)
lnAID	-3.809	0.0028 ***	-3.675	-2.969	-2.617	lnAID (1)
CAB	-6.543	0.0000***	-3.675	-2.969	-2.617	CAB(1)

***1%**5% *10% level of significance: Source; own computation

All variables that were non stationary at level form on Table 11 become stationary at first difference on Table 12. Because all T-statistics are found to be less than the critical values at least at 5% level of significance. The MacKinnon approximate p-values for all variables show

stationarity of variables at first difference. Thus, the variable inflation(CPIE) and deposit interest rate (DIR) is stationary at level form as presented on Table 11 and the remaining variables, lngns (I) , lnGDPp (1) , Urgr (1) , and lnAID (1) and CAB (1) are stationary at first difference as presented on Table 12 above respectively. Table-11 and Table 12 also shows the variables order of integration that the model is a combination of (I(0) and I(1) series.

4.2.3 The ARDL regression result

Before running the ARDL it was important to find the optimum lag length for model and all dependent and independent variables using Varsoc (vector autoregressive specification order criteria) .The variables optimum lag was selected based on Schwarz's Bayesian information criterion (SBIC) and the actual lag of each variable was determined accordingly. Based on the optimal lag length, ARDL model is estimated to assess the short run relationship between dependent and independent variables in absence of long run convergence under the citreous paribus assumption[14] . The regression result from ardl helps to shows the value of probability of F as to indicate joint significance of model under consideration. For Sample in range between 1982 - 2019, the number of observation in analysis were 38. The computed F(8, 29) = 40.64, with Prob > F = 0.0000; indicating that model in its entirety is statistically significant at 1% significance level. The R-squared = 0.92 and Adj R-squared = 0.90. The Log likelihood = 11.492643 , Root MSE = 0.2047. The command used is ardl lngns lnGDPP Urgr CPIE DIR ln-AID CAB, lags (1 0 0 0 0 0 1)

Table 13 ARDL model Regression result

ardl lngns lnGDPP Urgr CPIE DIR lnAID CAB, lags(1 0 0 0 0 0 1)

Dependent variable is lngns, number of observation are 38(1982 - 2019)				
Regressor variables	Coefficients.	Std. Err	t	P>|t|
lngns(L1)	0.0870872	.1592963	0.55	0.589
lnGDPP	1.924162	.3115659	6.18	0.000***
Urgr	-.3984139	.1065242	-3.74	0.001 ***
CPIE	-.010807	.0203874	-0.53	0.600
DIR	-.0089231	.0197412	-0.45	0.655

[14] The command used is ardl lngns lnGDPP Urgr CPIE DIR lnAID CAB, lags(1 0 0 0 0 0 1)

lnAID	.6039652	.1061242	5.69	0.000***
CAB	.0206915	.0150071	1.38	0.179
L1	.0359774	.0159134	2.26	0.031 **
_cons	-7.081936	1.232288	-5.75	0.000***

***1%**5% *10% level of significance: Source : own computation

4.2.4 Bounds tests for co -integration

This test was used for evaluating long run convergence in the model.

Table 14 Results of bounds test

Statistics range	**Critical values**				Pesaran/Shin/Smith (2001) ARDL Bounds Test for F and T-stat
	10%	5%	2.5%	1%	H0: no levels relationship
t-stat	-2.57 -4.04	-2.86 -4.38	-3.13 -4.66	-3.43 -4.99	t = -5.731
F-stat	2.12 3.23	2.45 3.61	2.75 3.99	3.15 4.43	F = 6.687
Adj co	-0.9129128		t= -5.731	P>|t|=0.0000	

Source: own computation

In critical value description above, the first numbers stand for lower bound and second numbers stand for upper bound under respective critical values. As indicated on Table 14 above, the calculated F-statistics is greater than upper bound at all level of significance. The absolute value of calculated T-statistics is larger than T-critical values at all levels of significance. ADJ coefficient lies between 0 and -1.This is an indication for rejection of null hypothesis of no levels of long run relationship. All statistics indicate the existence of a long run convergence or long run relationship between dependent and regressors.

4.2.5 Long Run Representation of the ARDL Model (ECM)

The ardl model was employed with optimum lag based on SBIC (Schwarz's Bayesian information criterion (SBIC).The long run convergence estimates results was based on ardl lngns lnGDPP Urgr CPIE DIR lnAID CAB, lags(1 0 0 0 0 0 1)ec

Table 15 Results of Ec model

VARIABLES	(1) ADJ	(2) LR	(3) SR
lnGDPP		2.108***	
		(0.192)	
Urgr		-0.436***	
		(0.0947)	
CPIE		-0.0118	
		(0.0225)	
DIR		-0.00977	
		(0.0217)	
lnAID		0.662***	
		(0.0968)	
CAB		0.0621***	
		(0.0224)	
L.lngns	-0.913***		
	(0.159)		
D.CAB			-0.0360**
			(0.0159)
Constant			-7.082***
			(1.232)
Observations	38	38	38
R-squared	0.638	0.638	0.638

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source : own computation

The results of the ECM as reported on Table 15 shows there were 38 observations used in regression (1982 – 2019). The R squared (0.64) and the adjusted R-squared (0.54). The ect-1(adj coefficient) confirmed that the model is not explosive and it is stable because the ECM coefficient is negative and found between zero and negative one; and statistically significant. The coefficient of the error correction term captures the speed at which short run variation adjusted towards the long run equilibrium is (-0.91). The speed of adjustment (-0.91) implies the short run variant from long run result is adjusted towards long run equilibrium by speed of 91% every year and adjustment of short run variation is made in (1/0.91=1.1years).

As the values on Table 15 shows percapita income, Aid, current account balance found to affect national saving favorably whereas metro population-growth rate begin to determine gross national saving negatively in the long run. However as measure of macroeconomic instability (inflation)

and deposit interest rate was remain negative in significant in determining national saving in Ethiopia. In the short run only current account balance found significant and negative to determine national saving in Ethiopia.

The percapita income positively determines national saving at 1% level of significance. As it is given on Table 15, a one unit increase in percapita income increases gross national saving by 2.11units. The positive effect of income on saving revealed by range of theories and empirical findings. The empirical findings in Ethiopia by (Geda and Kibret, 2006), (Gebeyehu, 2010), Tedla: 2017study from east Africa) (Abasimi & Martin, 2018)study from west African countries(Agrawal et al., 2010) from India , Ogoe,2009- from Ghana, Faruqee & Husain, 1998) from Asia, among others found average income has the positive determinant of national saving. The intuition behind is an increase in income increase saving by increasing number of poor graduating from poverty. Hence the literatures and empirical findings reveals importance of poverty reduction to improve saving.

Current account balance is an important macroeconomic variable that significantly determined national saving. In the long run current account balance was found to affect national saving positively at 1% level of significance and a unit increase in current account balance (CAB) increase national saving by 0.062 units. In the short run however current account balance was found to affect national saving negatively at 5% level of significance and a unit increase in CAB decrease national saving by 0.036 units.

In the short run current account deficit affect national saving negatively through budget deficit. However in the long run current account improves national saving through aggregate output or increase in national income. A trade deficit is a reflection of current over consumption and resulted not in a loss of wealth in Ethiopia in long run. The intuition behind is that Trade deficit is not a problem in itself, but perhaps as a symptom of an economic malady in short run. It is hence possible to create wealth in presence of budget deficit by optimizing government budget use at least by cutting non- productive expenditures. The result is in contrary to the study output by Ayalew (2013)from Ethiopia, Nagawa et al., 2020 from Uganda's and similar to study output by Ghebru (2014)from Ethiopia in the long run .

The role of foreign aid in supplementing domestic savings had been an issue of considerable controversy. The result indicates foreign saving complement or supplement domestic saving in long run Ethiopia. A unit increase in bilateral aid increases national saving by 0.66 units in the long run. The lesson is that under better management, it is better to use aid for expanding infrastructures parallel to small business investment, technology transfer, job creation, improve productivity to speed up or catalyze economic transformation. The empirical study resemblance with (Shields 2007) , (Kumar & Saleh, 2021), Workneh , (2013) ,(Papanek, 1972)**.**

The attention to urban was in the view that cities are the engines of national economic growth and development in general, is in part, based on the pro-urban perspective that is particularly true today in a knowledge-intensive globalizing economy where cities have played a central role as agents of innovation diffusion and socio-economic transformation. However slow demographic transition caused fast population growth and rapid urban surge in Ethiopia, The empirical finding shows a unit increase in urban population growth rate decreases national saving by 0.436 units in the long run. Hence having demographic menu of population growth rate is an important and starting point that we need to press to have national saving to grow.

Moreover, it is important to follow the lesson of east and south Asians so to secure demographic dividend. The result is similar to study output by (Juann H. Hung and Rong Qian : 2010) from china. The intuition behind is that slow demographic transition worsen capital formation capacity through environmental effect, food percapita, foreign exchange , unemployment and all together poverty effect. And the finding was against results of (Tedla: 2017) study on East Africa form 1991-2012..

In contrary to the goal 8 (8.6) of 2030 Agenda for sustainable development (UN :2015) planned to reduce substantially the proportion of youth un employment by 2020 , high unemployment in history of Ethiopia(31%) and remain to be an important problem. High population growth born fast urban growth and resulted in Unemployment lead to low percapita hence lower saving.. Regions of fast demographic transition benefitted in saving for example study in china (Juann H. Hung and Rong Qian : 2010) , (Faruqee, and Husain (1998) :study from Indonesia, Malaysia, Singapore and Thailand, Jha et al., 2009.; study from Asia (China, and Pilipinas) reveals fast demographic transition parallels increase in saving .

4.2.6. Comparison of hypothesis and findings of the regressors

In chapter one, I have hypothesized how exogenous variables are likely to related to national saving. The outcome/results of the study and the hypothesis were summarized on Table 16.

Table 16 Hypothesis and results of the study in long run

Variables	definition	hypothesis	results
lnGDPp	Percapita income	positive	positive
Urgr	Urban growth rate(popn)	negative	negative
CPIE	inflation	negative	insignificant
DIR	Deposit interest rate	positive	negative insignificant
lnAID	Bilateral aid	positive	positive
CAB	Current account balance	negative	positive

Source own computation

The results of findings and hypothesis become the same except inflation and deposit interest rate that was insignificant to affect national saving and the intuition behind is that it is difficult reduce the gap between inflation and deposit interest rate due to rapid inflation and led real interest to be negative un important to increase saving. Current account balance that was in contrary to hypothesis and found positive determinants of saving. The intuition was that trade deficits are not always a reflection of economic problem in contrary to the hypothesis. Poor economies sometimes finance their high levels of investment with foreign borrowing. Hence trade deficit can happen due to poor economies action to develop into modern industrial economies. In these cases, trade deficits are a sign of economic development but it is important to have policy that enforces to have a planned budget and activities that transform borrowing to contribute for development in long run in Ethiopia and controlling illegal capital out flows is important in order to increase saving from trade.

4.2.7 Diagnostic tests

Model diagnosis is an important test that was done in post estimation to check whether model is robust or not. The diagnosis was made for the serial correlation /auto correlation /problem hetro-schadasticity problem i.e test to check for model constancy of variance or not, model normality

using Jaco bera (Jb) statistics and finally test for model stability using cusum .This test is important to see how far dynamic models are dependable or not both in short and long run.

Table 17 results for diagnostic tests

Test statistics	Lm version and df	Prob > chi2	Test command
Serial correlation: Lagrange Multiplier Test of residual serial correlation	chi2(1)	0.5795	estat bgodfrey, lags(1)
Serial correlation: Durbin alternative test for autocorrelation	chi2(1)	0.6330	estat durbinalt
Serial correlation: Durbin-Watson d-statistic	chi2(1)	(9, 38) = 1.789846	estat dwatson
Hetros- chedasticity:	chi2	0.4236	estat imtest, white
Skewness	Chi(6)	0.4049	estat imtest, white
Kurtosis	Chi(1)	0.7124	estat imtest, white
Cameron & Trivedi's decomposition of IM-test	chi2(27)	0.4544	estat imtest, white
Normality: using jaco bera statistics	Chi2	.0822 Chi(2) .9597	Jb resid

Source: own computation

In testing serial correlation, Durbin Watson, durbinalt and bgodfrey statistics results confirms that there is no problem of serial correlation in the model. The Durbin watson d- statistics (estat

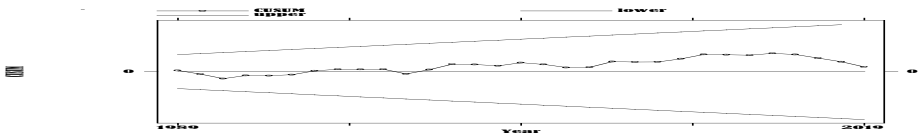
dwatson), as given on Table 16 equals 1.79[15]. Durbin alternative test (estat durbinalt) result also shown as 0.6330 is greater than 5%.In bgodfrey test, the value of the probability of chi2 (1) equals 0.5795 is greater than 5%. Hence we accept the null hypothesis of no serial correlation in the model.

The test for the existence of multiple variance study couldn't reject the null hypothesis of no Hetroscedasticity in the residual at 5% level of significance. Because the results of the test shows that Prob > chi2 0.4236 ,and the Cameron & Trivedi's decomposition of IM-test totaled to 0.4544 implying that ,it is greater than 5%.This shows that there is no Hetroscedasticity and indicates the existence of constant variance / homoscedasticity.

The Jac-obera statistics used to test model normality .The results of jacobera statistics as given on Table 17 above also indicate that, we couldn't reject the null hypothesis that the residuals are normally distributed. The P- value for Jacob era normality test statistics is in a range of: .0822 Chi(2) .9597 is greater than 5% hence we cannot reject the null hypothesis that explains model is normal.

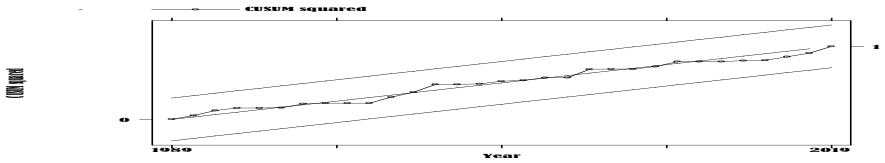
4.2.8. Model Stability – The CUMSUM Test

The model stability of the long-run and short-run relationships for the parameter consistency is examined by the cumulative sum (CUMSUM) and the cumulative sum of squares (CUMSUMSQ) of the recursive residual. The null hypothesis states model is correctly specified and stable. On the Graph5 and Graph 6 the cusum graph lies between two pair of strait lines showing regression result lies in between of critical bound at 5% significance. Therefore the model stability test confirmed that the null hypothesis of parameter stability cannot be rejected at the 5% critical bound. Thus, the parameters of the estimated saving model do not suffer from any instability in particular and other tests over the period of study and it could be said the model in general was robust.



[15] This is compared with d- statistics, "2" means "no serial correlation" . "0" means positive serial correlation and "4" means negative serial correlation.

Graph:5. Cumulative sum of Recursive Residuals



Graph 6 Cumulative sum of squares Recursive Residuals: Source : Own Computation

CHAPTER FIVE

5. SUMMARY, CONCLUSIONS AND POLICY RECOMMENDATION

5.1 Summary and Conclusion

Financing Sustainable Development and Developing Sustainable Finance is a global agenda since AAAA (UN: 2015). The gap between saving and investment in Ethiopia has sustained; as national saving or internal sources of finance kept on lagging behind the investment demand desired by the economy. Although, national saving rate increased from 5% of GDP in 1981 to about 30% of GDP by 2019; its average 16 % of GDP remained lower than investment-GDP ratio of 22% GDP over study period .This reveals an average of 6% GDP finance gap over four decades annually. The gap is felt more severely when one sees the gap in light of the size of the jobless growing population and poverty. Beyond the low saving rate relative to actual investment in Ethiopia, the need for a growing domestic finance mobilization should be seen in light of the average 3% annual population growth , 20-30 % annually unemployed and (4.8%) rapid urban population surge and 24% of poverty rate in Ethiopian population.

The inability to finance its development ventures necessities the country to look for external sources of finances. The external source of finance from Aid was averaged to 9.25% of GDP in the last four decades per year. Under two gaps condition in an economy like Ethiopia it is difficult to rule out the importance of foreign aid to complement investment.

The research finding imply range of multiple factors determine national saving such as productivity as proxied by per capita income, fiscal policy and monetary policy, demographics, External sectors in one way or another. The percapita income, current account balance, and foreign bilateral aid found to affect national saving positively and significantly in the long run. However

urbanization an important demographic variable distinguishing Ethiopia from SSA and the rest of the world average was found to discourage national saving in the long run in Ethiopia.

Percapita income, current account balance, and bilateral aid were found to affect national savings positively at 1% level of significance in the long run. An increase in aggregate income contributes for percapita income to grow and ultimately increased saving. The growth in percapita income is used to speed up graduation from poverty by speeding up productivity transformation and has paramount importance for growth of loanable funds in Ethiopia.

Current account balance was found to affect national saving positively in the long run and negatively in the short run, This made the external trade sector is important in determining national saving. Financing high levels of investment with foreign borrowing need to be optimized by having planned budget in short run and , mobilize citizens residing abroad to invest in domestic economy, and strong financial management of foreign funds , controlling illegal capital out flows through strong custom officers, exporting semi or processed goods, increase volume and type of exports and substituting imports of goods produced domestically and avoid food imports , efficient utilization of generated funds on economic sectors most productive to further returns from CAB for growth in national saving.

World is inter dependent and no state is self -sufficient and closed. poor world states suffers from scarcity of resources and hence aid is not bad to aid the economy .The finding shows aid contributes to the growth and expansion of national saving (loanable funds) positively. Hence one cannot ignore the effect transformation of global economy from aid dependence to domestic dependence and it is important to expand domestic capacity to close the gap coming.

Urbanization has been found to have positive impacts on demographic transition however rapid up ward trending of urban population in Ethiopia caused national saving to fall. The intuition behind is in a country like Ethiopia it is important to have policy and proclamation that encourages small family size and limit frequency of birth contrary to Ethiopian civil servant Proclamation No 1064/2017 that has an indirect incentive for child bearing with no limit for the frequency of birth that create other long run crowding out effect.

5.2. Policy Recommendation

The sustainable finance is important not only because of a need to shift out from aid dependence but the concrete finance gap and fast growing internal demand makes own source of sustainable funding for sustainable development important. The policy recommendations suggested by the study include the following:

1) Creating an enabling policy context through strong institution to enhance productivity in all sectors of the Economy. Among the precedencies are productivity in rural through, consolidating irrigation technology and labor intensive employment that can relieve agriculture from seasonal conditioning, Expanding a small business, through expansion of MFI constitute a vital complement in the process of speeding up rate of ladder from poverty or an increase in per capita income to raise saving.

2. With regard to transnational trade, trade is give and takes(trade negotiations) is important area to press resembling as genuine free trade that ends in foreign farming subsidy and achieving fair and stable prices for commodities and improving national exports. This must be complemented by efforts to strengthen the supply capacity of production, marketing and diversification to enhance the value-added commodities through processing and manufacturing, Import substituting goods that can be locally produced and strive to end food significance from external world.

3. Mobilizing Nationals residing abroad to invest and attract investors to Ethiopia, to this end Ethiopian government has multiplex jobs to do among multiplex right-of-way effective and good institutions can help to pursue better and farther sustainable procedures, secure internal stability or obviate conflicts through citizen - government deep embedded and established liaison action reduce non- productive expenditure and meliorate expansion of productive investment.

4. Under Proper direction: the benefit of ODA overbalance the costs, Ethiopia must design strategies and institutions to reduce investment menace through competent, and safe, honest administration of justice. To this end, donators and Ethiopian governments another work on precedence's with regard to ODA allocation taking into account implicit collegiality between investment in configuration and growth of country and local small business that can absorb and avail benefit the large employment of youth.

5) Strong population policy integral to the rest of scrimping should help to crop the demographic lagniappe/dividend/ , procedures that both speed up the transition to lower cohorts and enable cohorts to be productive , engagement in product by expanding national services to areas where youngish are to secure inclusive money making metamorphosis; Limiting birth motivation at least after certain frequentness of optimum range that can revert the then government expense to saving and are right-of –way area to press so to piece long lasting stretchable Ethiopia.

6) Appropriate financial intermediation i.e directing credit to private firms gauges employment, investment and sustains remunerative growth but due attention in systems right-of –way is important for stable and predictable macro – remunerative terrain (controlled inflation and favorable fiscal balanced environment) should also be served so as to act as an assurance to investors and entire economy.

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Appendices

Appendix 1 Estimates of ardl model

ardl lngns lnGDPP Urgr CPIE DIR lnAID CAB,lags(1 0 0 0 0 0 1)

Sample: 1982 - 2019 Number of obs = 38

F(8, 29) = 40.64

Prob > F = 0.0000

R-squared = 0.9181

Adj R-squared = 0.8955

Log likelihood = 11.492643 Root MSE = 0.2047

---

lngns	Coef.	Std. Err.	t	P>|t|	[95% Conf.	Interval]
lngns						
L1.	.0870872	.1592963	0.55	0.589	-.2387103	.4128848
lnGDPP	1.924162	.3115659	6.18	0.000	1.286938	2.561385
Urgr	-.3984139	.1065242	-3.74	0.001	-.6162804	-.1805474
CPIE	-.010807	.0203874	-0.53	0.600	-.052504	.03089
DIR	-.0089231	.0197412	-0.45	0.655	-.0492983	.0314522
lnAID	.6039652	.1061242	5.69	0.000	.3869168	.8210135
CAB						

```
       --. |   .0206915   .0150071     1.38   0.179    -.0100014    .0513843
       L1. |   .0359774   .0159134     2.26   0.031     .0034307     .068524
           |
     _cons |  -7.081936   1.232288    -5.75   0.000    -9.602247   -4.561624
------------------------------------------------------------------------------
```

Appendix 2 bounds co-integration test (test for long run relationship)

estat btest

note: estat btest has been superseded by estat ectest

as the prime procedure to test for a levels relationship.

(click to run)

Pesaran/Shin/Smith (2001) ARDL Bounds Test

H0: no levels relationship F = 6.687

t = -5.731

Critical Values (0.1-0.01), F-statistic, Case 3

```
     | [I_0]   [I_1]  | [I_0]   [I_1]  | [I_0]   [I_1]  | [I_0]   [I_1]
     |   L_1     L_1 |   L_05    L_05 |  L_025   L_025 |   L_01    L_01
------+---------------+---------------+---------------+---------------
  k_6 |   2.12    3.23 |   2.45    3.61 |   2.75    3.99 |   3.15    4.43
```

accept if F < critical value for I(0) regressors

reject if F > critical value for I(1) regressors

Critical Values (0.1-0.01), t-statistic, Case 3

```
     | [I_0]   [I_1]  | [I_0]   [I_1]  | [I_0]   [I_1]  | [I_0]   [I_1]
     |   L_1     L_1 |   L_05    L_05 |  L_025   L_025 |   L_01    L_01
------+---------------+---------------+---------------+---------------
```

k_6 | -2.57 -4.04 | -2.86 -4.38 | -3.13 -4.66 | -3.43 -4.99

accept if t > critical value for I(0) regressors

reject if t < critical value for I(1) regressors

k: # of non-deterministic regressors in long-run relationship

Critical values from Pesaran/Shin/Smith (2001)

Appendix 3 The error correction model;

ardl lngns lnGDPP Urgr CPIE DIR lnAID CAB,lags(1 0 0 0 0 0 1)ec

Sample: 1982 - 2019 Number of obs = 38

R-squared = 0.6377

Adj R-squared = 0.5378

Log likelihood = 11.492643 Root MSE = 0.2047

D.lngns	Coef.	Std. Err.	t	P>|t|	[95% Conf. Interval]
ADJ					
lngns					
L1.	-.9129128	.1592963	-5.73	0.000	-1.23871 -.5871152
LR					
lnGDPP	2.107717	.1920812	10.97	0.000	1.714867 2.500567
Urgr	-.4364205	.0946862	-4.61	0.000	-.6300756 -.2427654
CPIE	-.0118379	.0224704	-0.53	0.602	-.0577951 .0341192
DIR	-.0097743	.0216801	-0.45	0.655	-.0541151 .0345665
lnAID	.6615804	.096842	6.83	0.000	.4635163 .8596444
CAB					

```
        --. |   .0620747   .0224479     2.77    0.010     .0161637    .1079858
------------+----------------------------------------------------------------
SR          |
        CAB |
        D1. |  -.0359774   .0159134    -2.26   0.031     -.068524   -.0034307
            |
      _cons |  -7.081936   1.232288    -5.75   0.000    -9.602247   -4.561624
------------------------------------------------------------------------------
```

Appendix 4 Diagnostic tests

1.Serial correlation test

A, estat bgodfrey ,lags(1)

Breusch-Godfrey LM test for autocorrelation

```
---------------------------------------------------------------------------
   lags(p)  |        chi2              df              Prob > chi2
------------+--------------------------------------------------------------
      1     |        0.307             1               0.5795
---------------------------------------------------------------------------
                    H0: no serial correlation
```

B. estat durbinalt

Durbin's alternative test for autocorrelation

```
---------------------------------------------------------------------------
   lags(p)  |        chi2              df              Prob > chi2
------------+--------------------------------------------------------------
      1     |        0.228             1               0.6330
```

H0: no serial correlation

C. **estat dwatson**

Durbin-Watson d-statistic(9, 38) = 1.789846

2 .estat imtest , white

White's test for Ho: homoskedasticity

against Ha: unrestricted heteroskedasticity

chi2 (37) = 38.00

Prob > chi2 = 0.4236

Cameron & Trivedi's decomposition of IM-test

Source	chi2	df	p
Heteroskedasticity	38.00	37	0.4236
Skewness	8.30	8	0.4049
Kurtosis	0.14	1	0.7124
Total	46.43	46	0.4544

---

3. Model normality test

jb resid

Jarque-Bera normality test: .0822 Chi (2) .9597

Jarque-Bera test for Ho: normality:

4. Model stability test

cusum6 lngns lnGDPP Urgr CPIE DIR lnAID CAB, cs(cusum) lw(lower) uw(upper)

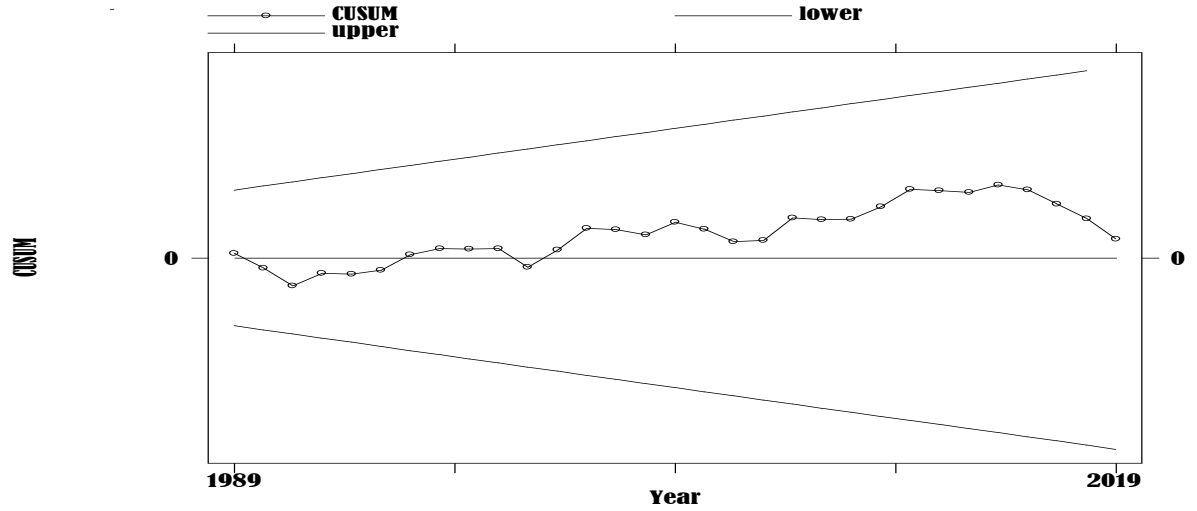

Fig 1 Cumulative sum of Recursive Residuals

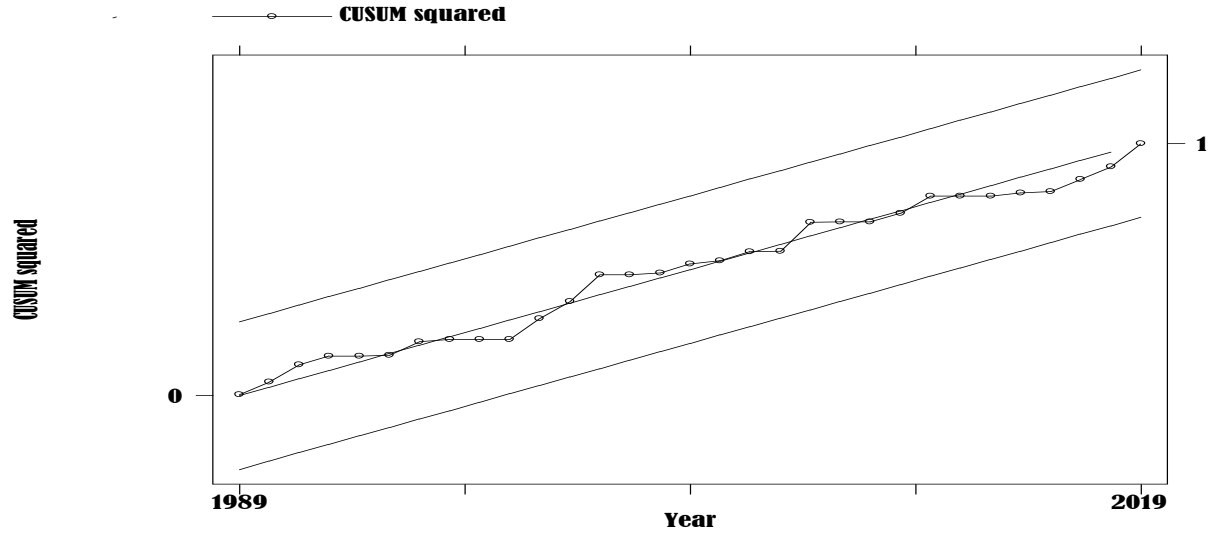

Fig 2: **Cumulative Sum of squares Recursive Residuals**