



**ST. MARRY'S UNIVERSITY (SMU)
SCHOOL OF GRADUATE STUDIES**

**THE IMPACT OF PUBLIC SPENDING ON ECONOMIC GROWTH: THE
CASE OF ETHIOPIA**

ABELONE DAGNE

ID SGS/0491/2008A

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**THE IMPACT OF PUBLIC SPENDING ON ECONOMIC GROWTH: THE
CASE OF ETHIOPIA**

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Abelone Dagne

ID SGS/0491/2008A

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Addis Ababa, Ethiopia

APPROVAL SHEET

As members of board of examining of the final MSc thesis open defense, we certify that we have read and evaluated the thesis prepared by Abelone Dagne under the title “THE IMPACT OF PUBLIC SPENDING ON ECONOMIC GROWTH: THE CASE OF ETHIOPIA” we recommend that this thesis to be accepted as fulfilling the thesis requirement for the Degree of Master of Science in Development Economics

Chairperson	Signature
Advisor	Signature
Internal Examiner	Signature
External Examiner	Signature

TABLE OF CONTENTS

Contents	Page
1. Introduction.....	1
1.1 Background of the study.....	1
1.2 Statement of the problem.....	3
1.3 Research Questions.....	4
1.4 Objectives of the study.....	4
1.5 Significance of the Study.....	5
1.6 Scope of the Study.....	5
1.7 Limitation of the Study.....	5
1.8 Organization of the Study.....	6
2. Literature review.....	7
2.1 Theoretical literature review.....	7
2.1.1 Definition and Measurement of Basic terms.....	7
2.1.2 The Theory: Economics of Government Spending.....	8
2.1.2.1 Keynesian Theory.....	12
2.1.2.2 Wagner’sOrganic State Theory.....	14
2.1.2.3 Peacock and Wiseman’s political constraint Model Analysis	15
2.1.2.4 Monetarist Theory.....	16
2.1.2.5 Crowding out Theory.....	17
2.1.2.6 Musgrave-Rostow’s Theory.....	17
2.1.2.7 Neo-Classical Theory of Growth.....	18
2.1.2.8 Endogenous Growth Theory.....	19
2.2 Emperical Literature.....	20
2.3 Ethiopian Economic Review.....	23
2.3.1 Performance of the Ethiopian Economy: Sectoral treatment	23
2.3.2 Trends in total Government expenditure and RGDP.....	26
2.3.3 The Share of each sector spending from the total government spending	27
3. Research Methodology.....	29
3.1 Research design.....	29

3.2 Method of data analysis.....	29
3.2.1 Time series and Unit Root Tests.....	29
3.2.1.1 Augmented Dickey-Fuller (ADF) test.....	30
3.2.2 Co-integration Test	31
3.2.2.1 Johanson (1988) Maximum Likelihood Estimation procedure.....	32
3.2.2.2 Vector Error Correction Model (VECM).....	32
3.2.3 Diagnostic test.....	34
3.3 Data type and source of data.....	35
3.4 Model Specification.....	35
3.5 Estimation procedure.....	37
4. Empirical Result and Discussion.....	39
4.1 Descriptive Statistics.....	39
4.2 Results for unit root test.....	40
4.3 Diagnostic tests of the model.....	41
4.4 Co-integration analysis.....	43
4.5 Long run Analysis.....	44
5. Conclusion and Recommendation.....	49
5.1 Conclusion	49
5.2 Recommendation.....	51
Reference.....	52
Appendix.....	58

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ACRONYMS AND ABBREVIATIONS

ADF	Augmented Dickey Fuller
AMC	Agriculture Marketing Corporation
ARDL	Auto Regressive Distributed Lag
BMI	Business Monitor International
CSA	Central Statics Agency
DF	Dickey Fuller
ECM	Error Correction Model
GDP	Gross Domestic Product
GNP	Gross National Product
GTP1	Growth and Transformation Plan One
GTP2	Growth and Transformation Plan Two
HSDP	Health Sector Development Plan
IMF	International Monetary Fund
MDGs	Millennium Development Goals
MOFED	Ministry of Finance and Economic Development Office
NBE	National Bank of Ethiopia
NPC	National Planning Commission
OECD	Organization for Economic Co-operation and Development
PASDEP	Plan for Accelerated & Sustained Development to end Poverty

RGDP	Real Gross Domestic Product
SDGs	Sustainable Development Goals
SDPRP	Sustainable Development and Poverty Reduction Program
TFP	Total Factor Productivity
VAR	Vector Auto Regress
VEC	Vector Error Correction
VECM	Vector Error Correction Model
WB	World Bank

LIST OF TABLES

Table Title	Page
Table 4.1: Descriptive Statistics of the Economic Variables (1975-2016).....	39
Table 4.2: Dickey Fuller Unit root Test at level and at first difference.....	40
Table 4.3: Augmented Dicky Fuller Test Result.....	40
Table 4.3.1: Correlation Test.....	41
Table 4.3.2: Heteroskedasticity Test.....	42
Table 4.4.1: Co-integration test result.....	43
Table 5.6: Long run estimation of the model.....	44
Table 5.5: Short run estimation of the EVCN model.....	46

LIST OF FIGURES

Figures	Page
Figure1: The Rahn Curve: Economy Shrinks When Government Too Large.....	9
Figure2.1: The Trend of Total Expenditure with RGDP in Million ETB.....	26
Figure2.2: The Share of each Sector Spending from the Total Expenditure.....	27
Figure4.1: Normality Test.....	42
Figure4.2: Stability of the Model.....	42

ABSTRACT

The rapid growth in government expenditure in Ethiopia has caused concern among policy makers on the implication of such growth. Over the two decades, government expenditure in the country grew at a faster rate. Given this fiscal scenario, an explanation of this requires studying the impact of government expenditure on economic growth. The general objectives of the study were to: investigate the impact of public spending on economic growth of Ethiopia. The data used were government expenditure components that included expenditure on agriculture, infrastructure, defense, and health care, Sources of data were Ethiopia government documents and international financial publications. The study applied restricted Vector Auto Regression estimation technique using annual time series data for the period 1975 to 2016 to evaluate the impact of government expenditure on economic growth. Both descriptive and econometric techniques were employed for the purpose of analysis. Before estimating the long run model, the time series characteristic of the data is tested using DF and ADF test and found that all the variables are stationary at first difference .Then Johansen co-integration tests revealed a long-run relationship between GDP growth rate and the selected components of government expenditure. Furthermore, VECM was latter estimated to determine the relationship dynamics. The result revealed that both in the long run and in the short run public spending on infrastructure and Defense promote economic growth where as public expenditure on agriculture and health were found to be negatively related to economic growth. All components of public expenditure have significant effect in explaining growth of RGDP except spending on health. The study concludes that the composition of government expenditure and public expenditure reform matter for economic growth.

1: INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Responsibility for spending monies raised from taxation and other sources has always been at the heart of the modern concept of government.

Prior to the 19th Century, this was principally a matter of funding the armed forces, with social improvement and economic development left largely in the hands of the private sector. The notion that the Government was responsible for improving the lot of the public for paternalistic reasons became established during the Victorian era, and accelerated in the first half of the 20th Century, with the growing influence of socialism and related doctrines. Politics.co.uk (2017)

According to UK politics news, briefings and debate, the First and Second World Wars, unsurprisingly, pushed public spending as a proportion of Gross Domestic Product up dramatically (from under 15 percent to over 45 percent, and from around 25 percent to over 60 percent, respectively). After each, however, the "size" of government did not revert to its prewar state, with public spending undergoing two step-changes upwards - a phenomenon known as the "ratchet effect". The experience of the Second World War, in particular, was responsible for the birth of the modern "welfare state" and the National Health Service, each representing a massive expansion of state responsibilities and spending commitments.

Supporters of bigger government argue that government programs provide valuable "public goods" such as education and infrastructure. They also claim that increases in government spending can strengthen economic growth by putting money into people's pockets. Smaller government has the opposite view. They explain that government is too big and that higher spending undermines economic growth by transferring additional resources from the productive sector of the economy to government, which uses them less efficiently. They also advise that an expanding public sector complicates efforts to implement pro-growth policies-such as fundamental tax reform and personal retirement accounts- because critics can use the existence of budget deficits as a reason to oppose policies that would strengthen the economy. Mitchell (2005).

The impact of public spending on economic growth has been a long-standing debate in public economic analysis. The key question is whether or not increasing public spending results to an

increase in economic growth. Generally, public spending, particularly on physical infrastructure and human capital are believed to enhance long-run growth through their impact on private sector productivity (Paparas et al., 2015; Barro, 1990; Barro and Sala-i- Martin, X.(1992).

Given the importance of public expenditures in financing investment and consumption activities, Ethiopia's fiscal policy plays a vital role in the economy. Ethiopian government activities may be divided into public investment, which is carried out by state-owned firms, and through government expenditures. The government expenditures classified in to current and capital expenditure. While the former includes wages, salaries, subsidies, transfers, and other expenses (i.e. consumption), the latter encompasses government spending on reinforcing human resources, providing social services and healthcare, developing economic resources, transportation and telecommunications, and increasing the availability of municipal and housing services. In order to achieve better economic performance, Ethiopia adopted deliberate planning and careful implementation of a development program with clear millennium development goals(MDG's) by introducing the First five years growth and transformation plan 2010/11-2014/15. With this first attempt, our government has started a five-year growth and transformation plan two that is operational today. By the end of Ethiopian Growth and Transformation Plan (GTP I) in 2014/15 total government expenditure was expected to reach ETB 201.1 billion, up from its ETB 71.3 billion in 2009/10 (MOFED,2010). Expecting positive outcome from the current expenditure, in long run the policy also aim to cover the capital spending from the domestic resources. MOFED (2014).

The government focused on financing the projects needed for improvement of education, health, housing, transportation, and telecommunication services. However, in recent time Ethiopia is one of the developing countries that performed well in economic growth. According to MOFED (2011) report Real GDP averaged growth 11.4 percent per annum during the period between 2003/04 and 2010/11, which placed Ethiopia among the highly performed countries in sub-Saharan Africa. Hence, this virtuous growth performance can significantly contribute to the poverty reduction strategy and meeting of both MDGs and current growth and transformation plan (GTP II) of Ethiopia. Formerly, in line with PASDEP, the first growth and transformation plan (GTP I) intended to achieve the MDGs in Ethiopia by 2015 and reaching middle income status by 2020.

The Second Growth and Transformation Plan (GTP II) is built on sectoral policies, strategies and programs, lessons drawn from the implementation of GTP I and the post-2015 sustainable development goals (SDGs). Nevertheless, GTP II has its own distinguishing features. The overarching objective of GTP II is to sustain the accelerated growth and thereby realizing the national vision of becoming a lower middle-income country by 2025 through sustaining the rapid, broad based and inclusive economic growth, which accelerates economic transformation and the journey towards the country's Renaissance. Investment in such things as research and development, health, education and infrastructure may facilitate economic growth over long term (NPC, 2016). The paper was conducted to examine the impacts of disaggregated public expenditure on output growth for the period 1975-2016.

1.2 Statement of the problem

Various study attempted to analyze the impact of government spending (health, infrastructure, agriculture, defense or a combination of them) on economic growth and poverty reduction, such as Lofgren and Robinson (2004), Chemingui M. (2007), Agenor et al (2004), Fan et al. (1999 , 2002, 2004 ,2006),(by applying dynamic CGE model)and Tewodaj et al (2006) and Lofgren, (2005) using regression analysis.

However, the empirical evidence across studies on the relative contributions of public investment across different sectors in different countries is mixed both in magnitudes and direction of impacts. The causes of much of the variations in economic growth over time are not well understood. In particular, the effect of government expenditure on economic growth has not been explored exhaustively. Several studies have attempted to investigate the channels through which different types of government expenditure can affect growth. The impact of public spending is limited by various factors and constraints such as the range of methodologies employed, the variation in the types of economies studied and the relative sectoral emphases of different studies that examine the link between public expenditure and development outcomes fall into one or two or more of economic sectors.

Ethiopia's economic growth has been slow despite increases in public spending over time. There has been massive spending annually, on physical infrastructure, health, education, economic services, defense and general administration. Economic theory predicts that increases in

productive public spending in areas like physical infrastructure, health and education leads to increases in economic growth of a country NBE (2016). Therefore, the issue of which government expenditure can foster permanent movements in economic growth becomes important.

The government of Ethiopia, through the ministry of finance has undertaken various budgetary rationalization and reforms aimed at minimizing unproductive public spending, which has been rising over the years NBE (2016).

Government expenditure has also been restructured to enhance economic growth by increasing development expenditures. However, despite the reforms; economic growth has not kept pace with government expenditure growth. Therefore, there is need to investigate the impact of government expenditure and its reform on economic growth. In particular, understanding the impact of the different components of government expenditure and reforms on economic growth is crucial to policy makers and also the studies in Ethiopia to address the relative contribution of policies on public spending across sectors are scarce and most of the studies in the area are out dated and didn't indicate the current scenario. The existence of lack of up to date literatures in the area and contrasting results between findings for the available studies leads to have further investigation in the area, to fill this gap this study examine the impact of public spending channels in current economic growth of Ethiopia for the period 1975-2016.

1.3 Research Questions

From the above given facts, the researcher needs to answer the following research questions.

- What is the trend of public spending related to national output of Ethiopia?
- Dose increasing government spending help or hinder economic growth?
- What is the impact of public spending towards defense, health, infrastructure and agriculture on economic growth?

1.4 Objectives of the Study

The general objective of the study is to determine the impact of public spending on economic growth of Ethiopia under the following specific objectives.

- To determine the relationship between public spending and economic growth of Ethiopia.
- To examine the trend of government expenditure and national output of Ethiopia
- To measure the impact of public spending towards growth enhancing sectors such as, health, agriculture and infrastructure on economic growth.

1.5 Significance of the Study

The author of the study has found it vital to investigate the impact of public spending on economic growth of Ethiopia given the fact that there is a wide room for ambiguity if analysis is purely theoretical. There is a need to support the theoretical arguments with empirical findings, which is why this study is being conducted. Since the country has been in continuous budget increment, it is important to single out, investigate the impact of public spending on economic growth of Ethiopia and make the necessary amendments to the country's expenditure policies. Thus, the study provides information to serve as input to improve on policy formulation, academics and also to serve as springboard to other researchers.

1.6 Scope of the Study

Due to the conflicting findings in the relationship between public spending and economic growth several studies have analyzed this topic. Some studies use panel data for several countries while others use time series data for a specific country. In this study, the later one is in use since the study focuses on the relationship between public spending and economic growth in a specific country, Ethiopia. This paper is limited to study on public spending of development enhancing sectors in Ethiopia and its impact on the economic growth of Ethiopia by using the data that covers from the period 1975-2016.

1.7 Limitation of the Study

Due to difficulty to directly measure the effectiveness of public policies and lack of data to measure the source of finance for the spending, the paper is limited in directly explaining the quality of public expenditure. Resource and time constraints are expected to have limitation on the study. Economic growth can be affected by both fiscal and monetary policies, but this research only looked at the fiscal policy. The research, however,

concentrated on the central government expenditure and its effect on economic growth, without addressing the means of financing

1.8 Organization of the Study

This study will be organized in to six chapters. Following the introductory chapter, chapter two will present the relevant theoretical as well as empirical literatures regarding the relationship between public expenditure and economic growth. Ethiopian Economy review in chapter three and then, Econometric methodology of the study is presented under chapter four followed by chapter five, which covered model estimation and interpretation of results. Finally, chapter six presents the conclusions and Recommendation.

2: LITRATURE REVIEW

2.1 Theoretical literature review

Economic theory has shown how government spending may either be beneficial or detrimental to economic growth. In traditional Keynesian macroeconomics, many kinds of public expenditures, even of a recurrent nature, can contribute positively to economic growth, through multiplier effects on aggregate demand. On the other hand, government consumption may crowd out private investment, dampen economic stimulus in the short run and reduce capital accumulation in the long run. Strictly, crowding-out is due to fiscal deficits and the associated effect on interest rates (Diamond, 1989).

Studies based on endogenous growth models distinguish between distortionary or non-distortionary taxation and between productive or unproductive expenditures. Expenditures are categorized as productive if they are included as influence in private production functions and unproductive if they are not (Barro and Sala-I-Martin, 1992). This categorization implies that productive expenditures have a direct effect upon the rate of economic growth but unproductive expenditures have an indirect or no effect. The issue of which expenditure items should be categorized as productive or unproductive is debatable and may be difficult to define a priori.

2.1.1 Definition and Measurement of Basic terms

(RGDP): This is the rate of increase in gross domestic product. It captures the changes in value of goods and services produced in a given economy for a specified period of time.

Infrastructure expenditure (Inf): It is the government expenditure on capital overheads. It is measured as development expenditure on transportation, communication, electricity and waterways as a share of infrastructure expenditure to the total public expenditure. This is the sector having critical role to promote RGDP. The empirical evidence across studies on the public spending across infrastructure in different countries is mixed.

Health expenditure (Ht): It consists of all expenditure made by the central government for hospitals, clinics, and public health affairs and services for medical, dental and paramedical practitioners; for medication, medical equipment and appliances; for applied research and

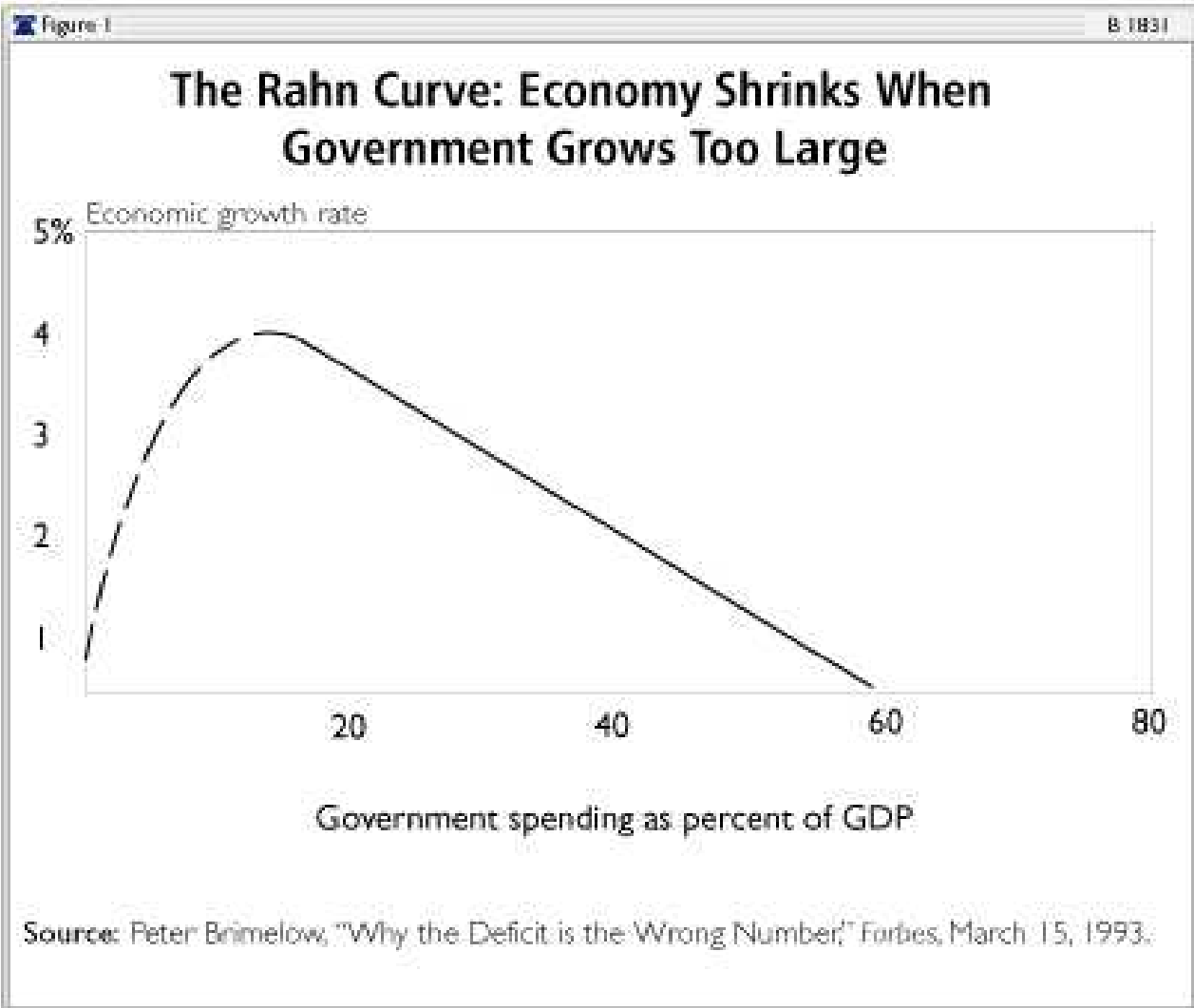
experimental development and it was used as a proxy for human capital development that affects the labor force. It was measured as a share of the total health expenditure to the total government expenditure. Empirical evidence across studies revealed that it has mixed relationship with RGDP.

Defense Expenditure (De): This is the administration, supervision and operation of military defense affairs and forces: land sea, air and space defense force; administration, operation and support of civil defense forces. It was measured as the share of total defense expenditure to the total public spending. Based on results from different studies defense and RGDP have mixed relationship.

Public Expenditure on Agriculture (Agr): This is the share of agriculture expenditure to the total government expenditure. It includes expenses such as buying modern agricultural equipment, agricultural inputs such as improved seeds, trained and hiring a number of agricultural development agents and so on which are expected to affect RGDP. Findings in different countries stated that agriculture and economic growth have negative and positive relationship

2.1.2 The Theory: Economics of Government Spending

Economic theory does not automatically generate strong conclusions about the impact of government outlays on economic performance. Indeed, almost every economist would agree that there are circumstances in which lower levels of government spending would enhance economic growth and other circumstances in which higher levels of government spending would be desirable.



The above Rahn chart indicates that, if government spending is zero, presumably there will be very little economic growth because enforcing contracts, protecting property, and developing an infrastructure would be very difficult if there were no government at all. In other words, some government spending is necessary for the successful operation of the rule of law. Figure 1 illustrates this point. Economic activity is very low or nonexistent in the absence of government, but it jumps dramatically as core functions of government are financed. This does not mean that government costs nothing, but that the benefits outweigh the costs. Mitchell (2005)

Costs vs. Benefits. Economists will generally agree that government spending becomes a burden at some point, either because government becomes too large or because outlays are misallocated. In such cases, the cost of government exceeds the benefit.

According to Mitchell (2005) the downward sloping portion of the Rahn curve can exist for a number of reasons, including:

- **The extraction cost.** Government spending requires costly financing choices. The federal government cannot spend money without first taking that money from someone. All of the options used to finance government spending have adverse consequences. Taxes discourage productive behavior, particularly in the current U.S. tax system, which imposes high tax rates on work, saving, investment, and other forms of productive behavior. Borrowing consumes capital that otherwise would be available for private investment and, in extreme cases, may lead to higher interest rates. Inflation debases a nation's currency, causing widespread economic distortion.
- **The displacement cost.** Government spending displaces private-sector activity. Every dollar that the government spends necessarily means one less dollar in the productive sector of the economy. This dampens growth since economic forces guide the allocation of resources in the private sector, whereas political forces dominate when politicians and bureaucrats decide how money is spent. Some government spending, such as maintaining a well-functioning legal system can have a high "rate-of-return." In general, however, governments do not use resources efficiently, resulting in less economic output.
- **The negative multiplier cost.** Government spending finances harmful intervention. Portions of the federal budget are used to finance activities that generate a distinctly negative effect on economic activity. For instance, many regulatory agencies have comparatively small budgets, but they impose large costs on the economy's productive sector. Outlays for international organizations are another good example. The direct expense to taxpayers of membership in organizations such as the International Monetary Fund (IMF) and Organization for Economic Co-operation and Development (OECD) is often trivial compared to the economic damage resulting from the anti-growth policies advocated by these multinational bureaucracies.
- **The behavioral subsidy cost.** Government spending encourages destructive choices. Many government programs subsidize economically undesirable decisions. Welfare programs encourage people to choose leisure over work. Unemployment insurance programs provide an incentive to remain unemployed. Flood insurance programs

encourage construction in flood plains. These are all examples of government programs that reduce economic growth and diminish national output because they promote misallocation or underutilization of resources.

- **The behavioral penalty cost.** Government spending discourages productive choices. Government programs often discourage economically desirable decisions. Saving is important to help provide capital for new investment, yet the incentive to save has been undermined by government programs that subsidize retirement, housing, and education. Why should a person set aside income if government programs finance these big-ticket expenses? Other government spending programs-Medicaid is a good example-generate a negative economic impact because of eligibility rules that encourage individuals to depress their incomes artificially and misallocate their wealth.
- **The market distortion cost.** Government spending distorts resource allocation. Buyers and sellers in competitive markets determine prices in a process that ensures the most efficient allocation of resources, but some government programs interfere with competitive markets. In both health care and education, government subsidies to reduce out-of-pocket expenses have created a "third-party payer" problem. When individuals use other people's money, they become less concerned about price. This undermines the critical role of competitive markets, causing significant inefficiency in sectors such as health care and education. Government programs also lead to resource misallocation because individuals, organizations, and companies spend time, energy, and money seeking either to obtain special government favors or to minimize their share of the cost of government.
- **The inefficiency cost.** Government spending is a less effective way to deliver services. Government directly provides many services and activities such as education, airports, and postal operations. However, there is evidence that the private sector could provide these important services at a higher quality and lower cost. In some cases, such as airports and postal services, the improvement would take place because of privatization. In other cases, such as education, the economic benefits would accrue by shifting to a model based on competition and choice.
- **The stagnation cost.** Government spending inhibits innovation. Because of competition and the desire to increase income and wealth, individuals and entities in the private sector

constantly search for new options and opportunities. Economic growth is greatly enhanced by this discovery process of "creative destruction." Government programs, however, are inherently inflexible, both because of centralization and because of bureaucracy. Reducing government-or devolving federal programs to the state and local levels-can eliminate or mitigate this effect.

Spending on a government program, department, or agency can impose more than one of these costs. For instance, all government spending imposes both extraction costs and displacement costs. This does not necessarily mean that outlays-either in the aggregate or for a specific program-are counterproductive. That calculation requires a cost-benefit analysis. Mitchell (2005)

The IMF and WB often divide total spending in to three broad categories: economic spending (agriculture and infrastructure), social spending (education, health, nutrition and safety nets) and public administration and defense spending. Government spending can also be divided into those expenditures whose welfare goals are meant to be realized in the long-term or short-term (Ali, G.A., and Fan, G., 2007). The long-term expenditures include investment on human and physical capital (infrastructure, education, health, and technology) while the short-term expenditures are social safety nets/welfare spending. Public expenditure diverts economic resources in to channels determined by the government in accordance with national objectives and public policy. As a consequence, the scale and direction of public expenditure may affect the: pattern and levels of consumption, volume of production, allocation of resource, distribution of income, levels of prices and employment.

2.1.2.1 Keynesian Theory (The Keynesian Controversy).

The Economics of government spending is not limited to cost-benefit analysis. There is also the Keynesian debate. In the 1930s, John Maynard Keynes argued that government spending-particularly increases in government spending-boosted growth by injecting purchasing power into the economy. According to Keynes, government could reverse economic downturns by borrowing money from the private sector and then returning the money to the private sector through various spending programs. Keynes (1936)

This "pump priming" concept did not necessarily mean that government should be big. Instead, Keynesian theory asserted that government spending-especially deficit spending-could provide short-term stimulus to help end a recession or depression. The Keynesians even argued that policymakers should be prepared to reduce government spending once the economy recovered in order to prevent inflation, which they believed would result from too much economic growth. They even postulated that there was a tradeoff between Inflation and unemployment (the Phillips Curve) and that government officials should increase or decrease government spending to steer the economy between too much of one or too much of the other. Keynesian economics was very influential for several decades and dominated public policy from the 1930s-1970s. The theory has since fallen out of favor, but it still influences policy discussions, particularly on whether or not changes in government spending have transitory economic effects. For instance, some lawmakers use Keynesian analysis to argue that higher or lower levels of government spending will stimulate or dampen economic growth. Mitchell (2005)

- **The Keynesian Stimulus Myth**

Larkey, et al. (1981) believed that government spending - especially debt-financed increases in government spending- boosted growth by "injecting" purchasing power into the economy, ostensibly by putting money into people's pockets. According to Keynesian theory, people would then spend the money, spurring growth. Politicians understandably liked Keynesianism because it provided a rationale for spending more money.

Some researchers, See Hansson and Henrekson (1994) estimated that larger levels of government were associated with higher levels of economic output, but their studies often contained severe methodological errors. More sophisticated analysis avoids this measurement problem and, not surprisingly, finds that government spending does not stimulate growth. In simple terms, Keynesian theory overlooks the fact that government does not have some magic source of money. The government cannot inject money into the economy without first taking it out of the economy via taxes or borrowing.

The Keynesian theory fell into disrepute once it became apparent that spending increases were associated with economic stagnation in the 1970s and that lower tax rates and spending restraint triggered an economic boom in the 1980s. Interestingly, John Maynard Keynes would probably be

aghast at how his theories have been used to support bigger government. Before his death, he stated that economic performance would be undermined if government spending exceeded 25 percent of gross domestic product (GDP). Roger (2003)

Keynesian economics promoted a mixed economy in which both the state and the private sector were considered to play an important role. Keynesian economics sought to provide solutions to what economists believed to be the failure of laissez-faire economic liberalism, which advocated that markets and the private sector operated best without state intervention (Trotman, 1997).

In Keynesian theory, macroeconomic trends could overwhelm the micro-level behavior of individuals. The theory is based on the assumptions of: The economy is operating in the short-run, wages and prices are fixed, money market is not important, taxation is in form of lump-sum taxes only and planned consumption and planned saving are both related to income. Keynes asserted the importance of aggregate demand for goods as the driving factor of the economy, especially in periods of downturn. The theory argued that government policies could be used to promote demand at a macro level and to fight high unemployment and deflation (Branson, 1989).

Keynes believed that the government was responsible for helping to pull a country out of a depression. If the government increased its expenditure, then the citizens were encouraged to spend more because more money was in circulation. People would start to invest more, and the economy would go back to normal. An increase in government purchases causes a large increase in output and vice versa. A central conclusion of Keynesian economics was that there was no strong automatic tendency for output and employment to move towards full employment levels.

2.1.2.2 Wagner's Organic State Theory

The German economist Wagner (1863) advanced a law of rising public expenditure by analyzing trends in the growth of public expenditure and in the size of public sector in many countries of the world. This theory is primarily concerned with the explanation of the growth of the share of GNP taken up by the public sector. This theory, popularly known as Wagner's law, states that as per capita income grows, the relative size of the public sector will grow also. This is because the state would need to expand administration and law and order services; increased concern for distributional issues; and a greater need to control private monopolies and other forms of market

failures. Thus, the state grows like an organism reflecting changes in the society and economy and making decisions on behalf (and to the benefit) of its citizens (Brown and Jackson 1996).

The flaw in Wagner's theory is that it does not contain a well articulated theory of public choice. The law assumes the problems of public choice by employing an organic theory of the state. Thus the state is assumed to behave as if it were an individual existing and making decision independently of the members of society. Expansion of public sector also cannot be explained in the absence of industrialization, and finally, the law concentrates upon a demand side explanation of government expenditure growth without considering the supply side explanations. In many ways, Wagner's law provides a good explanation of public sector growth. Its main limitation is that it concentrates solely on the demand for public sector services. What must determine the level is some interaction between demand and supply.

2.1.2.3 Peacock and Wiseman's Political Constraint Theory

This theory is based upon a political theory of government expenditure determination, namely that governments like to spend more money; that citizens do not like to pay more taxes; and that governments need to pay attention to the wishes of their citizens. The model assumes that there is some tolerable level of taxation that acts as a constraint on government behavior. As the economy (and thus incomes) grows, tax revenue at constant rate would rise, thereby enabling government expenditure to grow in line with GNP (Peacock and Wiseman, 1961).

According to Peacock and Wiseman, during period of social upheaval such as war, famine or some large-scale social disaster, the gradual upward trend in government expenditure would be distorted (displaced upward). In order to finance the increase in government expenditure, the government may be forced to raise taxation level, a policy which would be regarded as acceptable to the electorate during period of crises. This is called the displacement effect.

Besides, there is also the inspection effect. This arises from people's keener awareness of social problems during the period of upheaval. The government, therefore, expands its scope of services to improve these conditions, since people's perception of tolerable levels of taxation does not return to its former level, the government is able to finance these higher levels of expenditure originating in the expanded scope of government and debt charges. The net result of these two

effects is occasional short- term jumps in government expenditure within a rising long-term trend (Peacock and Wiseman, 1961).

The theory has also been criticized for giving insufficient weight to political influences on the level of public expenditure. Moreover, the theory does not isolate all relevant causes at work. Furthermore, the critics of this theory are based on answer to the question: What happens to expenditure in the post war period? There is no long-run displacement effect in the case where civilian public expenditure in the post war period return to their original growth path or in the case where there is only a temporally increase in post war civilian public expenditure until the old trend line is reached. There is evidence that after deferred civilian public expenditure has taken place following the war, public outlays return to the pre-war level (Brunkhead and Miner, 1979).

2.1.2.4 Monetarist Theory

This theory stresses the primary importance of money supply in determining nominal GDP and the price level (Ahmed, 1999).

Friedman (1956) argued convincingly that the high rates of inflation were due to rapid increases in the money supply. The key to good policy was therefore to control the supply of money. The foundations of the model were: There is a close relationship between the changes in the money supply and changes in national income in the long-run, without government interference the economy will tend towards its „natural“ rate of unemployment, velocity of circulation of money is predictable, money changes will only affect real national income indirectly and the economy is in equilibrium at full employment.

Monetarists disliked big government and tended to trust free markets. They did not like government expenditure and believed that fiscal policy was not helpful in bringing about economic growth. Where it could be beneficial, monetary policy could do better. Excessive government expenditure only interferes in the workings of free markets and could lead to bloated bureaucracies, unnecessary social programmes and large deficits (Cullison, 1993).

2.1.2.5 Crowding Out Theory

This theory as developed by Bacon and Eltis (1970) states that government intervention leads to reduction in private investment activities and this is known as 'crowding out'. The assumptions on the model are: The income generated in the market would equal the value of output; there is no nonmarket (government) sector in the economy, taxes channel resources from market sector to non-market (government) activity.

There are two forms of crowding out. The first form is the direct crowding out, whereby public sector production uses resources that could otherwise be used by the private sector. If the public sector replaces the private sector, it is expected to constrain economic growth. This displacement effect occurs directly as the public sector use tax revenues to buy resources that would otherwise be used by the private sector. The second form is the indirect crowding-out which occurs when government expenditure, taxation and government borrowing cause disincentives to productive effort, namely to work, to save and to invest (Trotman 1997).

The limitations of this model include: The theory neglects the importance of public sector services as inputs to the private sector especially education which is important in increasing the skills of the work force, and there are, of course , several other determinants of interest rates in the economy in addition to public sector. The proportion of private sector depends on the portion of the public sector. If public sector is to increase its productive investment, then private sector will be crowded out (Bailey, 2002).

2.1.2.6 Musgrave-Rostow's Theory

This theory takes government expenditure as a prerequisite of economic development, its level being directly related to the stage of development that a country has reached. In the early stage of economic growth and development, public investment as a proportion of the total investment of the economy is found to be high. The public sector provides social infrastructure overheads such as roads, transport infrastructure, sanitation services, law and order, health, education and other investments in human capital, which are all necessary to gear up the economy for takeoff into the middle stages of economic and social development (Musgrave and Musgrave, 1989).

In the middle stages of growth, the government continues to supply investment goods, but this time public investment is complementary to the growth in private investment. During the two stages of development, market failures exist, which can frustrate the push towards maturity, hence increase in government involvement in order to deal with these market failures. In the mass consumption stage, income maintenance programmes and policies designed to redistribute welfare grows significantly relative to other items of government expenditure, and also relative to GNP (Musgrave and Musgrave, 1989).

2.1.2.7 Neo-Classical Theory of Growth

Most ideas concerning economic growth starts from the aggregate production function where factors of production determine the national output.

According to the Neo-classical theories as advanced by Solow-Swan (1956), growth comes about in three ways if land is held fixed: increase in the labor supply; increase in the capital stock; and increase in productivity. Increasing labor supply generates a larger output. Real output rises if more people take part in a country's production. Capital increase can be divided into two parts; increase in physical and human capital. Physical capital increases output because it enhances the production of labor and provides valuable services directly. Human capital promotes economic growth because people with skills are more productive than those without them.

Productivity increases explain the increase in output that can be explained by the input increases (labour and capital). This is called the productivity of input and can be affected by a number of factors: By either financing or supplying directly the investments that the private sector would not supply in adequate quantities because of various market failure in certain kind of infrastructure projects and basic education and health expenditure, which could directly boost private sector productivity; by efficiently supplying certain basic public services that were necessary to provide basic conditions for entrepreneur activity and long term investment; and by financing its own activities in the manner that minimizes distortions to private sector savings and investment decision and to economic activities more generally (Burda and Wyplosz, 2001).

Within this framework, government expenditure could in principle impact growth by affecting capital and/or labor as well as the generation and/or assimilation of technological progress reflected in total factor productivity (TFP). However, since it is assumed in the model that the

long-run growth rate is driven by the population growth and the rate of technical progress, which is considered to be exogenous, the effect of government expenditure on growth through production factors is considered to be only transitional. The theory has some shortcomings which include the following. First, it provides an inadequate explanation of economic growth. Second, the theory does not give clear understanding of differences among nations-why some are rich and some remain poor and why some grew rapidly while others stagnate. James,N(2010)

2.1.2.8 Endogenous Growth Theory

The chief inventors of endogenous growth theory are Romer and Lucas (1990). This theory highlights the fact that if productivity is to increase, the labor force must continuously be provided with more resources. Resources in this case include physical capital, human capital and knowledge capital (technology). Therefore, growth is driven by accumulation of the factors of production while accumulation in turn is the result of investment in the private sector. This implies that the only way a government can affect economic growth, at least in the long-run, is via its impact on investment in capital, education and research and development.

Unlike neo-classical growth theory, technical change is no longer based to chance, but can be fostered and promoted by appropriate policies. Moreover, as the foundation for innovation and entrepreneurship are secured, the probability of further technical change and associated economic growth occurring, rise significantly. Technical change is no longer regarded as unexplainable and due to chance as in neo-classical theory, but in endogenous theories becomes itself a variable which can be influenced by policy decisions and should now be included within production functions, alongside the conventional inputs of labor and capital. Government policies can affect economic growth rates by taxing consumption, subsidizing investment and research, and shifting resources from government consumption to government investment.James,N(2010)

Reduction of growth in this models occurs when government expenditure deter investment by creating tax wedges beyond what is necessary to finance investments or taking away the incentives to save and accumulate capital (Folster and Henrokson, 1997).

2.2 Empirical literature review

Lofgren and plaz.Bonilly (2005), Ethiopian case, using dynamic CGE model found that focus on human development (sufficiently to achieve human development MDGs) puts theeconomy on a slower growth track that does not permit the economy to reach MDG1(poverty reduction) by 2015 while focus on infrastructure puts the economy on a faster growth that raises household consumption sufficiently to reach poverty reduction, andachieve the other MDGs within a few years after 2015.

The paper on the impacts ofpublic spending on rural household in Ethiopia indicated that the returns to roadinvestment are significantly higher than the returns to other sector spending while thehousehold expenditure impacts of public expenditure in agriculture and education weresmall (Tewodaj, M. et al, 2007)

Abu and Abdullahi (2010) used disaggregated analysis to investigate the effect ofgovernment expenditure on economic growth in Nigeria, for the period 1970-2008. The authors explored thattotal recurrent expenditures, total capital, and expenditure on education have negative effect on economic growth.However, increasing government expenditure in the areas of transport, communication and health resultedwith economic growth.

In addition to the above, Adewara and Oloni(2012) empirically analyzed the composition of public expenditure and economic growth in Nigeriabetween 1960 to 2008 using the vector Autoregressive models (VAR). The authors concluded that expenditure on transport; agriculture and health are positive and significantly related with economic growth. However, expenditure on Education is both negative and not significant to economic growth.

Niloy, et al.(2007) examined the growth effects of government spending with a particular focuses on disaggregated government expenditures for a panel of 30 developing countries between 1970s and 1980s. They found that the share of government capital expenditure in GDP is positively and significantly correlated with economic growth

In support of the above, John (2012) investigated the effect of the composition of public expenditure on economic growth using data from 1972 to 2008 in Kenya. He concluded that expenditure on infrastructure were weakly significant to economic growth. On the other hand,

expenditure on agriculture was negatively significant on economic growth and expenditure on health is insignificant determinants of economic growth.

Loto (2011) studied the effect of sectoral expenditure to economic growth in the period from 1980 to 2008 in Nigeria. His result showed that in the short-run, expenditure on health and infrastructure was positively related to economic growth. On the other hand, spending on agriculture was negatively related to economic growth.

Tajudeen and Ismail (2013) explored that the impact of public expenditure on economic growth with the period from 1970 to 2010 making use of annual time-series data in Nigeria. They used the bound's testing Auto-Regressive Distributed Lag (ARDL) approach to analyze the long run and short-run relationships between public expenditure and economic growth. They found that total expenditure has a negative impact on economic growth in Nigeria.

Government expenditure is one of the important determinants of economic growth. However, the growth of an economy depends on the size, spending capacity, and effective use of capital expenditure in the development process (Sharma 2012).

With an increased public spending in Ethiopia in the past few years and the plan to increase this spending on various sectors of the economy in the coming years, determining the relationship between public spending and economic growth remains to be policy level issue. While addressing this issue, it is important to consider not only the effect of public spending on short and long run growth as a whole but also the level and composition of expenditure on each public sector. The urgent need to alleviate poverty in Ethiopia in face of scarce availability of capital resources justifies the vitality of establishing sufficient evidence on the relationship between the effect of increased public sector spending and economic growth in the country (Bayew, 2015).

Government expenditure is expected to be means of reducing the negative impacts of market failure on the economy. However, allocations of public expenditure with lack of consideration for the appropriate needs of the country may cause greater distortion in the economy which may be detrimental to growth. (Bazezew , 2014)

Not much but few studies were also made in Ethiopia on the relationship of public spending and economic growth. Recently a study was made by Bayew (2015) on the impact of public sector

spending(road and electric power) on economic growth; using a time serious data of GDP and government expenditure for the period 1991-2013 and the study found that expenditure on road has a negative impact in the short run and insignificant in the long run.

The other similar study made by Teshome (2006) using Johanson Maximum Likelihood estimation procedure with 1961-2004 time serious data found that only expenditure on human capital have a long-run significant positive impact. Investment (productive) government spending displays a negative but insignificant impact on growth of real GDP, which again reveals the inefficiency and poor quality nature of public investment. In the short run, all components of government expenditure do not have significant meaning in explaining economic growth.

The study made by Mulugeta(2012) using 1971-2011 time serious data, applying Ram's(1986) endogenous growth Accounting model and found that the long run estimation result revealed real government spending on human capital formation is growth promoting; real government consumption is growth retarding and real government physical investment becomes insignificant in explaining growth of real per capita income. Real Private investment and real openness affect the growth of real per capita income positively and significantly.

Military spending is an important issue for developing countries. It is an expenditure by governments that has influence beyond the resources it takes up, especially when it leads to or facilitates conflicts". While most countries need some level of security to deal with internal and external threats, there are opportunity costs as the money could be used for other purposes that might improve the pace of development, but in more recent years the declining trend has bottomed out and military expenditures are increasing. Dunne (2010)

2.3 ETHIOPIAN ECONOMIC REVIEW

2.3.1 Performance of the Ethiopian Economy: Sectoral Treatment

Economic overview Ethiopia's long term development framework is underpinned by the 5 year Growth and Transformation Plans (GTPs) which runs from 2015 to 2020. The GTP targets annual GDP growth of 11% (driven by the manufacturing sector and rise in exports) and enabling Ethiopia to reach middle income status by 2025. MOFED 2014

Ethiopia registered 8.0 percent real GDP growth rate in 2015/16 which was much higher than 1.4 percent average for Sub-Saharan Africa. The economic growth was broad based with industry growing 20.6 percent, services 8.7 percent and agriculture 2.3 percent. GDP Annual Growth Rate in Ethiopia averaged 5.64 percent from 1981 until 2015, reaching an all time high of 13.90 percent in 1986 and a record low of -11.10 percent in 1984. Real economic growth is projected at 7% between 2016 and 2025 as the government continues its heavy public investment into priority sectors such as infrastructure, agriculture and manufacturing. NBE (2016)

The economy has exhibited a gradual structural shift. Though agriculture still remained a dominant sector, its share in GDP continued to shrink from 38.7 percent in 2014/15 to 36.7 percent in 2015/16 while that of industry and services stood at 16.7 and 47.3 percent, respectively. This trend is in line with the government's policy of agriculture led industrialization, developing manufacturing sector and enhancing export-led growth to sustain double digit economic growth trajectory achieved during the last 15 years. NBE Report 2016

According to IMF's Article IV Consultation, Ethiopia's large scale public investment in infrastructure is supporting structural transformation and growth. Notably, major hydropower projects such the Grand Ethiopia Renaissance Dam which at 6,000 MWs will be the largest in Africa, will triple Ethiopia's generation capacity to roughly 9,000 MWs – adequate enough to meet domestic demand and export. Economic outlook, 2016

The Business Monitor International (BMI), projects Ethiopia's real Gross Domestic Product (GDP) to record a 7.8% growth rate in 2016 from an 8.1% growth rate in 2015 driven by the Government's continued large-scale investment under the second phase of its Growth And Transformation Plan (GTP II). BMI reports that manufacturing and agricultural sectors will be the

main contributors to real GDP growth between 2016 and 2020 due to the government's investment in the country's infrastructural backbone by improving logistics channels. Ethiopia's investment into the fixed capital formation and construction industry will grow by 14% per year over 2016 and 2017. This will attract Foreign Direct Investments (FDIs) in the country to ensure sustained economic growth. Economic outlook,2016

Regarding fiscal operations, the Federal government fiscal policy continued to focus on enhanced resource mobilization through significant improvement in tax collection and administration, and pro-poor and development oriented expenditure with a view to financing a significant portion of the spending from domestic sources. Accordingly, domestic revenue depicted a 23.6 percent annual growth while general government expenditure increased by 18.4 percent with general government fiscal operations resulting in a deficit of 1.9 of GDP which was lower than 2.5 percent registered last year. NBE 2016

- **Defense and Security**

As would be expected from a developing country in East Africa, Ethiopia takes its fair share of crime. Petty theft, robbery, vehicle theft and burglary are fairly common in the country, especially in the developed urban center of Addis Ababa. The abundance of private security outfits only goes to buttress the fact that Ethiopia requires intervention to keep its crime to a low. Ethiopia currently spends only \$550 million (0.91% of its GDP) on military enforcement, which may show why the country has a low security score. In December 2015, however, Ethiopia signed a \$200 million deal with Kenya to help strengthen their borders. If Ethiopia is to strengthen its borders and its region, it must look towards expanding its military capabilities. Economic outlook,2016

- **Construction and Infrastructure**

Ethiopia is expected to see huge growth in the construction and infrastructure sector, with BMI predicting it to be the leader in such growth in the East Africa region. BMI predicts an 18.5% growth for Ethiopia's infrastructure in 2016, and an average growth rate of 10.7% in real terms over the next 10 years. The Growth and Transportation Plan (GTP) is entering its second phase,

from 2016-2020. This phase emphasizes key focus on hotel and airport improvement, which should also help boost tourism and international investment. The Black Rhino Group, UK-based Turner & Townsend to help build large highways and roads across the country, in order to help reduce transportation costs for goods. NBE Report 2016

The government is determined to increase road coverage from 20% to 22% by August 2016, with assistance from the China Seventh Group and the Export-Import Bank of Korea. This project will focus on building another 917 km of roads. Ethiopia is a clear outperformer in this sector not only in Africa, but in the world. BMI ranks Ethiopia as the second faster grower worldwide in this sector. Economic outlook, 2016

- **Agriculture**

Agriculture is very much the base of Ethiopia's economy, standing as the base and the building block of what the country is today. The agriculture sector accounts for 50% of the country's GDP, 85% of exports, and over 80% of total employment in the labor force. Principal crops include coffee, pulses, potatoes and sugarcane. These crops thus also spurs great amounts of activity in industries such as manufacturing, transport and marketing. Ethiopia's agriculture sector, however, faces many threats. These include soil degradation due to overuse, drought, high tax rates, low subsidies, and poor infrastructure. USAID and Ethiopia's government are working together to combat such issues, by providing agricultural education, technology, and better roads. The government is also in the process of regulating crop prices via the Agricultural Marketing Corporation (AMC) which will be in charge of influencing market prices and buying yield at increased prices, to increase farmer income. NBE,2014/15 Annual report

BMI predicts Ethiopia's agriculture industry to grow rapidly between 2015 and 2020, citing the expected 14.8% growth in the sugar industry over the next 5 years. Ethiopia aims to become a top-10 sugar producer worldwide by 2020, which the government outlined in its Growth and Transformation Plan (GTP). Ethiopia's agriculture sector is a healthy and important one, and it is safe to assume that it will continue to head in the positive direction for a while to come.

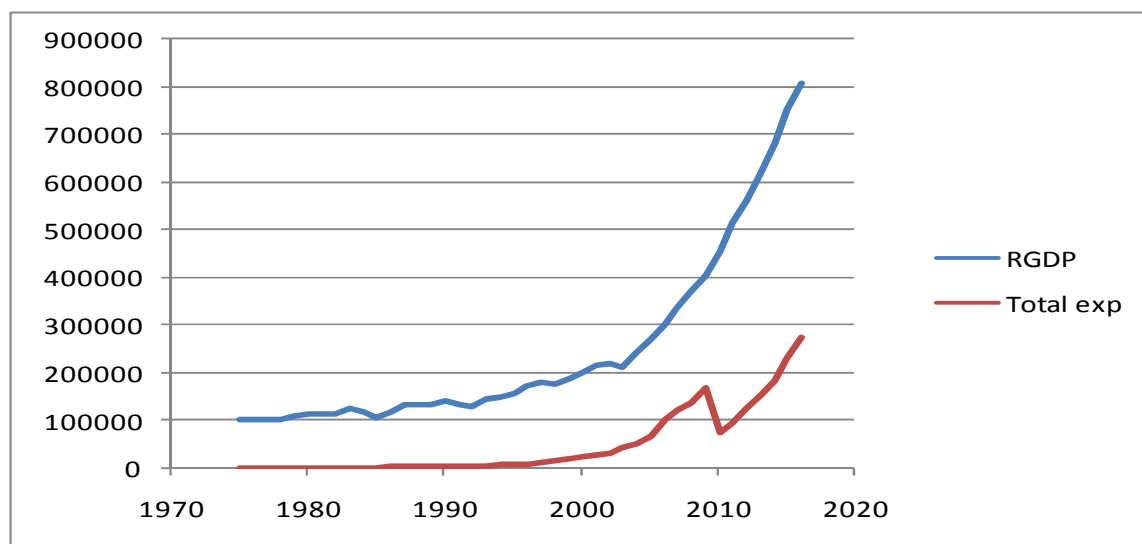
- **Health**

The government of Ethiopia, through its Sustainable Development and Poverty Reduction

Plan](SDPRP, 2002/03- 2004/05), Plan for Accelerated and Sustained Development to End Poverty(PASDEP, 2005/06–2009/10), and Growth and Transformation Plan (GTP, 2010/11-2014/15)has recognized the critical role that improved health services play in economic development.This recognition has led to increased investments in the health sector. A core component ofthe PASDEP was the Health Sector Development Plan (HSDP), which focuses on strengtheningEthiopia’s health system, particularly on interventions geared to improving maternal and childhealth and combating malaria, HIV and TB. The Health Sector Development Plan IV (2010/11 –2014/15) builds on previous HSDPs, and is line up to the health-related MDGs.NBE Report 2014/15

2.3.2 Trends in total government spending, and RGDP

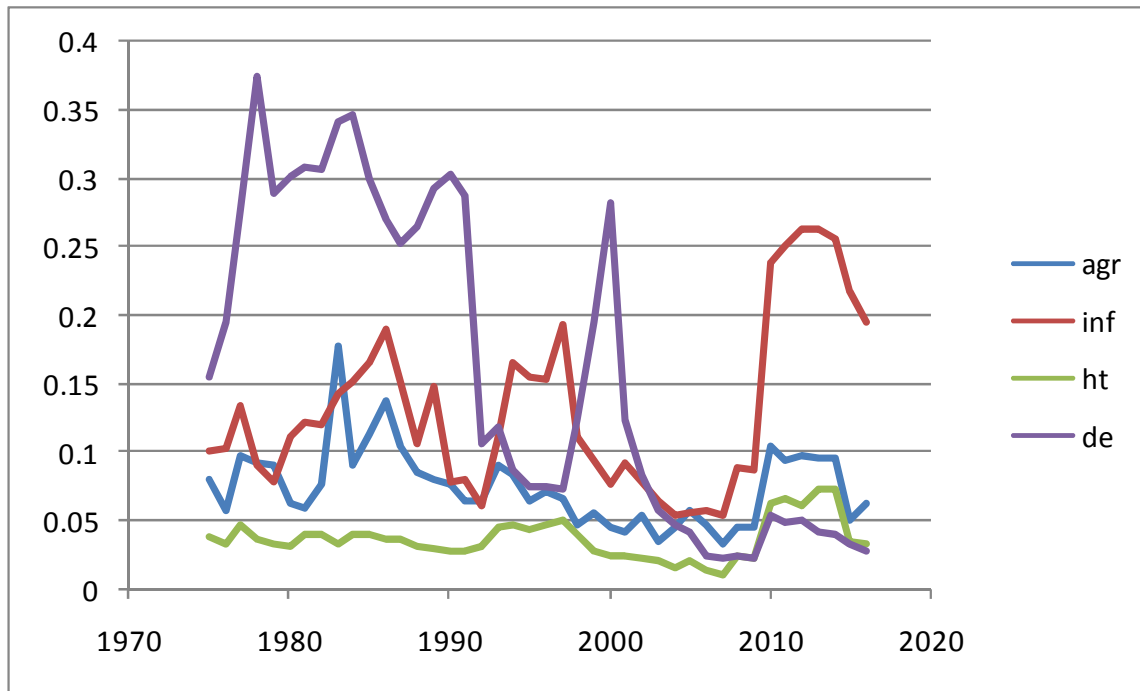
During the last four decades, public expenditures, not surprisingly, have risen vastly in absolute terms (cash spending) and never fall from one year to the next except marginal decline in 1992). The figure 2.1 shows us an increments trend in both RGDP and total spending.



Source : Owen calculation based on MOFED data

Figure:2.1 The trend of Total expenditure with RGDP in million ETB

2.3.3 The Share of each sector spending from the total government spending



Source:Owen calculation based on MOFED data

Figure2.2: The share of each sector spending from the total expenditure

The growth trend of the Ethiopian economy for most of the recent past is characterized by its moderate level of performance and its nature of high volatility. Here we can understand that the trend of infrastructure expenditure increase in an increasing rate starting from 2010 to 2016, spending on agriculture, defense and health sector also increase in a decreasing rate. After the end of the civil war to overthrow the Derg regime and the restoration of political stability in 1991/92, the new government adapted free market economic principle with the aim of encouraging private participation while decreasing government activities. The government liberalized the market at the first Phase of economic reform program (1991/92-1995/96) with the aim of removing government control on market prices. In addition, the government minimized the level of public expenditure and tried to stabilize the macro economy by reducing the inflation rate Wondwosen,(2012).

The government also changed the previous centralized system of fiscal administration by introducing fiscal federalism or decentralization was introduced in the country in 1991/92.

The fiscal federalism system which is originated during the transitional government period was ratified by the constitution of the Federal Democratic Republic of Ethiopia gave the rights of nations and nationalities and peoples to administer their own affairs within their defined territory. The justification for using total expenditure on health as a proxy to expenditure on human capital (labor) is evident in the context of developing countries.

3: RESEARCH METHODOLOGY

The chapter presents the empirical model adopted for the study. The variables used in the study are defined. The data, the data sources and the methods used in data analysis are explained.

3.1 Research Design

This study aimed at establishing the effects of government expenditure on economic growth in Ethiopia. Quantitative data were used in the study to answer the research questions posed in chapter one. The study used data for the period 1975 to 2016 for the components of government expenditure, namely: health expenditure, infrastructure expenditure, defense expenditure, and agriculture expenditure. Accordingly we have growth model that utilized to examine the relationship between growth and public expenditure both in short and long-run. The unit root test, co-integration test and the associated Error Correction Mechanism of (Johanson 1988) approach is used to study the long-run and short-run relationships between the two macro-economic variables. In this study the VAR model was used for estimation after undergoing time-series property tests.

This chapter has three main sections. The first section focuses on model specification and data characteristics. The second section discusses time series issues that are related to unit root problems. The last section deals with co-integration and error correction tests of Johanson.

3.2 Method of data Analysis

Both descriptive and econometric methods of data analysis are used. With regard to the former, the study has applied descriptive statistics such as tables and different types of graphs. The econometric part is analyzed using E-view version 9 statistical software packages.

3.2.1 Time series and Unit Root Tests

In time series model, Testing for the existence of unit roots is precondition for the study to investigate whether the variables are stationary or not. To avoid the generation of spurious (nonsense) regression results, Standard econometric tests like co-integration test and stationarity (unit root) test is conducted. OTexts (2017)

One way to determine more objectively if differencing is required is to use a *unit root test*. These are statistical hypothesis tests of stationarity that are designed for determining whether differencing is required. A number of unit root tests are available, and they are based on different assumptions and may lead to conflicting answers.

3.2.1.1 Augmented Dickey-Fuller (ADF) test

The null-hypothesis for an ADF test is that the data are non-stationary. So large p-values are indicative of non-stationarity, and small p-values suggest stationarity. Using the usual 5% threshold, differencing is required if the p-value is greater than 0.05. OTexts (2017)

Another popular unit root test is the *Kwiatkowski-Phillips-Schmidt-Shin (KPSS) test*. This reverses the hypotheses, so the null-hypothesis is that the data are stationary. In this case, small p-values (e.g., less than 0.05) suggest that differencing is required. OTexts (2017)

Establishing the order of integration between sectoral expenditure and economic growth (GDP) is the first step that enables us to determine the next step of estimation. If all the variables under the study are found to be stationary, then the application of regression is possible. However most macro time series data have not been stationary over time, so, the alternative is to difference the variables till they become stationary and run regression on their differences (Bo Sjö 2008).

A commonly applied formal test for existence of a unit root in the data is the Dickey-Fuller (DF) test its simple extension being the Augmented Dickey Fuller (ADF) test. The augmentation is adding lagged values (p) of first differences of the dependent variable as additional regressors which are required to account for possible occurrence of autocorrelation. In this study the Augmented Dickey fuller test is applied which involves estimating the following regressions.

$$\begin{aligned}
 & P \\
 Y_t = & Y_{t-1} + \sum_{i=2}^p \alpha_i \Delta Y_{t-i} + \epsilon_t \dots \dots \dots [1] \\
 & i=2
 \end{aligned}$$

$$Y_t = a_0 + Y_{t-1} + \sum_{i=2}^p \beta_i Y_{t-i} + \epsilon_t \dots \dots \dots [1-1]$$

$$Y_t = a_0 + Y_{t-1} + \sum_{i=2}^p \beta_i Y_{t-i} + a_2 t + \dots \dots \dots [1-2]$$

Testing for unit roots using equation [1] assumes that the underlying data generating process has no intercept term and time trend. To account for the existence of an intercept term, equation [1-1] is used. Equation [1-2] suggests using intercept and deterministic term to test for the unit root. In all of the above three equations, if $\beta = 0$, then Y_t series contains a unit root. After estimating the equations, the appropriate critical values to be used to test for the presence of a unit root is provided by Dickey Fuller in which the critical values are different for three regressions. After estimating the equations using OLS, the resulting tstatistics is compared with the respective critical values given in Ducky Fuller tables.(Bo Sjö 2008).

However, MacKinnon (1991) has implemented a much larger set of simulations than those tabulated by Dickey and Fuller. In addition, MacKinnon estimates the response surface using the simulation results, permitting the calculation of Dickey-Fuller critical values for any sample size and for any number of right-hand variables.

3.2.2 Co-integration Test

One possible means of avoiding spurious regression is the application of co integration techniques which allow the estimation of non spurious regressions with non-stationary data. The economic interpretation of co integration is that if two (or more) series are linked to form an equilibrium relationship spanning the long-run, then even though the series themselves may contain stochastic trends (i.e., non-stationary) they will nevertheless move closely together overtime and the difference between them will be stable (i.e. stationary) (Enders,1995). Therefore, it is important to

view co integration as a technique to estimate the equilibrium or long-run parameters in a relationship with unit root variables.

In order to determine whether or not a long-run equilibrium relationship exists among the unit root variables in a given model, we need to test empirically that the series in the model are co integrated. So far there are two major procedures to test for the existence of co integration, namely, the Engle-Granger two step procedures and the Johanson Maximum Likelihood Estimation procedure. In the Engle-Granger two-step procedure, variables entering the co integrating vector are tested for integration of the same order; in fact order of one-I(1). The first step is to estimate the long-run static model of the I(1) variables and obtain residual. If this residual, which is the linear combination of the variables or the disequilibrium, is stationary, then the variables are said to be co integrated and the second step uses these generated errors for estimation. Teshome,(2006). Techniques of estimating co-integration test are discussed below.

3.2.2.1 Johanson (1988) Maximum Likelihood Estimation procedure

This procedure avoids the use of two step Engle-Granger procedure and can estimate and test for the presence of multiple co integrating vectors. Johanson procedure also allows testing restricted versions of co integrating vector(s) and speed of adjustment parameters for the purpose of testing a theory by drawing statistical inferences concerning the magnitudes of the estimated coefficients. In this procedure, the existence of co-integration relationship is tested using vector error correction mechanism (VECM) and arbitrary selection of endogenous and exogenous variables is avoided. Owing to its apparent superiority to that of the EngleGranger methodology, in this study the Johanson Maximum Likelihood Procedure is applied for empirical analysis.

3.2.2.2 Vector Error Correction Model (VECM)

A vector error correction model (VECM) has information about the short run and long run adjustment to change in RGDP via the estimated parameters of our independent variable. It is a modeling technique which adds error correction features to a multi-factor model such as a vector auto regression model. And it is a restricted VAR designed for use with non-stationary series that are known to be co-integrated. Bazezew(2015).

The VEC has co-integration relations built into the specification so that it restricts the long-run behavior of the endogenous variables to converge to their co-integrating relationships while allowing for short-run adjustment dynamics. The co-integration term is known as the error correction term since the deviation from long run equilibrium is corrected gradually through a series of partial short-run adjustments. When the variables are co-integrated, the corresponding error correction representations must be included in the system. By doing so, one can avoid misspecification and omission of the important constraints. Thus, the VAR can be re-parameterized as a Vector Error Correction Model (VECM) form (Hamilton, 1994).

Vector Error Correction Model is estimated based on the Johansson test of co-integration results and using a predetermined optimal lag order of one (1). That is chosen by the appropriate information criterion results. Accordingly, the VECM has two parts: the long run and short run dynamics with co-integrating and short run coefficients that are used for further analysis including the speed of adjustment (ECT_{t-1}). The coefficient of the error term (ECT_{t-1}) is used to measure the speed of adjustment towards the long run equilibrium. And (ECT_{t-1}) is considered to be good if the range is between 0 and 1. (ECT_{t-1}) should be negative and significant number and if positive and insignificant value means explosive and not reasonable. For example, if the (ECT_{t-1}) estimated coefficient is -0.87 then, the estimated coefficient indicates that about 87 per cent of this disequilibrium is corrected within one year if the series is annually data. But if the (ECT_{t-1}) are -1.07 as an example then, the estimated coefficient implies that about 107 per cent of this disequilibrium is corrected between one year and this does not make sense. (<http://stats.stackexchange.com>).

This model is employed to identify the impact of public spending in Economic growth of Ethiopia. Some macro level factors are incorporated in the econometric model. Both the dependent and independent variables are hypothesized as important drivers of expected result and they can be put in equation form as:

$$\text{LogRGDP}_t = \alpha_0 + \alpha_1 \text{LogAGR}_t + \alpha_2 \text{LogDE}_t + \alpha_3 \text{LogHT}_t + \text{LogINF}_t + \epsilon_t$$

Where ϵ_t is the stochastic term, α 's are the model parameters and the subscript t stands for time.

Following Johansen (1988) and Johansen and Juselius (1990), assuming the variables mentioned above are endogenous and using matrix notation denoted by vector Z_t , the vector autoregressive

model(VAR) of order p can be written as

$$Z_t = A_1 Z_{t-1} + \dots + A_p Z_{t-p} + U_t \dots \dots \dots 1$$

It can be reformulated in a vector error correction model (VECM) as follows

$$DZ_t = \Gamma_1 DZ_{t-1} + \Gamma_2 DZ_{t-2} + \dots + \Gamma_{p-1} DZ_{t-p+1} + \alpha Z_{t-1} + U_t \dots \dots \dots 2$$

Where $\Gamma_i = (I - A_1 - A_2 - \dots - A_p)$ ($i = 1, 2, \dots, p-1$) and $\alpha = -(I - A_1 - A_2 - \dots - A_k)$

from which the speed of adjustment to equilibrium coefficients and the long run coefficient matrix or the co-integrating vector will be identified. In the empirical estimation, Equation (2) can be augmented to include the deterministic term (time trend and/or intercept) and the appropriate lag length will be selected using Akaike Information Criteria(AIC),Schwarz Criterion (SC) and others.

When we become specific and taking our variable of interest in mind, all the variables in the above VAR model, except variables which are integrated of order zero or I(0), are found to be I(1). Hence, the appropriate modeling approach to identify the long run and short run relationship is vector error correction model (VECM). The variable under this paper are found I(1).

3.2.3 Diagnostic test

I. Heteroskedasticity Tests

The MODEL procedure now provides two tests for heteroskedasticity of the errors: White's test and the modified Breusch-Pagan test. Both White's test and the Breusch-Pagan are based on the residuals of the fitted model. For systems of equations, these tests are computed separately for the residuals of each equation. The residuals of estimation are used to investigate the heteroskedasticity of the true disturbances. Andrews (1991)

Testing heteroskedasticity of the errors is a major challenge in high dimensional regressions where the number of covariates is large compared to the sample size. Traditional procedures such as the White and the Breusch-Pagan tests typically suffer from low sizes and powers. Zhaoyuan and Jianfeng(2016).

II. Serial Correlation Test

Serial Correlation is a correlation among members of the series of error terms ordered in time.

It is mainly caused by incorrect functional forms, auto regressions, manipulation of data, data conversion and non-stationarity of the data (Wooldridge 2009).

The problem of serial correlation can be detected using the graphical method, Geary test, Durbin-Watson d test and Breusch-Godfrey (BG) test. In this study, the BG test that is based on the Lagrange Multiplier principle is chosen since other tests have drawbacks that made the BG test to be chosen. Though the graphical method is powerful and suggestive, its detection power is more of a qualitative nature than others making it less preferred. The drawback of the Geary test is that it has no assumptions about the probability distribution from which the observations are drawn. Due to these reasons the Breusch-Godfrey (BG) test of serial correlation is the best option at hand. Jim (2012).

III. Normality test

In the literature, there are several tests for normality such as histogram of residuals normal probability plot (NPP), Anderson-Darling and Jarque-Bera tests. The Jarque-Bera test for normality is employed in this research.

3.3 Data type and source of data

The study use annual time series secondary data covering the period from 1975 to 2016 and collected from different sources. All the data in this research are obtained from published and unpublished sources of the ministry of finance and economic development office (MoFED) and the National Bank of Ethiopia (NBE).

The figures in the data are given in millions of birr (the currency of Ethiopia). The real GDP is obtained by taking the ratio of the nominal GDP to the GDP deflator so that GDP is used in real terms.

3.4 Model Specification

Model specification is a mathematical expression showing the interrelationship between the economic relationship existing between economic variables (dependent and independent). Ebere and Kemsola (2012)

The model is five-variable model and stated covers the Gross Domestic Product (GDP) at constant prices as the dependent variable to capture economic growth while public expenditure on agriculture, health, infrastructure and defense were the independent variables. Taking inference from “Augmented Solow growth model”, Solow (1956) postulated that economic growth resultant from the accumulation of physical capital and an expansion of the labor force in conjunction with an “exogenous” factor, technological progress that make physical capital and labor more productive.

The model developed by Solow states that, at any time the economy has some amount of capital, labor and Knowledge or technological progress which makes physical capital and labor more productive and this are combined to produce output. Estimation of how certain components of Public spending affects economic growth was performed with a macroeconomic model which based on the augmented form of Cobb Douglas Production Function(1):Yousra and Louaj (2014).

But the new theory, called endogenous growth theory, integrates two fundamental hypotheses, namely that privet capital productivity should not be decreasing and the externality concept.Romer (1986) assimilates to capital the stock of knowledge created by a learning- by-doing process, in the spirit of Havelmo(1956) and Arrow (1962).This article was promoted by the architect of the neoclassical economy, Lucas in 1988, who proposed his own endogenous growth model with human capital as the engine of perpetual growth. Hence the model can be modified by including human capital in one aggregate function, such that

$$Y_t = A_t K_t^\alpha H_t^\beta (L_t)^{1-\alpha-\beta} U_t \dots\dots\dots 1$$

The log model of the above equation is,

$$\text{Log}Y_t = \alpha \text{Log}K_t + \beta \text{Log}H_t + (1-\alpha-\beta)\text{Log}(A_t L_t) \dots\dots\dots 2$$

Based on the above equation we can re write the model as:

$$\text{GDP} = f(K, L, H, A) \dots\dots\dots 3$$

For the purpose of investigating the relationship between public expenditure and economic growth in Ethiopia, this research work is based on the modified Augmented Solow model by Neo Classical endogenous growth model which extends the basic production function framework to allow

human capital as additional input to enter the production function and that output of the economy (Y) determined by Human Capital and other variables.

This paper needs to investigate the relationship between government expenditure components (agriculture, health, infrastructure and defense) and economic growth.

In order to study such a positive and negative impacts of public spending on economic growth and the long run relationship between them, thus this study will use Co-integration and Vector error correction model based on Keynesian and Endogenous growth model theoretical framework. This is because Keynesian model states that expansion of government expenditure accelerates economic growth in which the growth model is a function of public expenditure. Wondwosen (2012).

The log form of this model allows including any relevant variable which affects economic growth. Bazezew (2014)

In this study the researcher specified an Augmented Solow Growth Model where the production function of the economy is given by:

$$Y_t = A_t f(L_t, K_t, G_t, X_t) \dots\dots\dots 4$$

In the model, the level of output (Y) is assumed to be a function of two factors of production, capital (K) and labor (L) and components of government expenditure (G). A represents level of technology; t represents time dimension and X_t represents a vector including other factors affecting economic growth.

3.5 Estimation Procedure

In order to estimate the growth effect of the composition of government expenditure and take care the inter sectoral productivity equation (4) will Modified by disaggregating government expenditure into expenditure on Infrastructural, Agriculture, Health and Defence

Thus, the growth model is specified as below:

$$R_{gdp} = f(A_g, H_t, De, Inf, \dots) \dots\dots\dots (5)$$

Where: R_{gdp}Real Gross Domestic Product

Ag.....Expenditure on Agriculture

Ht.....Expenditure on Health

De..... ..Expenditure on Defense

Inf.....Expenditure on Infrastructure

The above equation is converted into linear form and the result is indicated below:

$$Rgdp = \beta_0 + \beta_1 Ag + \beta_3 Ht + \beta_4 Inf + \beta_5 De + \epsilon_i \dots\dots\dots (6)$$

The equation above is transformed into to log model and it becomes;

$$\log RGDP = \beta_0 + \beta_1 \log Agr + \beta_3 \log Ht + \beta_4 \log Inf + \beta_5 \log De + \epsilon_i \dots\dots\dots (7)$$

Where: log stands for natural logarithm

's - coefficients of the explanatory variables

4: RESULTS AND DISCUSSION

4.1 Descriptive Statistics

In this study annual time series data covering the period from 1975 to 2016 is used. The variables under consideration are gross domestic product and total government expenditure on defense, health, Infrastructure and agriculture. Real Gross Domestic Product (RGDP) is a dependent variable, whereas, the other variables are determinant factors of RGDP.

Table 4.1: Descriptive Statistics of the Economic Variables (1975-2016, in millions of ETB)

	RGDP	DE	HT	AGR	INF
Mean	249689.5	2525.581	1934.600	3208.455	8051.814
Median	164543.3	1650.200	456.0640	682.7385	1528.516
Maximum	808488.9	8020.000	13641.89	17693.08	52855.20
Minimum	102406.6	184.9000	46.32100	92.01000	118.5700
Std. Dev.	192056.2	2297.400	3351.398	4880.392	14735.87
Skewness	1.572448	1.141869	2.085302	1.759752	2.067693
Kurtosis	4.373785	3.158120	6.389117	4.944467	5.913651

Source: Author's own calculation using Eviews 9

The above table indicates the description of variables in the estimation. All they expressed in million Ethiopia Birr. From the table we can see that the average RGDP is 249689.5 million Ethiopia birr and varies from 102406.6 to 808488.9 million Ethiopia birr with a standard deviation of 192056.2 million ETB. To the same case, the average Defense expenditure is 2525.581 million ETB and goes from 184.9000 to 8020.0000 million ETB. Health expenditure of the country with the mean of 1934.600 Million ETB also varies from 46.3210 to 13641.89 in 2015/16. Finally the mean expenditure of agriculture and infrastructure is 3208.455 and 8051.814 respectively and their minimum and maximum expenditure which goes from 92.01000 to 17693.08 and from 118.5700 to 52855.20 respectively. Here the higher maximum expenditure of the nation is going to the main sectors that of Infrastructure health and agriculture due to the assumption that their contribution to the growth becomes high with a minimum share of total expenditure to defense.

4.2 Results for unit root test

As mentioned in the previous chapter, in studying economic relationships one of the problems faced is spurious regression. This problem can be solved by checking if the variables are co-integrated so that a long-run relationship exists between them. In co-integration analysis, the first step is to study the order of integration that is determined by unit root tests. In this paper two unit root tests are applied and their results are discussed below

Table 4.2:Dickey Fuller Unit root test results at level and First difference

LogRG DP	DF statistics with trend		Critical Value	DF statistics without trend		Critical Value	Conclusion
	At Level	At 1 st difference		At Level	At 1 st difference		
LogRG DP	-0.8653 47	-6.73977	1%=- 3.77090	-0.2482 09	-1.71822 2	1%=- 2.622585	Non Stationary
LogDE	-2.9511 21	-4.11569 2	5%=- 3.190000	-2.4833 19	-1.71822 2	5%=- 1.949097	Non Stationary
LogHE	-3.3083 87	-6.13628 9	10%=- 2.890	-0.4385 37	-3.55606	10%=- 1.611824	Non Stationary
LogAgr	-3.5692 69	-7.09719 3		-1.1240 05	-6.20299 3		Non Stationary
LogInt	-2.8705 32	-6.2578		-0.1266 06	-6.90798		Non Stationary

Source:Owen calculation using Eviews

Table 4.3: Agumented Dicky Fuller Test result

Variable	ADF statistics	Critical Value	Order of integration
DlogRGDP	-6.672686		Stationary at 1 st Difference
DlogDE	-4.223579	1%=-4.211868	Stationary at 1 st Difference
DlogHt	-6.034579	5%=-3.529758	Stationary at 1 st Difference
DlogInf	-6.311857	10%=-3.196411	Stationary at 1 st Difference
DlogAgr	-7.195438		Stationary at 1 st Difference

Source: Own calculation using Eviews 9

We have carried out unit root test for each variable using Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) test for unit-root null versus a stationary alternative. The DF test result revealed that all variables are not stationary at level and at first difference or they have unit root problem. Our ADF result indicate that all the variables are stationery at I(1).

In the unit root test the fact that all the variables appear to be I(1) indicating that they are possible candidates helping to explain the (stochastic) trend in a given endogenous variable. This mean that the long run co integration equations will only consist of variables which are I(1).Abebe and Jemal(2013).

4.3 Diagnostic test of the model

From our Appendix II we can observe that the adjusted R-squired has approximately a value of 0.41 which implies that the variations in Real Gross Domestic Product (RGDP) are well explained by changes in the share of public spending on infrastructure, agriculture and defense, it is good and we are happy for the model and our F statistics which measure the fitness of the model is significant even at 1percent.

Correlation Test

This model does not have a serial correlation problem because the value of p=12% which is greater than 5%.

Table 4.3.1: Correlation Test: Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.052085	Prob. F(12,15)	0.4556
Obs*R-squared	16.34146	Prob. Chi-Square(12)	0.1212

Hetroskedasticity

Here the observed r-squared P value is 47.80% meaning that this model does not have hetroskedasticity problem it is homoskedasticity.

Table 4.3.2: Heteroskedasticity test

F-statistic	0.921089	Prob. F(15,23)	0.5553
Obs*R-squared	14.63582	Prob. Chi-Square(15)	0.478
Scaled explained SS	8.928946	Prob. Chi-Square(15)	0.8812

Normality Test

Our P value here is 0.53 which is greater than 5%, meaning that residual of this model is normality distributed which is desirable.

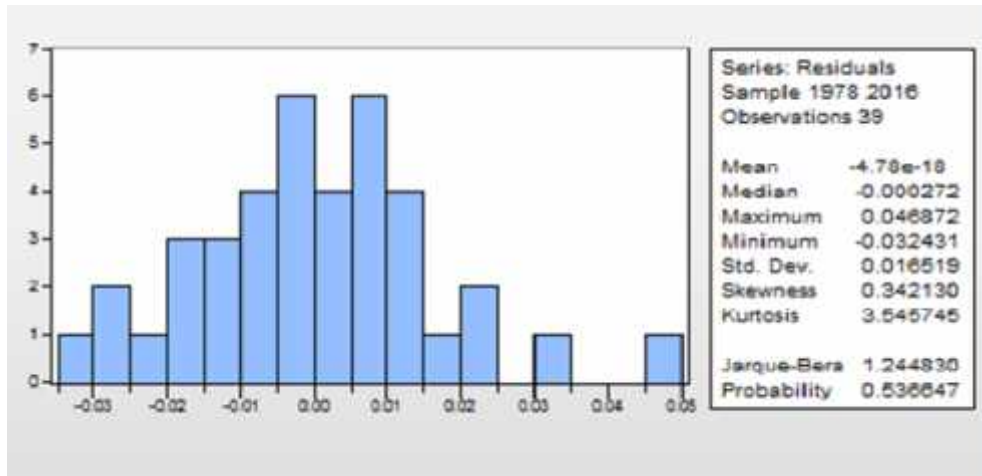


Figure 4.1: Normality Test

Stability of the Model : Our model is stable

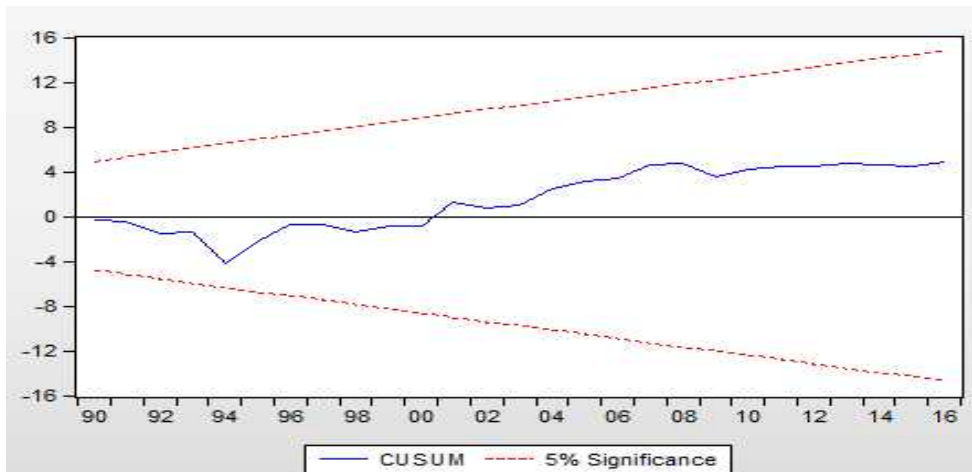


Figure 4.2: Stability of the Model

4.4 Co-integration analysis

To modify the long run model estimation, we will apply the co-integration tests developed by Johansen (1988) to investigate whether there is co-integration relationship. The co-integration tests include GDP (LRGDP), health expenditure (LHt), agriculture expenditure (LAgr), defense expenditure (LDe) and infrastructure expenditure (LInf) over the period 1975-2016. Accordingly, Johansen co-integration test is applied at the predetermined automatic lag order selection of one. In these tests, the trace statistic is compared to 5% critical values. The trace test statistic precedes sequentially from the first hypothesis no co-integration to an increasing number of co-integrating vectors. The results of co-integration tests for model variables are reported in Table 4.4.1. The trace test statistic indicates that one co-integrating vector exists in the system at the conventional 5 percent significance level and using p-values<5%. The short run and long run specification of our VECM that considers the existence of I(1) of all variables can be estimated based on the Johansson test of co-integration results as follows:

Table 4.4.1: Co-integration test result

Haypotesized No.of CE(s)	Eigen value	Trace Statistics	0.05 Critical Value	Prob**
None	0.675348	102.8098	95.75366	0.0150
At most 1	0.402451	57.80977	69.81889	0.3087
At most 2	0.331502	37.21301	47.85613	0.3376
At most 3	0.259824	21.10411	29.79707	0.3512
At most 4	0.172099	9.069411	15.49471	0.3590
At most 5	0.037116	15.14963	3.841466	0.2184

Trace test indicates one co-integrating eqn(s) at the 0.5 level.

**MacKinnon-Haug-Michelis (1999) p-values

Table 4.4.1, tells us about the result what we get from Johansen Co-integration test. Here we have the null hypothesis there is no co integration among the four variables. We have the guide line that when the p value is less than 5% we reject the null. But when the p values greater than the 5% we can't reject the null hypothesis. Here we have at least one co-integration, this is because

our p value is less than 5% level that is 1%. This means that, There is co-integration among the four variables or this four variables have long run association meaning that in the long run they move together. Here the trace statistics indicates one co-integration equation then we can use VECM.

4.5 Long run Analysis

From the co-integration test results presented in table 4.4.1 above one co-integrating relationships were obtained using Johansen test of co-integration. However, the main objective of this study is to examine the impact of government expenditure on infrastructure, health, agriculture and defense on economic growth. The equation is solved through Johansen test was used to confirm the appropriateness of the selected equation. To investigate the long-run effects in this model, we presented the estimated normalized co-integration coefficient vectors in Table 4.4.2.

Table 4.4.2: Long Run Estimation of the model

Variable	LogInf	LogHt	LogDe	LogAgr	Constant
Coefficient	0.852978	-0.86123	0.512089	-1.26885	-10.7996
T-stat	(1.85887)	(-1.97379)	(3.34529)	(-3.77667)	

Source: Owen computation using Eview, 9:

Note: values in parenthesis are t-stat

With the evidence from the co-integration test, it can be interpreted that economic growth in Ethiopia significantly depends on public expenditure on defense in the long run. But, the relationship between economic growth and public spending on health has a negative and insignificant impact and its relationship with agricultural spending is negative and significant. The results show that in the long-run, spending on infrastructure has a positive and insignificant impact on economic growth. This sectoral expenditure on infrastructure could not be significant this is because the lack of complementary policies, political instability, rent seeking problem by officials, having unmotivated civil servants, and poorly administered huge projects results in unproductive and poor performance of the sector contribution to the growth. This result is similar with previous studies such as Teshome (2006), Tewedaj et al(2007), Loto (2011) and Mulugeta (2012). But it is against Bayew (2015) and Jhon (2012). However, expenditure on defense has a positive and statistically significant impact on economic growth. This may be due to the fact that

our country is in the way to decline and substituting importing of defense and manufacturing equipments by producing such equipment domestically through Metals Engineering Corporation (METEC), to build technological capabilities of the country's defense force through identifying existing and potential needs based on research and development. This is an umbrella organization for multiple industries and factories, and become a leading and an emerging corporation registering remediable growth in the area of manufacturing and industrial production, hence the contribution of this company directly improve the foreign currency accumulation of the country, indirectly it has a positive impact on economic growth or it promote growth by increasing the current account balance. This result conform the Keynesians 'theoretical model which states that the rise in government spending acknowledges the possibility of positive effect on growth. This result is similar with the result found by (Ando 2009) who concludes based on the Feder model for 109 countries including 30 OECD countries that defense expenditure has a positive impact on the rate of economic growth in all 109 countries. On the other hand this result is in contradiction with previous findings of negative or insignificant effects of defense expenditure on economic growth like Bazezew (2014). Thus, government investment on defense sector in Ethiopia helps promote economic growth in the long-run.

The other factor that affects GDP in Ethiopia is expenditure on agriculture. It has a negative long run impact, a result similar to Teshome,(2006),Wondwesen(2012),Jhon(2012) and Bazezew(2014). The significant and negative long-run effect of agriculture is especially expected. From the perspective of economic theory and policy and strategy of the Ethiopian government, the share of agriculture to GDP in the long run should decline and hence investment on agriculture also should be decreased and probably transformed in to industrial economy. The government of Ethiopia put a strategy that agriculture leads the economy in the short run by creating favorable conditions for industry to play a key role and leading the economy in the long run. The above result can be shown in equation form as below:

$$\text{Log(RGDP)} = -10.7997 + 0.853 \text{Log(Inf)} - 0.861 \text{Log(Ht)} + 0.512 \text{Log(De)} - 1.289 \text{Log(Agr)} + U \dots \dots \dots 9$$

This equation is the long-run equation for economic growth which is explained by logarithm of real gross domestic product, total public expenditure on, health, agriculture, defense, and infrastructure and finally the error term U_t that the long-run analysis is based on. From the above long run equation economic growth with respect to government expenditure changes is highly elastic with a 1 percent change in public expenditure on Defense sector leading to an increase in

economic growth by 0.51 percent. The argument of endogenous growth theories of additional effects of human capital over the static effect on the level of output that explains sustainable economic growth. But, the relationship between economic growth and government expenditure on health found to be negative and agriculture was also found to be negative. That is a 1 percent increase in government expenditure on health, and agriculture leading to a decline in economic growth by 0.86, and 1.27 percent in the long run respectively. Though, the coefficient of public expenditure on health is insignificant.

Table 4.4.3: Short run Estimation of the VECM model

D(LogRGDP)						
Variables	D(LogRGDP) _t 1	D(LogInf) _t 1	D(LogHt) _t 1	D(LogDe) _t 1	D(LogAgr) _t 1	ECT(t-1)
Coefficients	-0.089	0.035*	-0.014294	0.026*	-0.0438*	-0.047*
P-values	(0.6249)	(0.042)	(0.4743)	(0.0495)	(0.0142)	(0.0001)

Source: Owen composition using Eview 9 Note: number of parenthesis are P-values:|*indicates significance at 5% level.

The model estimates that the short run dynamics which is mainly driven by lagged real GDP, total government expenditure on infrastructure, health, agriculture and defense sectors. The short run coefficient of individual variables should be examined to determine the relative contribution of each component of government expenditure to economic growth in Ethiopia. As shown in table 4.4.3 the co-efficient of the first lagged value of real gross domestic product was negative and insignificant. This indicates, in the short run, real gross domestic product in the current period is not sensitive to what it was in the previous period. Similarly, the coefficient of first lagged value of expenditure on health was observed to be negative and insignificant.

As to defense spending, the coefficient is statistically significant and positive implying that one percent increase in defense spending leading to increase in economic growth by 0.026 percent in the short run. This may be due to the fact that when the nation going to be secured, it may build confidence on both privet and foreign investors in which they may contribute to the GDP of the nation and it also avoid fear of instability and further damage of nation's property. This directly improves the economic growth or it helps growth by strengthening the current account balance.

The growth contribution of agriculture expenditure for overall economic growth in the short run is found to be significantly negative. The primary reason for these contrary responses pushes us to look in to the components of agriculture spending. Salary for the development agents and recurrent expenditure in the sector are very dominant. In such circumstance the spending on the sector may not help the growth of the economy. Top-down approach, bureaucratic resistance to attitude change, a general lack of respect for traditional methods and knowledge, and inadequate understanding of genuine participatory extension planning and the failure to appreciate farmers' knowledge, perceptions and priorities; Blanket recommendation of technology packages (fertilizer, seed, etc.) irrespective of the differences in agro-ecologies and heterogeneous physical and socio-economic features; Lack of economic rationale (marginal productivity, cost-benefit and value for money) and inadequate consideration of local context, risk and farmers knowledge; Supply-driven 'transfer-of-technology' paradigm; Weak research-extension linkage in technology generation, verification through on-farm testing and selection of technologies adaptable to different farm systems; Inadequate decentralization of extension planning to *wereda* (district) level in order to ensure the active involvement of development agents; Negative attitudes of farmers towards development agents involvement in non-extension activities such as credit collection and input distribution; Extension workers' lack of practical experience and limited knowledge of holistic approaches that consider the farm as a system that integrates the socio-economic and physical environment and influences households' production and marketing decision-making; Lack of adequate farmer participation in identification and priority-setting of agricultural production problems to ensure extension planning is based on the farmers' problem priorities; Limited role and participation of the private sector in input supply, distribution and retailing, as well as output marketing, hindering smallholder commercialization to some extent; and Lack of appropriate monitoring and evaluation system, with failure to monitor and carry out timely reviews of implementation progress to take corrective measures, as well as evaluation of lessons learned to use in future project design.

Not only that the long run effects of the sector turn to be significantly negative. Which tells the huge spending on agriculture sector doesn't have an encouraging impact for the growth of the economy. Therefore, the government should encourage further investigation towards looking at the real impacts of each spending on the economic growth.

The co-efficient of the first lagged values of expenditure on infrastructure has a significant effect on economic growth in the short run.

The coefficient of the error correction term (ECT_{t-1}) for the economic growth equation is significant and negative that is correctly signed and indicating the existence of long-run relationship amongst the growth model variables. This guarantees that although economic growth may temporarily deviate from its long run equilibrium value, it would gradually reach to its equilibrium after a shock. This implies that in the event of a deviation between actual and long-run equilibrium level, there would be an adjustment back to the long-run relationship in subsequent periods to eliminate this discrepancy. The coefficient of the error term and/or the speed of adjustment towards equilibrium value is (-0.047) which implies that there is relatively low speed of adjustment towards long-run equilibrium. This indicates that whenever there was a disturbance and/or a shock in the system, 4.7 percent of the deviation or the discrepancy of the actual economic growth from its equilibrium value is eliminated within a year and/or if there is a one percent disequilibrium or shock in the preceding period, the impact of a shock to change in real GDP is corrected by 4.7 percent per annum.

In conclusion, short-run changes in infrastructure have a strong and significant impact on the change of the growth rate as it has not significant in the long-run. The other important economic interpretation in the error correction model is the coefficient of the lagged error correction term (ECT_{t-1}), it reveals that in a case of shock and disequilibrium, the model converges to its equilibrium position in the long-run. From the estimation result, it is revealed that 4.7% of the disequilibrium is adjusted in each year.

5: CONCLUSION AND RECOMMENDATION

5.1 Conclusion

Using a time series data from the year 1975 to 2016 we investigated the growth impact of government sectoral spending on health, agriculture, defense and infrastructure on economic growth in Ethiopia. Before estimating the model, first the series was tested for stationary, and co-integration. After indicating the presence of the long-run relationship using Johansen co-integration approach, the short run dynamics of the long run economic growth is examined by estimating an error correction model. The objective of this paper is to investigate the impacts of specific government sectoral spending on health, defense, infrastructure and agriculture on economic growth. And, hence the growth model is a function of government expenditure. We find that in the short-run the main determinant of economic growth is only spending on agriculture during the study period. The co-integration analysis, on the other hand, indicated that the main driving forces behind long-run growth are spending on agriculture and defense, while spending on health become insignificant both in the short and long run

Total government expenditure on human capital has not a significant effect on the economy of the country both in the short-run and long-run. This is because inefficiencies of the sector, slow adoption of technology, corruption and embezzlements, brain drain and a larger population of elderly, greater demand for public health care and thus, higher government health expenditure. This is because elderly people often require costly medical treatment due to chronic illness, so the higher health expenditure may improve life expectancy without accompany by improvement in health status and human capital formation considering the elderly population who are not part of active workforce. Investment in to health does not necessarily promote productivity because, the government may not be giving attention to improve the efficient and quality of services from the health sector rather increasing its expenditure .So, increase health expenditure alone is insufficient to produce good health outcome which promote growth. This result is consistent with works of John (2012) and against Loto(2011), Abu and Abdulahi (2010), Teshome (2006).

On the other hand expenditure on infrastructures (road construction, Telecommunication, mega projects etc) have a positive impact on economic growth both in long-run and short-run periods but it is insignificant in the long run this is because based on the objective set by the government

in our GTP II which have a target to increase the expenditure of pro poor sectors of the economy such as,health and infrastructure and having attention from the government to expend the sector growth, there is an increment to the expenditure on such sector. But due to several reasons, this sectoral expenditure on infrastructure is positive and insignificant this is because the lack of complementary policies, political instability, rent seeking problem by officials, having unmotivated civil servants, and poorly administered huge projects results in unproductive and poor performance of the sector contribution to the growth. This result inconsistent with works of Teshome(2006),Tewedaj et al(2007),Loto (2011)and Mulugeta(2012).

Similar with findings from John(2012),Loto(2011) and Tewedaj et al(2007), this paper revealed that agricultural expenditure of the nation have a negative contribution to the GDP and it is significant both in the short-run and long run period of the economy. The reason behind here is that, the long run expectation of Ethiopia to be industrial country, share of agriculture to GDP in the long run should decline and hence investment on agriculture also should be decreased and probably transformed in to industrial economy; weakness in the global economy and the decline in commodity price for coffe,gold,oilseeds and pulses will affect export earning negatively; Salary for the development agents and recurrent expenditure in the sector are very dominant; Blanket recommendation of technology packages; Weak research-extension linkage in technology generation,; Inadequate decentralization of extension planning ;Negative attitudes of farmers towards development agents involvement in non-extension activities; Extension workers' lack of practical experience and Lack of appropriate monitoring and evaluation system; Limited role and participation of the private sector in input supply etc are the probable cause for negative association given the effort and the investment done.

The defense expenditure has a positive and significant effect both in the long run and in the short run. This means that, the highest defense expenditure may promote economic growth. In line with Peace and security, when the countries become well secured, it may build confidence on both internal and external investors and they contribute to the GDP of the nation. And it also creates a good and secured image of the nation and avoids fear of instability and further damage of nation's property. Due to the fact that our country is in the way to decline and substituting importing of defense and manufacturing equipments domestically producing by Metals Engineering Corporation (METEC), and the contribution of this company directly improve the foreign currency

accumulation of the country, indirectly it has a positive impact on economic growth or it promote growth by increasing the current account balance. man power mobilization of soldiers in which they are going to support the agriculture sector in chronic events in order to build stable economy. This result is similar with Ando (2009) and against with Endale et,al(2007) and Bazezew (2014).

The absolute value of e_{t-1} (-0.047) decides how quickly the equilibrium is restored to the long run equilibrium. It means if there is a 1% disequilibrium shock in the preceding period, the impact of a shock to change in RGDP corrected by 4.7%.

6.2 Recommendations

Based on the findings of this research, the following are recommended:

- Since spending on infrastructure sector contributes to the economy growth significantly and positively, the government has to expand its spending to achieve faster growth. But having political instability, rent seeking, unmotivated civil servant and poorly administered huge projects are reasons which make spending on infrastructure become insignificant in the long run. So, the government should remove the above bureaucratic bottle necks and motivate qualified civil servants.
- Since health spending is mach more and it can't promote growth, because of inefficiencies of health institution, slow adoption of technology, corruption and embezzlements and brain drain, the government should ensure a supportive and efficient of socioeconomic structure for efficient utilization of resources, build good governance, stop the outflow of skilled manpower and controlthe final destination of the birr that it spends on health sector.
- Spending on agriculture have a significant negative impact on the economy due to its vulnerability to adverse weather fluctuation, weakness in global economy and the decline in export commodity price which affect export earnings. The government should sustained investment in agriculture to diversify and grow export base will mitigate this down side risks.
- Finallyspending on defense promotes growth significantly and positively, thus it is recommended that increase its expenditure can faster the growth of the economy.

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APPENDIX

Appendix I: RGDP and Sectoral Expenditure of Ethiopia in Million(ETB)

Year	RGDP	De	Agr	Inf	Ht
1975	102406.58	184.9	94.493	118.57	46.321
1976	103100.21	315.59	92.01	166.315	54.618
1977	104154.65	383.15	135.145	183.559	66.19
1978	103566.84	703.4	174.245	167.503	70.374
1979	108532.64	627.56	195.327	167.443	71.606
1980	113795.19	695.7	144.097	256.361	74.491
1981	115224.11	727.1	138.294	285.582	96.64
1982	115110.58	835.6	208.608	325.463	109.483
1983	126706.99	1062.3	550.947	442.365	105.234
1984	118729.14	939.12	244.443	409.11	110.554
1985	107221.24	926.37	351.021	508.909	121.735
1986	117837.33	929.36	471.332	648.56	125.664
1987	134380.24	1011.1	415.549	604.529	147.236
1988	134308.81	1340	433.395	534.039	154.635
1989	134767.01	1654.4	449.268	826.515	169.612
1990	140247.62	1841.1	468.416	474.583	174.416
1991	135164.66	1646	371.082	457.47	160.483
1992	130176.98	634	380.34	360.249	188.89
1993	145798.55	680.77	517.071	633.495	255.79
1994	148275.62	662.982	623.435	1240.588	349.288
1995	156247.2	736.56	629.255	1493.455	430.172
1996	172839.41	771.555	736.222	1563.576	481.956
1997	180910.93	864.25	775.14	2254.55	584.22
1998	178301.49	1955.49	740.41	1758.7	641.8
1999	188990.36	4335.6	1220.97	2098.31	638.37
2000	198963.01	6816.258	1090.576	1854.726	568.9333
2001	215628.64	3642.284	1242.157	2676.614	729.17
2002	218873.23	2891.702	1830.374	2649.411	787.371
2003	214131.69	2545.984	1499.367	2821.617	891.742
2004	243526.34	2494	2309.53	2790.81	837.77
2005	272142.25	2876.5	3836.906	3706.117	1425.049
2006	301468.12	2648.051	4748.653	5824.227	1363.442
2007	335918.65	3004.92	4037.19	6628.74	1284.4
2008	372014.04	3453	6209	11922.3	3404.6
2009	404337.8	4000	7666	14570.6	3873.3
2010	455539.34	4000	7646.5	17498.6	4692.7
2011	515078.5	4750	8937.6	23711.6	6313.6
2012	559621.57	6486	12122.5	32859	7676.8
2013	618842.24	6493.152	14649.48	40399.78	11331.06
2014	682358.26	7488.6	17693.08	47300.86	13641.89
2015	753230.06	8000	11687.35	50126.18	7899.05
2016	808488.89	8020	16988.33	52855.2	9102.53

Source:MOFED and NBE

AppendexII:long run estimation of VECM

Vector Error Correction Estimates

Date: 05/30/17 Time: 15:29

Sample (adjusted): 1978 2016

Included observations: 39 after adjustments

Standard errors in () & t-statistics in []

Cointegrating Eq:	CointEq1
LOGRGDP(-1)	1.000000
LOGINF(-1)	0.852978 (0.45887) [1.85887]
LOGHT(-1)	-0.861228 (0.43633) [-1.97379]
LOGDE(-1)	0.512089 (0.15308) [3.34529]
LOGAGR(-1)	-1.268851 (0.33597) [-3.77667]
C	-10.79964

Appendix III: Short run estimation of VECM

Dependent Variable: D(LOGRGDP)

Method: Least Squares

Date: 05/25/17 Time: 12:20

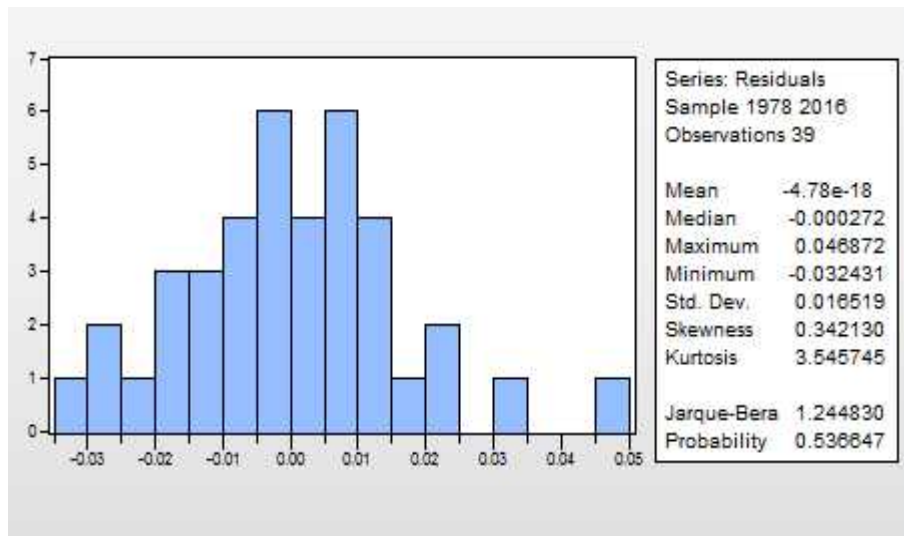
Sample (adjusted): 1978 2016

Included observations: 39 after adjustments

$$D(\text{LOGRGDP}) = C(1) * (\text{LOGRGDP}(-1) + 0.852978057594 * \text{LOGINF}(-1) - 0.861227891303 * \text{LOGHT}(-1) + 0.512089137596 * \text{LOGDE}(-1) - 1.26885137215 * \text{LOGAGR}(-1) - 10.7996356013) + C(2) * D(\text{LOGRGDP}(-1)) + C(3) * D(\text{LOGRGDP}(-2)) + C(4) * D(\text{LOGINF}(-1)) + C(5) * D(\text{LOGINF}(-2)) + C(6) * D(\text{LOGHT}(-1)) + C(7) * D(\text{LOGHT}(-2)) + C(8) * D(\text{LOGDE}(-1)) + C(9) * D(\text{LOGDE}(-2)) + C(10) * D(\text{LOGAGR}(-1)) + C(11) * D(\text{LOGAGR}(-2)) + C(12)$$

	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	-0.046639	0.009825	-4.747067	0.0001
C(2)	-0.087839	0.177598	-0.494592	0.6249
C(3)	-0.510532	0.190927	-2.673967	0.0126
C(4)	0.035105	0.016441	2.135252	0.0420
C(5)	0.014916	0.016164	0.922795	0.3643
C(6)	-0.014294	0.019699	-0.725623	0.4743
C(7)	-0.014855	0.023751	-0.625430	0.5369
C(8)	0.025765	0.012529	2.056378	0.0495
C(9)	0.010321	0.011809	0.874047	0.3898
C(10)	-0.043386	0.016553	-2.621021	0.0142
C(11)	-0.035381	0.012515	-2.827119	0.0087
C(12)	0.037367	0.006293	5.938105	0.0000
R-squared	0.583327	Mean dependent var		0.022820
Adjusted R-squared	0.413571	S.D. dependent var		0.025591
S.E. of regression	0.019597	Akaike info criterion		-4.779232
Sum squared resid	0.010369	Schwarz criterion		-4.267367
Log likelihood	105.1950	Hannan-Quinn criter.		-4.595579
F-statistic	3.436275	Durbin-Watson stat		2.229779
Prob(F-statistic)	0.004353			

Appendix III: normality test



Appendix IV: Correlation test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.052085	Prob. F(12,15)	0.4556
Obs*R-squared	17.82354	Prob. Chi-Square(12)	0.1212

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 05/31/17 Time: 09:42

Sample: 1978 2016

Included observations: 39

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C(1)	0.031151	0.021723	1.433972	0.1721
C(2)	0.358594	0.623070	0.575528	0.5735
C(3)	0.888183	0.527447	1.683929	0.1129
C(4)	-0.015347	0.026237	-0.584935	0.5673
C(5)	-0.017484	0.024159	-0.723685	0.4804
C(6)	0.003208	0.026158	0.122630	0.9040
C(7)	-0.029994	0.032761	-0.915541	0.3744
C(8)	-0.013704	0.019282	-0.710717	0.4882
C(9)	-0.022829	0.016128	-1.415464	0.1774
C(10)	0.049426	0.028756	1.718832	0.1062
C(11)	0.036026	0.020418	1.764459	0.0980
C(12)	-0.026695	0.016284	-1.639345	0.1219
RESID(-1)	-0.698362	0.587050	-1.189613	0.2527
RESID(-2)	-1.097395	0.528556	-2.076212	0.0555
RESID(-3)	0.206284	0.429569	0.480213	0.6380
RESID(-4)	0.141703	0.427606	0.331387	0.7449

RESID(-5)	-0.489347	0.330257	-1.481717	0.1591
RESID(-6)	0.211115	0.293948	0.718205	0.4837
RESID(-7)	0.016296	0.285444	0.057091	0.9552
RESID(-8)	0.187058	0.295350	0.633343	0.5360
RESID(-9)	-0.077708	0.319841	-0.242958	0.8113
RESID(-10)	-0.034520	0.273622	-0.126160	0.9013
RESID(-11)	-0.069916	0.314398	-0.222380	0.8270
RESID(-12)	-0.266348	0.266129	-1.000823	0.3328

Appendix V: Heteroskedasticity

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.921089	Prob. F(15,23)	0.5553
Obs*R-squared	14.63582	Prob. Chi-Square(15)	0.4780
Scaled explained SS	8.928946	Prob. Chi-Square(15)	0.8812

Test Equation:

Dependent Variable: RESID^2

Method: Least Squares

Date: 05/25/17 Time: 12:27

Sample: 1978 2016

Included observations: 39

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.022319	0.018755	-1.190030	0.2462
LOGRGDP(-1)	-0.001646	0.004104	-0.401047	0.6921
LOGINF(-1)	2.78E-05	0.000400	0.069449	0.9452
LOGHT(-1)	-0.000182	0.000496	-0.366590	0.7173
LOGDE(-1)	0.000123	0.000338	0.365244	0.7183
LOGAGR(-1)	0.000198	0.000375	0.528810	0.6020
LOGRGDP(-2)	0.001482	0.005954	0.248951	0.8056
LOGRGDP(-3)	0.002215	0.004478	0.494642	0.6255
LOGINF(-2)	0.000324	0.000464	0.698749	0.4917
LOGINF(-3)	0.000207	0.000445	0.465211	0.6462
LOGHT(-2)	-0.000548	0.000610	-0.897332	0.3788
LOGHT(-3)	-8.86E-05	0.000595	-0.148849	0.8830
LOGDE(-2)	-0.000117	0.000430	-0.272051	0.7880
LOGDE(-3)	0.000309	0.000286	1.079685	0.2915
LOGAGR(-2)	-4.35E-05	0.000406	-0.107017	0.9157
LOGAGR(-3)	-0.000874	0.000354	-2.470779	0.0213

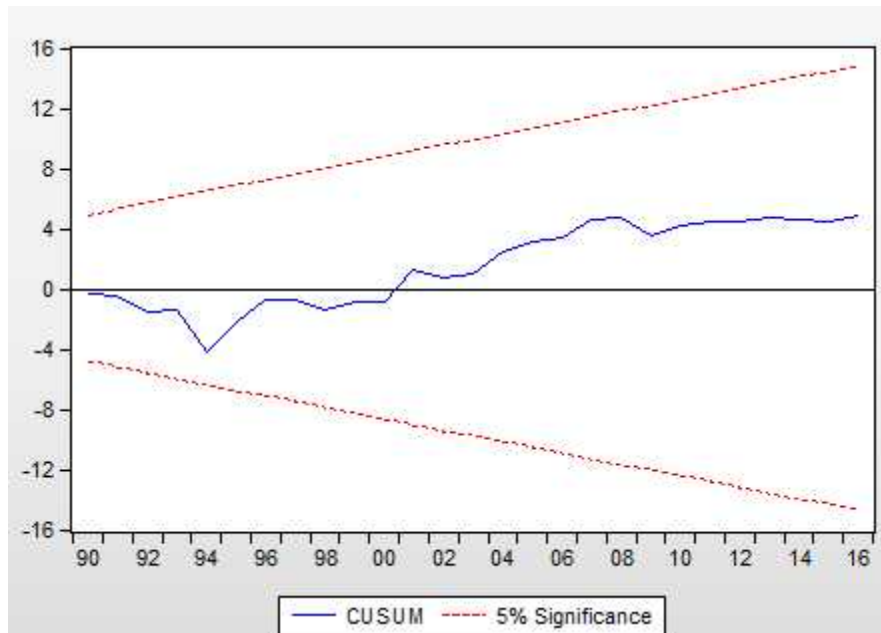
R-squared	0.375277	Mean dependent var	0.000266
Adjusted R-squared	-0.032150	S.D. dependent var	0.000430
S.E. of regression	0.000437	Akaike info criterion	-12.34262
Sum squared resid	4.38E-06	Schwarz criterion	-11.66013
Log likelihood	256.6811	Hannan-Quinn criter.	-12.09775
F-statistic	0.921089	Durbin-Watson stat	1.835179
Prob(F-statistic)	0.555313		

Appendix IV: Wald (F) Joint significance

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	7.557042	(12, 27)	0.0000
Chi-square	90.68451	12	0.0000

Appendix IIV: Stability



DECLARATION

I, Abalone Dagne declare that this work entitled “The Impact of Public Spending in Economic Growth: The case of Ethiopia” is outcome of my own effort & study and that all sources of materials used for the study have been duly acknowledged. I have produced it independently except for the guidance and suggestion of the Research Advisor.

This study has not been submitted for any degree in this University or any other University. It is offered for the partial fulfillment of the degree of Masters of Business Administration [MBA].

Declared By:

Name: _____

Signature: _____

Date: _____

Place and date of Submission _____

ENDORSEMENT

This thesis has been submitted to St. Mary's University, School of Graduate Studies for examination with my approval as a university advisor.

Advisor

Signature

St. Mary's University, Addis Ababa

June, 2017