**IMPACT OF GOVERNMENT SPENDING ON ECONOMIC GROWTH IN TANZANIA**

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**A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN ECONOMICS OF OPEN UNIVERSITY OF TANZANIA**

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# CERTIFICATION

The undersigned certifies that he has read and hereby recommends for acceptance by Open University of Tanzania a dissertation entitled; “Impact of Government spending on Economic Growth in Tanzania”in partial fulfillment of the requirements for the degree of Master of Science in Economics of the Open University of Tanzania.

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.......................................

Date

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Date

**DEDICATION**

I dedicate this work to my family.

**ACKNOWLEDGEMENT**

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**ABSTRACT**

The study investigated the relationship between government sectoral expenditure (human capital, agriculture and defence) and economic growth in Tanzania over the period from 1985 to 2015. The study used annual time series data and applied co-integration and error correction model to examine the short run and long run relationship between GDP and government sectoral spending. The Granger causality test was also employed to investigate the direction of causal relationship between GDP and public sectoral spending. It is found that health and defence expenditures have both short run and long run positive significant effect on economic growth, while spending on education and defence have positive but insignificant effect on growth of economy. The Granger causality test revealed that there is unidirectional causality relationship running from economic growth to government expenditures, and bidirectional causality relationship between health and economic growth. These results have policy implication that economic growth can be improved significantly when the ratio of public expenditure on health and defence sectors to total expenditure increases. Such improvement has a large impact on improvement of human productivity and offers predictable environment for investment which leads to improved national output. Also the government should focus on well-defined expenditure policies that identify the unproductive and productive investments, and efficient management of resources in development of education, health, agriculture and defence should be emphasized.

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# ABBREVIATIONS AND ACRONYMS

ADF Augmented Dickey-Fuller

AEG Augmented Engle and Granger

AIC Akaike’s Information Criterion

AIDS Acquired Immune Deficiency Syndrome

BRN Big Results Now

CAG Controller and Auditor General

CHF Community Health Fund

DF Dickey-Fuller

DW Durbin-Watson

GDP Gross Domestic Product

HIV Human Immunodeficiency Virus

HQIC Hannan-Quinn Information Criterion

IFPRI International Food Policy Research Institute

JK Jakaya Mrisho Kikwete

MKUKUTA Mpango wa Kupambana na Kupunguza Umasikini Tanzania

MMEM Mpango wa Maendeleo ya Elimu ya Msingi

NDSC National Defence Security Council

NHIF National health Insurance Fund

OLS Ordinary Least Squares

SBIC Schwarz-Bayez Information Criterion

SPEED Statistics of Public Expenditure for Economic Development

TPDF Tanzania People’s Defence Force

VAR Vector Autoregression

# CHAPTER ONE

**1.0 INTRODUCTION**

## 1.1 Background of the Study

Public expenditure is the vital means used by the government in the developing countries to promote economic growth which is an essential feature for sustainable development. The government expenditure on investment and productive activities is expected to contribute positively to economy. This instrument of fiscal policy promotes economic growth in the sense that public investment contributes to capital accumulation.

Other importance of government expenditure includes the provision of those facilities that are not fully covered by the market economy such as health and education. Public expenditure brings about a better standard of living of the people through provision of better infrastructure, health, housing, education service and improvement in agricultural productivity and food security (Loto, 2012). The relationship between government expenditure and economic growth has continued to create series of debate among scholars. Economic theories do don’t straight generate strong conclusions concerning the effect of government expenditure on economic performance.

Most of the studies argue that there are circumstance in which lower levels of government spending would enhance economic growth and other circumstance in which higher levels of government spending would be desirable. When the government spending is zero automatically there will be very little economic growth because enforcing contracts, protecting properties and developing infrastructures would be impossible. This means that sometimes government spending is necessary for the successful operations of the rule of law (Mitchell, 2005).

Economists are of two different views about the role of government expenditure on economic growth, some economists argue that government expenditure on human capital raises the productivity of labour and increases the growth of national output. Similarly expenditure on infrastructures reduces production costs, increases private sector investment and profitability of firms, thus fostering economic growth. Supporting this view scholar such as Ranjan (2008), Cooray (2009) concluded that expansion of government expenditure contributes positively to economic growth. However, studies by Laudau (1986) and Barro (1991) suggested that large government expenditure has negative impact on economic growth and slow down overall performance of the economy.

The vision of ensuring sustainable economic development and poverty reduction has been in the government’s development policies and strategies documents of all developing countries. In this respect, economic growth which is the annual increase in a national’s real GDP is taken as the main objective for overcoming persistent poverty and improving welfare of the society. So the relationship between government spending and economic growth is especially important for developing countries, most of which have experienced increasing levels of public expenditure overtime (Lindauer and Valenclick, 1992). This has tended to be associated with rising fiscal deficits, suggesting their limited ability to raise sufficient revenue to finance higher levels of expenditure. Rising deficits tend to have had an adverse effect on growth in OECD countries (Knellar et al, 1998).

Despite the increase in levels of public expenditure experienced by developing countries, unfortunately the rising expenditure has not translated to meaningful growth and development, as most of African countries ranks among the poorest countries in the world with decay of infrastructures (such as roads and power supply) and collapse of public education and health, industries and increase rise of unemployment among teeming youth. According to Barro (1990), the nature of impact of public expenditure on growth will depend on its form, expenditure on investment and productive sectors should contribute positively to economic growth. This means that there are some components of government expenditure that are productive which contribute positively to growth and unproductive expenditure that retards growth.

Most of developing countries have limited ability to raise sufficient fund to finance higher levels of expenditure. Thus due to lack of sufficient revenue there is a need for policy makers in developing countries to categorize productive and non-productive sectors for proper allocation of resources so as to realize truly economic growth. So investigating the short and long run relationship between government sectoral spending and economic growth is inevitable and can great help in utilizing the country’s scarce resources efficiently.

## 1.2 Public Expenditure and Economic Growth Regional Review

Total government expenditure as percentage of GDP has evolved through time across regions with little or no relationship with growth rate since 1980’s.the table 1 below shows total average values of public spending ratio to GDP and average values of GDP per capita growth rates in the different period since 1980. In general, the public spending as share of GDP is decreasing while GDP per capita growth rates show diverse behavior. EAP experienced stable growth, increasing in MNA, a high-low-high pattern in AFR and low-high-low trend in LAC. The only region (SAS) with a clear rising trend in the spending.

Table 1.: Public Expenditure and GDP per Capital Growth



AFR – Africa, EAP – East Asia and Pacific, ECA – East Europe and Central Asia, INL – Industrialized Countries, LAC – Latin America and Caribbean, MNA – Middle East and North Africa, SAS – South Asia.

**Source:** World Bank World Development Indicators and IMF Government Finance Statistics

On the other hand the composition of public expenditure has varies significantly with clear patterns across regions and through time .the top three expenditure for Africa in 2002 were education, defence and health. Although education expenditure was the largest (14 percent), the percentage is smaller compared to Asia and Latin America. Defence accounted for 8 percent of total government expenditure in the region and 8 percent of total government expenditure on health. Education expenditure was the largest among all government expenditure in Asia accounting for 16 percent in 2002, defence and agriculture ranked second and third, accounting for 9 percent each of total government expenditure in 2002, reduced from 18 percent to 15 percent respectively in 1980.

## 1.3 Statement of the Problem

Tanzania especially during Jakaya Mrisho Kikwete regime has directed more than 60 percent of its total expenditure on poverty oriented sectors, expecting productivity improvement and welfare of the people so economic growth. Despite the total public expenditure increase experienced by Tanzania last decades, unfortunately rising government expenditure has not translated to meaningful growth and development, as Tanzania ranks among the poorest countries in the world and many Tanzanians have continued to wallow in abject poverty with the basic needs poverty rate 28.2 percent, while more that 80 percent lives on less Tsh 1,380 per day (World Bank, 2015).Couple with this, is dilapidated infrastructure( especially railway, roads and power supply) that has led to the retards of many industries, including high level of unemployment for youths.

Tanzania has devoted much resources and efforts to various sectors anticipating productivity improvement of the citizens and thereby economic growth. These resources are cost to the society not only because they are economic resources but also because they have alternative uses. Therefore, investigating the impact of resources devoted to agriculture, defence, education and health sectors on economic growth may be a big concern to policy makers and even to the society. This study will attempt to examine the impact of government sectoral spending on economic growth in Tanzania and their causal relationships.

## 1.4 Objective of the Study

The general objective of the study is to investigate the impact of government sectoral spending on economic growth in Tanzania. The study will intend to address the following specific objectives

1. To investigate the long run and short run relationship between government expenditure (human capita, which refers to education and health, agriculture and defence), and economic growth.
2. To examine the existence of causality relationships among the variables of the study (economic growth, health, education, agriculture and defence)
3. To identify the direction of the causality relationship existing between the studied variables

## 1.5 Hypothesis of the Study

The study hypotheses are as follows

H1: There is a short and long-run relationship between government sectoral expenditure and economic growth in Tanzania

H2: There is a causal relationship between human capital, agriculture and defence sectors expenditure and economic growth

## 1.6 Significance of the Study

This study was conducted using secondary data for human capital investment, agriculture, defence and real GDP growth for 31 years (1985-2015). Economic issues are very important components in addressing social-economic development matters; therefore a clear recognition of various economic dynamics is important to policy makers. The information that this study is providing will help the government and policy makers to generate evidences for policy implication that aim to analyze the interaction of human capital investment, agriculture, defence and economic growth. This will help to develop policy framework that will consider benefits of the existing relationships and reduce cost of addressing individual macroeconomic issues.

The study improved the practical knowledge, skills and contributes to this debate by providing further empirical evidence concerning impact of government sectoral spending on economic growth. This study paved the way for the further studies on relationship between government sectoral spending and economic growth.

## 

## CHAPTER TWO

2.0 LITERATURE REVIEW

## 2.1 Overview of Public Expenditure in Tanzania

Over the past decade the Tanzanian economy has performed strongly, recording average growth of 7.3% in 2015, driven by information and communications, construction, manufacturing and other services. Medium-term prospects are favorable, with growth projected to remain above 7%, supported by public investments in infrastructure, particularly in the transport and energy sectors. Agriculture remains the mainstay of the economy, employing the majority of the workforce, but the sector is plagued by infrastructure gaps and low productivity.

As the economy continues to perform strongly overtime the activities and the functions of the government have also increased, this leads to increase in the public expenditure on administration and regulation of the economy. A large share of the public expenditure has been in the MKUKUTA strategic interventions whereby more than 70 percent of the budget has been allocated in the poverty reduction sectors such education, health, water, roads, agriculture and energy.

The increase in government expenditure has been associated with increase in recurrent expenditure rather than capital expenditure. For instance government expenditure grown from 15 percent of GDP in 2001/02 to 26.0 percent in 2007/08 with recurrent expenditure grow faster, 2001/02 grew by 11.8 percent of GDP compared to 3.5 percent of capital expenditure while in 2011/12 reaches 16.9 percent recurrent and capital expenditure recorded 9.6 percent.

In 2014/15 financial year the amount allocated for recurrent expenditure (Tsh 13,408.22 billion) was increased by 6.6 percent compared to previous fiscal year, the amount allocated for capital expenditure (Tsh 6,445.11 billion) was increased by 13,6 percent compared to 2013/14.

According to Tanzania development vision 2025, government spending will continue to increase in order to achieve the objectives of economic growth and poverty reduction, despite the continued government spending on various sectors of the economy between 2000s and 2014 Tanzania economy grew at average 7 percent and lying outside the list of middle income countries this implies that past government expenditure effort was not enough translated into meaningful growth and development in Tanzania. So identifying the long run relationship between government sectoral spending and economic growth can great help in utilizing the country’s scarce resources efficiently.

### 2.2 Trends in Public Expenditure by Sector

The real term analysis of education and health expenditures is suitable than nominal terms. But there is no reliable price index which is can serve as deflator in conversion of nominal public expenditures into real terms, hence the share of public expenditure on education and health to GDP is used as indicator to capture the trends in improvement of the education and health sector.

The share of total government expenditure on education to GDP slightly increased from average value of 2.2 percent in 1989-1990 to an average of 2.39 in years 1996-1998.during 2004-2008 education expenditure as percentage of GDP was increased and almost doubled by recording average value of 4.77 percent. Budget for education in proportion to the national budget has continued to decline, in 2008/2009 the budget for the sector of education reached 20 percent of GDP. Education budget continued to decline as 18 percent of GDP was set aside for education sectors in 2009/2010, and it was 17 percent during 2010/2011-2011/2012.

The average value of expenditure on health as a percentage of GDP was 1.3 between 1995-1999.in the next six years it has increased and reached an average value of 1.65 percent between 2000-2005,health expenditure as percentage of GDP has again increased doubling the value of last six years by recording an average value of 3.47 during 2006-2010. During the three years 2011-2013 the average value of expenditure to GDP percentage as declined reaching 2.78 percent. The share of public spending on health out of total government expenditure declined from 13.1% in 2009/10 to 12.0% in 2010/11,while the share of public health allocation in the total budget also declined from 12.3% in the 2010/11 budget to 10.0% in the 2011/12 budget which is below 15% recommended under the Abuja Declaration.

The ministry of defence is designed to support Tanzanian’s foreign and security policy objectives. It guides the contributions of the defence forces to meet defence and security goals, and shapes their structure and capabilities. It is responsible for ensuring availability of enough budgets for consistent training and maintaining the armed force in accordance with the defence doctrine.

The average value of military expenditure as a percentage of GDP was 3.92 percent during 1985-1990. In the next six years it has decreased and reached an average value of 2.46 percent in 1991-1996.The military budget as percentage of GDP continued to fall and recording average value of 2.29 percent during 1997-2002. The declines of military budget for the next twelve years was further continued as the government only set aside average of 1.76 percent in 2003-2008 and 1.01 percentage of GDP between 2009-2015.

The decline of defence budget from year to year have caused the TPDF to lack capacity, to include human capital, to leverage donor support effectively or to implement change within the organization, the TPDF has the will and manpower but not the right equipment and sophisticated weapons to complete all the missions it would like to undertake. Agriculture remains the largest sector in the Tanzania economy and hence its performance has significant effect on output and corresponding income and poverty level. The sector account for about half of GPD and exports, and its importance is amplified through backward and forward linkage effects. Sale of agricultural products accounts for about 70 percent of rural household income.

Over the 1990s, average agricultural growth was 3.6 percent which was higher than in the 1970s and 1980s when annual agricultural growth averaged 2.9 and 2.1 percent respectively. During the 1990s agricultural exports grew at an annual rate of over 7 percent per year, although the rate slowed due to declining market prices. During 2002-2010 average growth for agriculture sector was only 4.2 percent, and 3.6 and 4.3 percent in 2011 and 2012 respectively mainly driven by increased production of the major food crops and good weather but the sector was also boosted by the improvements in extension services to support livestock development.

The sector recorded 5.3 percent in the second quarter of 2013 compared to 5.1 percent in the 2012, reflecting low productivity for an undercapitalized sector should be at least 6 percent plus. The share of total government expenditure on agriculture recorded average of 5.54 percent in 1985-1990.between 1991-96 agriculture expenditure as percentage of total expenditure was increased to average value of 6.88 percent. In seven years from 2000 to 2006 budget for agriculture as share of total budget reached 6.28 percent accounting for decrease compared in 1991-96, the agriculture budget as share of total budget continued to decrease and recording 4.49 percent during 2007 and 2009.

The sector share in the overall budget dropped from 7.8 percent in 2010/11 to 6.9 percent in 2011/12, this was due to diminishing trend attributed to a large decrease in fund that had been invested in agriculture sector in 2010/11 for procurement of power tillers. The sector contributes about 25 percent of the GDP for instance the sector contributed 24.8 and 24.7 percent to GDP in 2012 and 2013 respectively and still account for 70 percent of employed labor force and largest source of foreign exchange earnings and it feeds both the rural and urban populations.

Real gross domestic product (real GDP) is a microeconomic measure of the value of the economic output adjusted for price changes. Due to inflation GDP increases and does not actually reflect the true growth in an economy. That is why the inflation rate must be deducted from the GDP to get the real growth percentage. Real GDP per capita indicate the total amount of the market value of all domestically produced final goods and services divided by total population (Romer and Weil 1992).

The growth performance of Tanzania economy with relative public spending since 1980’s has strengthened in recent years although growth rate have fluctuated from year to year reflecting vulnerability of the economy to external shocks. Real GDP growth recorded 3.8 percent with GDP per capita growth rate was 0.61 in 1989,the next six years (1990-1995) real GDP and GDP per capita growth rate decreased after recording average value of 2.7 and -0.57 percent respectively. The economy slightly recovered in the next four years (1996-1999) recording increased average value of 4.1 and 1.52 of real GDP and GDP per capita growth rate.

In 2000 Tanzania economy performed well where the real GDP and GDP per capita growth rate recorded 4.9 and 2.36 percent respectively due to the better growth performance in improvement of weather conditions following the El Nino floods of 1998 which destroyed crops and infrastructures thereby disrupting internal movement of agricultural commodities as well as export shipment. During 2001-2008 growth has averaged approximately 7 percent which is historically high for Tanzania and comparable to the performance of the fastest growing economies in sub-Saharan Africa. Real GDP growth rate peaked 7.8 percent in 2004 and real GDP per capita reached a maximum value of 4.97.but due to the severe and prolonged drought the GDP growth recorded 7.4% in 2005 and 6.7% in 2006 with real GDP per capita growth rate 4.45 and 3.76 percent respectively.

Real GDP grew by 7.3% in 2013 and GDP per capita growth rate recorded 4.09 percent driven by continued strong performance of construction, trade, agriculture and transport sectors as well as prudent monetary policy and recent decrease in global food and energy prices.

Despite the public expenditures on the above mentioned sectors and growth rates attained since 1980’s, poverty rates in Tanzania remain highest especially in rural areas with 37.6 percent of rural households live below the basic needs poverty line (PHDR, 2009).

**CHAPTER THREE**

# 3.0 LITERATURE REVIEW

## 3.1 Introduction

This chapter presents the theoretical and empirical review of previous studies related to main topic. It is divided into two sections, the first section is theoretical literature review and the second is empirical literature review.

## 3.2 Theoretical Growth Theory

Before the modern human capital theories came to literature, the classical economists recognized three factor of production, land, labor and capital hence influence economy. Growth is self re-enforcing as it exhibit increasing return to scale with saving as a creator of investment as well as growth. Growth rate depend on the decisions and actions of agents especially their savings and investment behavior, creativity and innovations (Wendewesen, 2012)

### 3.2.1 Classical Growth Theory

The theory developed focused mainly on the way market economies functioned and concentrated on the dynamics of economic growth. Adam smith recognized three factors of production, land, labor and capital, the production function is subjected to increasing return to scale with the passage of time, the size of the market will increase which will lead to both internal and external economies of scale eventually low the cost of production.

This process would be initiated by improvement in the production techniques and greater degree of division of labour. According to Adam smith improvement on productivity is influenced by technological development, however productive forced would automatically be released into the economy in the form of innovation and that would get adjusted to the currently available supply of capital at that point of time. This means that the economy would never suffer from the want of technical know-how and that the technical knowledge and that it would keep expanding as the capital stock of the country expanded.

In a developing economy both income level and capital stock rise the rate of capital accumulation also shows a tendency to increase, this leads to increase in the capital stock in successive periods as investment keeps on increasing. The decline in the incremental capital output ratio due to the influence of capital on the production of labor contributes to the progress of an economy.

### 3.2.2 Neoclassical Growth Theories

Long term economic growth is determined solely by the accumulation of the factor inputs such as physical capital and labor. Solow (1957 ) in the long run sustained positive growth rate of output per capita is only apparent if there is continues advances in technological knowledge in the form of new goods, new markets or new process. If there is no technological progress, then the effect of diminishing returns would eventually cause economic growth to cease.

According to Ramsey (1928) the accumulation process is described as higher level of per capital, production will generate a new supply of capital and a demand of capital for a full employment steady state with constant per capita capital will arise. Along the optimal path the rate of saving changes over time and converges toward the long run level associated with the steady state. When people are provided with more and more of the same capital goods without inventing new uses for the capital, then extra capital goods become redundant and therefore the marginal product of capital will become negligible. But the model cannot explain the existence of continuous economic progress (Wendewesen. T, 2012)

### 3.2.3 Endogenous Growth Theories

The endogenous growth theory has great contribution in solving the limitation of the neo-classical growth theory with aim at providing a rigorous model in which all variables crucial for growth are included. So in order to solve the limitations of the neoclassical theory and answer the long run determinants of economic growth, endogenous growth models were developed. Lucas (1988) considers human capital as a separate input in the production function formed predominantly by workers through education or on-the job training. According to Lucas (1988) model the rate at which human capital is being accumulated was seen as the critical determinant of productivity growth.

Lucas (1988) and Romer (1990) argued that in order to generate economic growth having a large population is not sufficient rather stock of human capital and research and development are source of economic growth. According to these model physical and human capital do not suffer from diminishing returns since when the owner of the capital employs a skilled and health worker, the productivity of the capital and technology will improve hence have increasing returns to scale as the spillover of knowledge across producers and external benefit from improvements in human capital.

Mankiw, Romer and Weil (1992) stated the difference in human capital; saving and population growth determines cross-country difference in income per capita, they come with this argument after formulating an augmented Solow model in which human capital enters as factor of production with those of physical capital and raw labor. When human capital taken into account in the model it shows that the accumulation of physical capital and population growth has greater effects on income per capita and excluding if from the model may result in biased result.

## 3.3 Public Expenditure Growth Theories

There are theories explaining the factors determining the growth in public expenditure. Among them Adolf Wagner’s law of increasing government activities and the peacock Wiseman hypothesis are more important, the factors are mainly environmental, technological, economic, administrative and political in nature.

### 3.3.1 Musgrave Theory of Public Expenditure Growth

According to Musgrave there are changes in the income elasticity of demand for public services in the ranges of per capital income. At low level of per capital income, demand for public services tends to be very low this is so because such income is devoted to satisfying primary needs and that when per capital income start to rise above these levels of low income, the demand for services supplied by the public sectors such as education and transport start to rise, thereby forcing the government to increase expenditure on them. At the high level of per capital income the rate of the public sector growth tends to fall as the more basic needs are being satisfied.

### 3.3.2 The Wagner’s Theory of Increasing State Activities

One of the prominent Economist Wagner (1890) offered a model of the determination of public expenditure in which public expenditure growth is outcome of increasing national income. He considered public expenditure as a behavioral variable. He formulated “the law of increasing extension of state activity which has now come to be known as Wagner’s law. This law is one of public finance theories that emphasize economic growth as fundamental determinant of government size. Wagner’s Law states that as real income per capita increases, the share of public expenditure increase. Therefore, the implication of Wagner’s Law is that causation runs from economic growth to growth in public expenditure and so public expenditure is considered as endogenous to the growth of national income

According to Wagner the government expenditure can increase over time as a result of economic growth due to three reasons. First, during the process of modernization and industrialization, public activities would substitute private activities and so public expenditure would increase as there is more demand for administrative and legal services. Second, cultural and welfare services are income elastic and they would increase with an increase in national income. Wagner argues that private sector is inefficient in providing some goods and services like culture and educational needs and so public expenditure would expand as society gets richer.

Third, as national income increases, public sector is required to finance large-scale projects to satisfy technological needs and manage monopoly. For example, airports, ports and railroads should be monopolized by state according Wolf Wagner (Tulsidharan; 2006). These findings are against the growth theory of Keynesian economist which argues that an increase in government spending is the stimulator of the economic growth and other macroeconomic variables.

### 3.3.3 Wiseman-Peacock Hypothesis

Wiseman and peacock studiedpublic expenditure in UK for the period 1890-1955. According to them public expenditure does not increase in a smooth and continuous manner, but it jerks or step like fashion. At times some social or other disturbance takes place creating a need for increased public expenditure which the existing public revenue cannot meet. While earlier due to an insufficient pressure for public expenditure the revenue constraints was dominating and restraining an expansion in public expenditure, now under changed requirements such a restraint gives away. Increase in the public expenditure and makes the inadequacy of the present revenue quite clear to everyone. The movement from older level of expenditure and taxation to a new and high level is the displacement effect. The inadequacy of the revenue as compared with the required public expenditure creates an inspections effect.

The government and the people review the revenue position and the need to find a solution of the important problem that have come up and agree to the required adjustments to finance the increased expenditure .they attain new level of tax tolerance, in this way the public expenditure and revenue get stabilized at a new level till another disturbance occurs to cause a displacement effect, thus each major disturbance leads to government assuming a large proportion of the total national activity.

## 3.4 Rationale for Intervention in Agriculture, Education, Health and Defence

Education policy can affect education outcome either through educational quality or educational quantity. Educational quality is usually expressed in enrolment levels or average years of schooling or literacy rate. Educational quality has been traditionally measured by input measures such as teacher-student ratios and total public expenditure on education. However, in recent years the educational quality is measured in terms of output indicators through the performance of students and graduates in test score in different subjects (Patron, 2006).

The most important motivation for public intervention in education and health are the presence of market failures and equity consideration. The idea of education and education externalities or market failures occurs when the benefits of individually acquired education and health may not be restricted to the individual but might spill over to others as well, accruing at higher levels of aggregation. For instance, among educational externalities are crime reduction and better health outcome better household management and improvement in GDP or productivity (Moretti, 2006).

The agriculture sector is the backbone of an economy. Its strategic importance lies in its forward and backward integration with the rest of the economy, the establishment and maintenance of food security, the economic welfare of rural areas and stabilization capabilities in relation to the balance of payments. In developing countries, rural development plays a crucial role in economic development and poverty alleviation .according to Johnstone and Mellor (1961), agriculture make important contributions to the structural transformation of economies as it could provide labour, capital, foreign exchange and food to the growing industrial and urban sector and a market for domestically produced goods.

In many African countries rural-urban migration appears to be accelerating, so the best way to manage rural-urban migration is to increase agricultural investment and output (Stiglitz, 1969). It is very important but difficult task to balance national security and economic growth. National security is the first priority in each country, but a huge military expenditure can be a large burden for government and welfare of the people. Therefore he effective budget plan for military spending is required. Military expenditure influence economic growth through a wide variety of channels. The channels can be broadly divided into three main categories, demand, supply and security (Dunne et al, 2005).

In the demand side, additional defence spending increases total demand and capital utilization and reduce unemployment, military expenditure influence economic growth through expanding social infrastructure and increasing human capital. In supply side, military expenditure can result in the development of technology and human resource that can spill over into the private sector. In security side, military expenditure enhance the incentive to accumulate capital and produce more output, leading to higher economic growth (Thompson, 1974), in many developing countries, war and lack of security are major obstacles to development (Dunne et al, 2005).

## 3.5 Impact of Government Sectoral Spending on Economic Growth

A number of studies have investigated the impact of government spending on economic growth. However the studies have come with different results which have generated a wealth literature which employed different methodology hence come to contradictory conclusion. These studies demonstrate the absence of empirical consensus and also revealed a series of difference in methodology during analyzing the results.

Government spending includes all government consumption, investment and transfer payment made by a state. Government acquisition of goods and services for current use to directly satisfy individual or collective needs of the members of the community is classed as government final consumption expenditure (Wendewesen Tsadiku, 2012). Government spending can be financed by seigniorage, taxes or government borrowing, government acquisition of goods and services intended to create future benefits such as infrastructure investment, human capital, agriculture or research spending is classed as government investment (capital formation).

**The Keynesian Theory;** Increased government spending is thought to raise aggregate demand and increase consumption, which in turn leads to increased production. According to Keynes public expenditure is an exogenous factor which can be utilized as a policy instruments to promote economic growth. Hence an increase in government consumption is likely to lead an increase in employment profitability and investment through multiplier effects on aggregate demand. As a result government expenditure augments the aggregate demand which provokes an increased output depending on expenditure multipliers.

Barro (1990) has indicated that fiscal budgetary expansion via government expenditure can enhance economic growth. Moreover Barro and Sala-i-Martin (1992) classify expenditure as productive and unproductive and assume that productive expenditure has a direct impact on the rate of economic growth and the unproductive expenditure has no effect. Classified, general public expenditure service education, health, transportation and communication and defence expenditure as productive expenditure. Health and education is treated as investment because of the addition to human capital they might entail.

Krueger (1990) provides guidance for policy makers to how government may spend in order to bring about positive impact on the economy. First any decision on government spending can be undertaken only when there is a specified set of procedures or criteria for deciding what fits within the scope of the enunciated policy and also an administrative apparatus for implementing the policy. Second, even when it appears that government action would actually be effective; there is something of a presumption in favor of policies and programs requiring a minimum of administrative and bureaucratic input. These are important because policies, once in place appear to have a life of their own and because they divert scarce administrative resources from those in which governmental comparative advantage is stronger. Third, policies directly controlling private activity are likely to be less efficacious in term of achieving their objectives than policies that provide incentives for individuals to undertake the activities which are deemed desirable.

## 3.6 Empirical Literature Review

The literatures demonstrate the current empirical studies which have been done with regard to the economic growth influenced by government sectoral spending. The study by Kapunda S. M and Topera J. S. (2013), employed ordinary least square method and using 1965-2010 data to examine government expenditure composition and how it influence economic growth in Tanzania. The study shows that factors that contribute positively and significantly to economic growth are capital expenditure and terms of trade. They also found that health, agriculture, general public service, defence and dummy influence growth positively but not significantly. Recurrent expenditure and few other factors have negative impact on growth.

Holger.S and Peter, W. (2006) examined the impact of increased school enrollment on economic growth in Tanzania. Using a dynamic computable general equilibrium (DCGE) model and applying a 2000 social accounting matrix (SAM) for Tanzania.

The study found that an increase in school enrollment (education human capital) in the long run leads to higher economic growth rate and increase household incomes.

Kweka and Morrissey (2000), the objective of the study was to investigate the impact of public expenditure on economic growth in Tanzania. The study formulated a simple growth accounting model, adapting Ram (1986) in which total government expenditure is disaggregated into expenditure on physical investment, consumption spending and human capital investment.

The study found that increased productive expenditure (physical investment) appears to have a negative impact on growth; consumption expenditure relates positively to growth and in particular appears to be associated with increased private consumption. Expenditure on human capital investment was insignificant, hence the result confirmed that public expenditure investment in Tanzania has not been productive, aid appears to have a positive impact on growth.

A study by Naftaly Mose and Aquilars Kalia (2014) empirically investigated how government expenditure contributes to the economic growth in East Africa from 1980-2010.using balanced panel fixed effect model; government expenditure was disaggregated to scrutinize its effect of growth. The study tested for panel unit root and found that only two variables that are GDP and investment are stationary at level. The finding confirms the conventional view that relative investment expenditure promotes economic growth while consumption retards it. While human capital expenditure was found to be insignificant. The study suggests that for east Africa, the policy of increasing government expenditure on investment budget to promote growth will be appropriate, but fewer funds should be channeled towards other government programs.

Nkiru Patricia and Daniel Izuchukwu (2013) examined the effect of public expenditure in education on economic growth of Nigeria over a period from 1977 to 2012, with particular focus on disaggregated and sectoral expenditure analysis. The study applied error correction model to determine the effect of public expenditure on economic growth in Nigeria. The results indicated that total education expenditure is highly and statistically significant and have positive relationship on economic growth in Nigeria in the long run.

The study concluded that economic growth is clearly impacted by factors both exogenous and endogenous to the public expenditure in Nigeria. It is therefore recommended that there is need for the government to reduce it budgetary allocation to recurrent expenditure on education and place more emphasis on capital expenditure so as to accelerate economic growth of Nigeria.

Emmanuel Musaba, Pius Chilonda and Greenwell Matchaya (2013) studied the impact of government sectoral expenditure on economic growth in Malawi. Using time series data from 1980-2007,co-integration analysis in the context of error correction model was employed to estimate the growth effect of government expenditure in agriculture, education, health, defence, social protection and transport and communication.

The short run result shows no significant relationship between government sectoral expenditure and economic growth. The long run result showed a significant positive effect on economic growth of expenditure on agriculture and defence, the expenditure on education, health, social protection and transportation and communication were negatively related to economic growth. The study suggested that to boost economic growth in Malawi efficient management of resource allocation to all sectors should be emphasized.

Wendwesen Tsadiku (2012) examines the economic growth impact of government spending on human capital, agriculture sector, road construction and non-poverty sectors spending on economic growth in Ethiopia. To estimate the model, first the series was tested for stationary and co-integration test analysis was done. After indicating the presence of the long-run relationship using augmented Engle and Granger approach, the short-run dynamics of the long run economic growth was examined by estimating error correction model.

The study confirms that spending on education and road sector have positive effect on growth while in the short-run health has insignificant effect on economic growth. Hence government sectoral spending on human capital and road construction contributes positively to growth in the short and long run.

## 3.7 Research Gap

Numbers of studies have examined the impact of government expenditure on economic growth. However, contradicting thoughts have emerged, some scholars argue that increase in government expenditure on social-economic and physical infrastructure encourages economic growth while some scholar do not support the claim that increase in government spending promotes economic growth, instead they assert that higher government expenditure may slow down overall performance of the economy.

To empirically examine the relationship between government expenditure and economic growth some scholars disaggregated government expenditure into physical investment, consumption spending, and human capital investment while some scholars aggregated the government expenditure. Despite the contradicting results and different methodologies employed to investigate the impact of government expenditure on economic growth all literatures show that, there seems to be existence of relationship between government expenditure and economic growth but neither of the scholar has shown it clear if the existing relationship is causal and the direction of causality.

The literatures from Tanzania in which total government expenditure was disaggregated into expenditure on physical investment, consumption spending and human capital investment, have failed to show the separate impact of the education and health sector on economic growth since both education and health are important elements of human capital, using both indicators are relatively better measure of human capital investment than using education or health indicator alone.

This study focused on short run and long run relationship between government sectoral expenditure and economic growth by presenting the separate impact of education and health sectors and showing the direction of causality emanating from those long run relationships.

**CHAPTER FOUR**

# 4.0 RESEARCH METHODOLOGY

This chapter discusses the research methodology that was used in this study. The chapter is divided into four sections, the first section present theoretical framework and model specification, the second section involves source and nature of data, relevant validity tests is included in the third section and the final section will present variables measurements.

## 4.1 Theoretical Framework and Model Specification

There are no generally accepted models of the growth process and hence no standard analytical framework that are appropriate for studies such as this one (Abramovitz, 1983). The theoretical foundation of this study is based on the augmented Solow model and endogenous growth model which the model incorporated human capital and other variables as the cause of economic growth. Real GDP in natural logarithm form is used as dependent variable in the regression model and government expenditure on agriculture and human capital as percentage of total expenditure and government expenditure on defence as percentage of GDP are incorporated as explanatory variables

## 4.2 Model Specification

In order to capture the impact of government sectoral spending on economic growth in Tanzania, this study will employ the augmented Solow production function with modification that extends the basic production function frame work to allow human capital as additional input to enter the production function, as adapted by Wendewesen Tsadiku (2012) when investigating the impact of government sectoral spending on economy growth in Ethiopia.

According to Solow’s formulation economic growth is a function of capital accumulation, an expansion of labor force and exogenous factor, technology progress which makes physical capital and labor more productive, that is

Yt = ( Kt, At, Lt )

Where

Y= Output level or economic growth

A=Level of total factor productivity

K=stock of physical capital

t= time dimension

L= labor, measured by number of workers

But according to endogenous theory ‘’human capital’’ influences economic growth and hence the model can be modified by encompassing human capital in one aggregate. Such that

Yt = At Kα t Hβt (Lt)1-α-β

The reduced equation for the above will appear as

Log Yt = αLog Kt + βLog Ht + (1- α – β) Log (At, Lt)

Where

Log Yt = log for real output proxied as log of GDP

Log Kt = log of capital stock proxied as log of gross capital formation

Log Ht = log of human capital at time t estimated as government spending on health and education.

Log Lt = log of labor at time

Log At = is exogenous determined level of aggregate productivity or total factor productivity

Based on the above formulation, the model can be re-written as

GDP = f(K, L, H,A)

LnGDP = lnα0 + α1lnKt + α2lnLt + α3lnHt

Assuming α=α1 ; β=α2 ; (1- α – β ) = α3

The prior economic expectations

α0, α1, α2 and α3 > 0

This study investigates the relationship between components of government spending specifically, human capital, agriculture and defence sector and economic growth, thus growth model is a function of public expenditure. The model in this study is made upon the following function.

Yt = f(Ed, He, Ag, Df)

Where

Yt = is real GDP

Ed = government expenditure on education as percentage of total expenditure

He = government expenditure on health as percentage of total expenditure

Ag = government expenditure on agriculture as percentage of total expenditure

Df = government expenditure on defence as percentage of GDP

For the estimation purpose equation can be represent by the following logarithmic reduced form equation.

LYt = β0 + β1LEd + β2LHe + β3LAg + β4LDf

## 4.3 Source and Nature of Data

This study involved secondary data concerning real gross domestic product, education and health expenditure as percentage of total expenditure, agriculture expenditure as percentage of total expenditure and defence expenditure as percentage of GDP in Tanzania for 31 years (1985-2015) to determine the impact and direction of the relationship among variables. Data and supporting figures was collected from secondary sources including publications, about 70 percent of the data used for estimation purpose in this study was obtained from online Statistics of Public Expenditure for Economic Development (SPEED) database complied by the International Food Policy Research Institute (IFPRI), World bank and ministry of finance, bank of Tanzania, ministry of education and vocational training. Some of the data was collected from international organizations such as UNCTAD.

## 4.4 Validity Test

This part present necessary tests and validity issues concerned with multivariate time series modeling, major test includes stationary test which show wether or not there are unit roots associated with time series variables. This help to understand next procedure to undertake, the Engle- Granger (1987) two step co-integration procedures was used to test the presence of co-integration between the variables and lastly the relationship between variables was done using the Granger causality test.

### 4.4.1 Stationarity Test

The standard classical methods of estimation are based on the assumption that all variables are stationary. However most economic variables are not stationary ,models containing non-stationary variables will often lead to a problem of spurious regression whereby the results obtained suggest that there are statistically significant relationships between the variables in the regression model when in fact all that is obtained is evidence of contemporaneous correlation rather than meaningful he presence of unit causal relationship. Therefore it is necessary to test for stationarity of time series before running any sort of regression analysis.

Non stationary variables become stationary after differencing, such variable is said to have difference stationary process. Thus it is possible to estimate using difference of variables of differences is stationary. But such procedure gives only the short run dynamics and there would be a loss of considerable long run information (Gujarat, 2004). Among the methods of testing the presence of unit roots in a variable is Dickey-Fuller (DF) and augmented Dickey-Fuller (ADF)

Yt = φYt-1 + Ut

Subtracting Yt-1 from the both sides gives

∆Yt = δYt – 1 + Ut

Where δ = (φ – 1)

The test for stationarity is conducted on the parameters sigma (δ) if δ=0 or φ=1 it implies that variables Y is stationary.

The hypothesis is formulated as follows

H0 = δ = 0 or (φ – 1)

H1 = δ ‹ 0 or φ‹1 if including a constant to the regression is suggested, that is

∆Yt = α + δYt-1 + Ut

Where α is constant term however if the series contains a deterministic trend, testing for stationarity using equation above is not valid. Therefore it is important to incorporate time trend as follows

∆Yt = α + δYt-1 + BT + Ut

Where T is the trend element

For the above equation the parameter sigma is used while testing for stationary where the decision is made using a ῐ-statistics. If the calculated value ῐ is less than the critical value (reported by DF) the null hypothesis is accepted and not if otherwise. Rejecting the null hypothesis implies that there exists stationarity. If a variable is not stationary in levels appear to be stationary after the nth difference, then the variable is said to be integrated of order n denoted as I(n).however the DF test has a serious limitation in that it suffers from residual autocorrelation.

To amend this weakness the DF model is augmented with additional lagged first difference of the dependent variable. This is called augmented Dickey-Fuller, thus incorporating lagged first difference of the dependent term in the above equations gives

∆Yt = δYt-1 + ∑ki=1 ϴi∆Yt-1 + Ut

∆Yt = α + δYt-1 + ∑ki=1 ϴi∆Yt-1 + Ut

∆Yt = α +BT + δYt-1 + ∑ki=1 ϴi∆Yt-1 + Ut

Where α is constant, T is trend, K is the lag length and U ̴ IID (0, δ2)

### 4.4.2 Co-Integration and Error Correction Model

In order to investigate the extent to which sectoral government expenditure is related to economic growth in Tanzania. The theory of co-integration and error correction model is applied with help to this procedure it is possible to investigate the short and long run relationship between variables. The Engle-Granger (1987) two step co-integration procedures were used to test present of co-integration between the variables.

**Co-integration:** Co-integration was developed by Granger (1981) and was further elaborated by Engle and Granger (1987).it addresses the issue of integrating short run dynamics with long run equilibrium. The presence of co-integration implies that even if the dependent and independent variables are non stationary, the deviations (the residual from the estimation of the equation) are stationary. According to Engle and Granger if there is co-integration the equation with non-stationary variable is estimated by error correction model for long run equilibrium and short run dynamics.

The Engle-Granger procedure involves two steps, explanation of the equilibrium part the ECM in order to establish whether the variables are co-integrated in the first step. This step is to estimate the long run static model of the I(1) variable and obtain residuals. 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. If the variable are I(0) the generating process can always be written in an error collection model in which first difference of the dependent variable is regressed on the first difference of the explanatory variables with their appropriate lags and the first lag of the residual obtained in the first step.

This one can be sure of co-integration if the following results are obtained high R2 significant coefficient, a significantly non-zero co-integration regression DW statistics and significant DF and ADF test residuals from the levels regression. The coefficient estimate from the levels or static regression can be interpreted as the long run effect.

**The Error correction mechanism:** Economictheories are usually concerned with the relationship between the variables, thus differencing a series has to be dealt with in the context of regression model rather than separately. An error correction mechanism provides a room for considering both short and long run factors while modeling differenced series. This takes the form of;

∆Yt = r∆Xt + α ( Yt-1 – βXt-1) + Ut  for short run relationship. This is ECM of a two variables

It relates the change in X and еt-1 = (Y - βXt)t-1.the coefficient α shows the degree of adjustment of the dependent variable to its long run solution. While α is expected to be negative and less than unity it serves to influence the short run movement in the dependent variable.

This study basically employ econometric model to achieve the empirical result. In this model one investigate the short and long run relationship between real GDP and government sectoral spending more specifically human capital which is estimated as the expenditure on education and health sector, agriculture and defence sector spending by applying co-integration test and the associated error correction model.

### 4.2.3 Vector Auto Regression Model

After the identification of the co-integrating vectors (Appendix B), the vector autoregressive (VAR) which is a set of autoregressive distributed lag was run to identify the co-integrating equations and their estimated coefficients. Since the study has four five variables then five equations indicating any variable can be explained by the others, from the result of vector auto regression the significant equation (s) will be obtained.

### 4.4.3 Granger causality

The study applied Granger causality test to determine the direction of causality. The Granger causality test is statistical hypothesis test for determining whether one time series is useful in forecasting another (Granger 1988)

## 4.5 Variables Measurements

This section describes variables which are studied in the research. Economic growth is measured as the rate at which the real GDP of Tanzania has been growing over time. Agriculture is measured as expenditure on agriculture as percentage of total expenditure, defence is measured as expenditure on defence as percentage of GDP, and human capital is measured as expenditure on health and education sector as percentage of total expenditure.

Table 4.: Variables and How They Were Measured

|  |  |  |
| --- | --- | --- |
| **Type of variable** | **Unit/Proxy** | **Used signs of variables** |
| Economic growth | Real GDP | Gdp |
| Agriculture | government expenditure on agriculture as percentage of total expenditure | Agr |
| Education human capital | Government expenditure on education as percentage of total expenditure | Educ |
| Health human capital | Government expenditure on health as percentage of total expenditure | HT |
| Defence | Government expenditure on defence as percentage of GDP | Def |

# CHAPTER FIVE

# 5.0 DATA ANALYSIS AND DISCUSSION OF RESULTS

## 5.1 Introduction

This chapter shows the econometric analysis between economic growth (GDP) and government sectoral spending particularly on human capital which is comprised of health and education, agriculture and defence/military sectors. To achieve the main and specific objectives of this study, the presence of statistical relationship among the variables are carried out in four steps.

Initially the order of integration of the variables are investigated using standard tests for the presence of unit root and the second step involves testing for co-integration using the Augmented Engle-Granger (1987) procedure is used. In the third step involves the utilization of Error Correction modeling, according to Engle-Granger (1987) when variables are co-integrated there always exists a corresponding error correction model that describes the short run dynamics of the co-integrating variables toward equilibrium.

Finally the fourth step involves testing for the direction causal relationship among the variables using simple pair-wise Granger causality test.

## 5.1 Data Reliability

This sub section explores the properties of each variable by descriptive statistics and correlation between the variables as well as unit root test between the variables.

### 5.1.1 Basic Descriptive Statistics

Before further data analysis, it is important to understand the properties of each variable by generating descriptive statistics. This helps to understand how the variables behave. Table 4.1 presents the mean, minimum, maximum, standard deviation, Skewness and Kurtosis test for each variable.

Table 5.: Descriptive Statistics

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Variable | Lgdp | Leduc | LHT | Lagr | LDef |
| Mean | 1.491908 | 2.783798 | 2.341488 | 1.717878 | 0.693685 |
| Std Dev. | 0.648414 | 0.423895 | 0.489803 | 0.370643 | 0.495251 |
| Min | -0.91629 | 2.043814 | 1.578979 | 0.770108 | -0.10536 |
| Max | 2.054124 | 3.268047 | 3.067588 | 2.398804 | 1.706565 |
| Skewness | -1.95975 | -0.41776 | 0.323174 | 0.78661 | -0.05249 |
| Kurtosis | 7.280496 | 1.696035 | 1.811804 | 3.423525 | 2.357008 |

**Source:** own estimation

Key: Lgdp = log of GDP, Leduc = Log of Expenditure on Education Sector, LHT = Log of Expenditure on Health, Lagr = Log of Expenditure on Agriculture and LDef = Log of Expenditure on defense

Table 4.1 shows that, the study has used 31 observations. Real GDP (gdp) has large standard deviation among all the variables, which suggests that GDP is highly volatile as compared to other variables. The results show that GDP and Defense starts from negative to positive. Other variables start from positive. The negative sign for Real GDP is caused by decline in its growth especially in early 1990’s where the real growth was less than 1 percent. This situation is similar to Defense whereby between 2010 and 2012 the expenditure was less than 1 percent of the total government expenditure.

In this study, a Skewness/Kurtosis test for normality is applied to the data to test the normality of each variable, as shown in table 4.1. The data shows that all variables are normally distributed. Furthermore, graphical sketch (in APPENDIX D) of each of the variables over time is made so as to informally identify the presence of any trending behavior in the variables in question over time.

### 5.1.2 Correlation Analysis

Correlation analysis among the variables shows the strength and direction of relationship among the two variables. A negative sign implies inverse relationship whereas a positive sign means a positive relationship. Table 4.2 presents the correlation matrix of the variables.

Table 5.: Correlation Matrix for Variables of the Model

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Lgdp | Leduc | LTH | Lagr | Ldef |
| Lgdp | 1 |  |  |  |  |
| Leduc | -0.2942 | 1 |  |  |  |
| LHT | -0.4738 | 0.7706 | 1 |  |  |
| Lagr | -0.2637 | 0.2395 | 0.347 | 1 |  |
| LDef | -0.4631 | 0.381 | 0.6358 | 0.0437 | 1 |

**Source:** Own estimation

Table 4.2 shows that all variables are positively correlated with each other except the correlation between economic growths (Lgdp) and other variables. This negative correlation might be due to the instabilities in Real GDP that the country has been experiencing over the years. One thing to note is that the direction and strength of the relationship might change due to inclusion of lagged term of variables in the Model.

## 5.2 Unit Root Tests

Model estimation begins with the analysis of order of integration of each variable using ADF test for this analysis. The unit root test is used to investigate the null hypothesis for this study that the variables contain unit root. The variables involved in unit root test are real value of GDP(Lgdp), percentage of education expenditure in total expenditure (Leduc), percentage of health expenditure in total expenditure (LHT), percentage of agriculture expenditure in total expenditure (Lagr), defence expenditure as percentage of GDP (Ldef) over the period 1985-2015.

Table 5.: Unit Root Results

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Variables |  | | ADF TEST | |  | ORDER OF INTEGRATION |
| LEVELS | 5% Critical value | | FIRST DIFFERENCE | 5% Critical value |
| Lgdp | -2.322 | -2.986 | | -5.952\*\*\* | -2.989 | I (1) |
| Leduc | -2.753 | -2.986 | | -6.216\*\*\* | -2.989 | I (1) |
| LHT | -2.376 | -2.986 | | -7.891\*\*\* | -2.989 | I (1) |
| Lagr | -3.282 | -3.580 | | -4.535\*\*\* | -3.584 | I (1) |
| Ldef | -0.724 | -2.986 | | -6.478\*\*\* | -2.989 | I (1) |

**Source:** Own Estimation

Note \*\*\*Indicates statistical significance at 5%.

Table 4.3 shows the results for the test of stationarity for the natural log of GDP and the selected variables for government expenditure at level form and First difference. From the table given above the test statistics failed to reject the null hypothesis of non-stationarity at levels form since the calculated values are less than the Mackinnon critical value (at 5%). Since the study failed to reject the null hypotheses at levels form, a further test for stationarity at the first difference was done.

The study successfully rejects the null hypothesis of non-stationarity and accepts the alternative hypothesis that the data is stationary, implying that these variables achieved stationarity at first difference. Thus, the study conclude that the variables under investigation are integrated of order one, that is to say I (1). Since the variables are integrated of the same order, the study, therefore, examine their co-integrating relationship using two steps Eagle and Granger co-integration procedure.

## 5.3 Empirical Analysis of Engle and Granger Co-integration Test

Co-integration refers to the fact that two or more series share a stochastic trend (Stock & Watson). Engle and Granger (1987) suggested a two-step process to test for co-integration (an OLS regression and a unit root test).the results in the table 4.4 suggest that government sectoral spending and economic growth are stationary at first difference this means that the stationary series allow employing the Engle-Granger(1987) approach.

Taking into the consideration that all the variables are best characterized by being integrated of order one I(1), the long run relationship between variables of government spending and economic growth is investigated using Engle-Granger. The ADF test is carried out to test wither the residual contain unit root or not, this is done by running OLS regression.

Table 5.: Co-integration test through AEG



**Source:** Own Estimation



The result from OLS regression shows that the residual is stationary at 5% critical level, a Durban-Watson statistic shows the existence of co-integration. Based on the appropriate critical value I reject the null hypothesis of no co-integration which implies the existence of long run tendency toward equilibrium. Hence, The residual from the regression of change in gdp on the respect changes in Leduc, LHT, Lagr and LDef and the residual (Rt) specified below,

∆Lgdpt = β0 + β1∆Leduc + β2∆LHT + β3∆Lagr + β4∆LDef + β5Rt

are integrated of order one I(1), that is they are stationary, hence the co-integrating error correction regression will be

Table 5.: Error Correction Regression Estimate



**Source:** Own Estimation

The estimated ECM equation above states that ∆Lgdpt as

∆Lgdpt = 0.0550785 + 0.0498383∆Leduc + 0.2513893∆LHT + 0.0000284∆Lagr + 0.245227∆LDef – 0.4710739Rt-1

The sign of the error correction term is negative and significant. It implies that the mechanism that adjusts to the long-run equilibrium by 47% of any disturbance that may occur in the short-run per annually. Therefore if there is a one unit percent disequilibrium shock in the preceding period, the impact of shock to change in Real GDP is corrected by 47 percent.

The results show that in the short-run the effect of education, health, agriculture and defence are positive. The results show that in the short-run the effect of health expenditure on GDP is significantly positive. The coefficient of health is 0.25; this means that a one percent increases in health expenditure will increase GDP by 0.25 percent. The positive significant impact of health expenditure on economic growth (GDP), can be explained by the huge investment increase in human capital more especially on health which represent an important links in determining the strength of the relationship between growth and development, as improvement of health care system improves health of the people/workers mentally and physically which guarantee high level of participation in economic activities leads to productivity increase that enhances output.

The other possible reason could be job creation as the investment in health sector go with improvement of existing health centers and building of new health centers (hospitals and dispensaries) which requires human resources so many medical attendants and doctors are employed to this sector. The findings of this research concerning the significant positive impact of health on GDP are consistent with the endogenous growth theories (Mainly developed by Lucas (1988), Romer (1990), ManKiw, Romer and Weil (1992) which argue that improvement in human capital (health workers) leads to productivity improvement that enhances output, also supports the Keynesian view that government investment on social sectors are causes of growth. With respect to the researches done, the findings are also similar to Tofik (2012), Katema (2006) and Teshome (2006).

The coefficient for government expenditure on defence has significant positive influence on economic growth, since a one percent increase in defence expenditure will cause GDP to rise by 0.245 percent. The significant positive impact of defence expenditure on GDP is because the defence expenditure has direct and important link to economic growth in Tanzania due to the fact that it facilitate favorable environment for the economy to operate by maintaining law and order and protecting the nation from external aggression. This ensures peace hence political stability of the nation which is vital for a good investment atmosphere for the both foreign and internal investors.

The other reason is military expenditure create jobs due to considerable infrastructure built up around them that requires contractors, trades, consultants and so on to support the military, then there are private business that emerge as result of military spending including everything from weapons manufacturers to restaurants and catering services that are near military base. This findings of positive significant effect of defence expenditure on economic growth is similar to Loto (2011) and Nworji and Oluwalaiye (2012).

The result shows that agriculture expenditure has positive impact on economic growth but insignificant, this means that spending on agriculture contribution almost nothing to GDP growth. This could be assisted by the migration of educated and healthy young people who move to urban areas especially Dar es salaam to search for good life, this leaving behind old, the sick and dependants in the village. The second reason could be the decrease in agricultural budget associated with increase in recurrent expenditure on agriculture sector which means the sector concentrated much on unproductive activities rather than productive activities, also most of the rural residents run subsistence farming due to lack of advanced technology as they depend on rainfall and hand hoe hence they produce mainly for consumption, even when their production increases because of good harvest additional income goes to more consumption rather than saving or investing.

On the other hand government expenditure on education has positive insignificant effect on economic growth (GDP), which implies that its contribution to GDP growth is futile. this can be explained by the factor that education may have big impact on the people who have no positive impact on the economy, as many graduates and youth are staying at home without involvement in economic activities due to lack of capital for self-employments as a result they become burden to both parents and government, so this may increase the dependency ratio that absorb the resources of the economy that would have been invested in creating new assets and values.

The other possible reason could be high rate of unemployment, this implies even if education status of the labor force has increased but their skills and creativity are yet to be employed neither in formal nor informal economic sectors hence retards growth as the acquired knowledge and skills contribute nothing to the economy. the findings of positive insignificancy effect of education sector on economic growth are empirically in the line with the previous studies Kweka and Morrissey (2000), Dimiti (2011) and Naftaly and Aquilars (2014) which concluded that investment on education sector has insignificant effect on economic growth as opposed by a study of Wendewesen Tsadiku (2012), Katema (2006) and Kidanemariam.G.G (2013) which concluded that spending on education sector contributes to economic growth.

The estimated ECM equation above shows that the short run changes in LHT and LDef have positive significant effect on the short run changes in Lgdp. While the short run changes in Leduc and Lagr have positive insignificant impact on the short run changes in Lgdp. Thus the estimated parameters *β1, β2, β3*and *β4* are the short run marginal effect on Lgdp

## 5.5 Granger Causality Tests

Co-integration implies the existence of Granger causality, but it does not indicate the direction of the causality relationship. The study investigates the direction of the relation using simple pair-wise Granger causality tests between government spending and economic growth. The study uses the Akaike's information criterion (AIC) to determine the optimum lag length. The series optimum lag length from the AIC is 4 because the higher order lag structure naturally provides a better fit for the data.

The Vector Autoregressive Model can be considered as a means of conducting granger causality tests. One of the hypothesis was to test for granger causality between the four variables, the null hypothesis state that: there is no Granger causality (coefficients on the lags of X are jointly equal to zero).Variables were subjected to basic Vector Autoregression (VAR) and results are presented in appendix C the significant co-integrating equations (vector) can be derived from those result

Table 5.: Pair-wise Granger Causality



Source:

Table 5.6 shows that the study rejected the null hypothesis that government expenditures Granger cause economic growth. However the results show that the null hypothesis that government spending granger cause Economic growth is rejected at 5% level of significance. Therefore, the tests reveal that there is unidirectional causality running from Economic growth to government expenditure. This means that Economic growth has granger cause to Education, Health, Agriculture and defense expenditures but these expenditures in these sectors jointly do not granger cause Economic growth (Real GDP).

The unidirectional causal relationship running from economic growth (GDP) to government sectoral spending (human capital, agriculture and defence) in Tanzania, implies that GDP has greater influence in government expenditures. This unidirectional relationship could be explained by the factor that Tanzania economy has been experiencing GDP growth especially from 1996/97 and reached its peak in 2004 by recording 7.8 percent growth, so this growth of GDP cause public expenditure to increase due to the fact that as the economy expands the sources of government revenue increases hence government fund increases with decrease in fiscal deficit this guarantee sufficient fund and ability to finance development projects (public expenditures) increases.

Economic growth is accompanied with spread of urbanization leading to the relative growth of public expenditure, with the growth of urban areas for instance in big cities like Arusha, Dar es salaam, Mwanza and Mbeya there has been an increasing tendency of expenditures on civil administration and social services, such as expenses on water supply, electricity, provision of transport, maintenance of roads, school and colleges, traffic controls, public health and the likes of expenditures on courts and prisons.

Economic growth is as well accompanied by population growth experience by Tanzania since 1980’s which naturally calls for increase in the public expenditure as all government functions are to be performed more extensively. The government will have the responsibility of solving problems such as food, unemployment, housing and health by spending more on those areas. The economic growth in Tanzania goes along with the expansion of trade and commerce since 2000’s, so Tanzania as a country has to provide and maintain a quick and efficient transport system to accommodate the expanded trade. Since transport system being a public utility the government has been investing in transport services, this obviously call for a high public expenditure for maintenance and expansion.

This findings support the public expenditure growth theory of Adolf Wagner (1883) which argue that as the economy develop over time the activities and functions of the government increases, and against the growth theory of Keynesian which argue that increase in government spending is the stimulator of the economic growth and other macroeconomic variables. More interesting the results show that Health expenditure granger cause Economic growth as well as economic growth granger causes health expenditure. This shows that there is a bi-directional between health expenditure and economic growth. Moreover the results show that Health and defense expenditure does not granger cause agriculture expenditure while Education and GDP granger cause agriculture expenditure.

The bidirectional causal relationship between health expenditure and GDP in Tanzania is consistent with the endogenous growth theories which argue that the improvement in human capital (healthy labor force) leads to productivity improvement and thereby output growth. The health expenditure granger cause economic growth and economic growth granger cause health in Tanzania could be explained by the significant increase in the share of health expenditure since 1989/90 and doubled in 2004/10 pushed by MKUKUTA I & II and Tanzania development vision 2025, where the government have been investing much in health sectors so as to have healthy society with improved social wellbeing that will contribute effectively to personal and national development.

So through this the government have been investing in strengthening the health system, rehabilitation, human resource development, improved availability of medicines, medical equipments and in the recent years the government has improved the financing of district health service by investing more on complimentary financing option of the national health insurance fund (NHIF) and community health fund (CHF) which accommodates large number of citizens, this has helped to improve health status and increase life expectancy in Tanzania as a result more healthy Tanzanians labor force which leads to productivity improvement hence output growth (GDP).

The unidirectional causal relationship from education expenditure to agriculture expenditure in Tanzania could be explained by the unemployment in the government institutions(inability of the government to employ all graduates from different level of education), the government have heavily invested in education sector (poverty reduction sector) as Tanzania development vision 2025 needs, as a result thousand are graduating every year and the government institutions cannot afford to employ all of them. The only sector that can employ and have been employing about 65 percent of Tanzanians is agriculture, so the government has decided to invest in agriculture sector by improving different infrastructures so as to create good and friendly agricultural environment which can enable more youth and graduates to be absorbed/employed by the agriculture sector.

# CHAPTER SIX

# 6.0 CONCLUSION AND POLICY IMPLICATIONS

## 6.1 Conclusion

The main objective of the study was to investigate the impact of government spending on economic growth in Tanzania, a particular focus on human capital (education and health), agriculture and defence sectors. To estimate the model first the series was tested for stationarity, and co-integration analysis test was done, after indicating the presence of long run relationship using Augmented Engle and Granger approach the short run dynamics of the long run economic growth was examined by estimating an error correction model.

The econometrics findings confirmed that spending on education, health; agriculture and defence have positive effect on economic growth (GDP). The results of the health and defence indicates that in the short run health and defence expenditures have positive significant impact on growth, while the study found that in the short run education and agriculture sectors have positive insignificant effect on growth. Results also showed that there were three co-integrating equations obtained by a linear combination involving economic growth (GDP), human capital, agriculture and defence.

This means the four series will tend to move together towards the equilibrium in the long run. However this movement is not necessarily causal. So the Granger causality test was employed to test whether the relationship can be interpretated in term of causality, upon using Granger causality test the study confirmed that there are three causality relationships.

There is unidirectional causality running from economic growth to government sectoral expenditure. This means that economic growth has greater cause to education, health, agriculture and defence expenditure but these sectors expenditure jointly do not granger because economic growth, these findings is similar to the public expenditure theory of Adolf Wagner (1890) which argues that economic growth causes the growth of public expenditure. Another unidirectional causal relationship was from education expenditure to agriculture expenditure. The final causal relationship was bidirectional causal relationship between health expenditure and economic growth (GDP).

From this study, it can be concluded that economic performance can be improved significantly when the ratio of public spending on health and defence to total public spending increases, and the budgets for education and agriculture should be increased by reducing recurrent expenditures to concentrate more on productive activities inorder to realize truly significant impact of agriculture and education on economic growth.

## 6.2 Policy Implication

The findings of this research have important policy implications. In order to improve economic growth, the public expenditure needs to be better prioritized towards basic health services provision. More resources should be devoted to improve health of the citizens of Tanzania a such measure has a large impact on human productivity which leads to improved nation output since healthier labor force are always strong, energetic, creative and attentive hence make them more effective and efficient in the production process.

In addition to achieve economic growth, also more resources should be channeled to defence service since it has a large impact on improving national growth simply because an improved defence force is able to maintain internal peace and security among the citizens and protecting nation from external aggression, hence maintain political stability which is essential feature to attract investors and for the good stable investment atmosphere as it assures both domestic and foreign investors that their asset will be well safeguarded.

The government should strive to create institutional capacity so as to achieve sustainable growth through transforming the defence force to modern one and improve basic health service. This means the policy makers should focus on obtaining more resources which are crucial and appropriate for strengthening, training new institutions or changing the existing institutional setups of the defence and health sectors of Tanzania that bring modern defence force with sophisticated techniques, tactical, weapons and produce quality manpower.

The findings also shows that despite the positive impact of health and defence on economy, the economic growth (GDP) is highly cause sectors expenditures (jointly). This implies that as the economy expand more government expenditure is required, more over it shows that the government sectoral spending in Tanzania is influenced by economic growth and not reverse. So a well-defined expenditure policy that identifies the unproductive and productive activities should be pursued and efficient management of resources in development of education, health, agriculture and defence should be emphasized.

Regarding the positive insignificant association found between government expenditure on agriculture and economic growth, the government or policy makers should now abide/comply with the Maputo declaration which requires all African countries to allocate at least 10 percent of the budget resources to agriculture sector so as to realize truly contribution of agriculture sector in the economy

## 6.2.1 Limitation of the Study

The study only employed 31 years annual data covering from 1985 to 2015; this study also excluded comparative analysis with other countries. In this research public expenditure on only formal education was used as a proxy for human capital investment in education area hence excluding the impact of informal education on production as well economic growth. The study did not include the impact of private expenditure on human capital investment, agriculture and defence as a result the contribution of private sector on investment in economic growth was not presented.

**6.2.2 Areas for Further Research**

More research is needed so as to provide a broader and reliable source of information that will help planners and policy makers toward better strategically plans and allocate resources more efficiently. For further research, I recommend other studies to investigate the impact of government spending in transportation infrastructures and aids (official development assistance) on economic growth, as well as the impact of recurrent expenditures on GDP growth so as to obtain more valuable and applicable findings that can address many issues and impact directly on the welfare of the individuals and the country at large.

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# APPENDICES

**Appendix A**



**Appendix B**



**Appendix C**

**Table 4.5.1 Vector Autoregression results**

|  |  |  |  |
| --- | --- | --- | --- |
| Sample: 1989 – 2015  Log likelihood = 127.0564  FPE = 1.84e-06  Det(Sigma\_ml) = 5.63e-11 | | | No. of obs =27 |
| AIC =-1.63381 |
| HQIC =-0.13534 |
| SBIC = 3.405557 |
| Equation Parms | RMSE | R-sq | chi2 P>chi2 |
| Lgdp 21 | 0.719154 | 0.7329 | 74.08563 0.0000 |
| Leduc 21 | 0.138674 | 0.9728 | 963.9899 0.0000 |
| LHT 21 | 0.223001 | 0.9429 | 446.2556 0.0000 |
| Lagr 21 | 0.308128 | 0.8577 | 162.722 0.0000 |
| LDef 21 | 0.093039 | 0.9891 | 2444.77 0.0000 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Coef. | Std. Err. | Z | P>|z| | | | [95% Conf. | | Interval] |
| Lgdp | Lgdp |  | | | | | | | |
|  | L1. .3835875 | 0.172988 | 2.22 | 0.027 | | | .0445382 | | 0.722637 |
| L2. -.1128121 | 0.189399 | -0.6 | 0.551 | | | -.4840267 | | 0.258403 |
| L3. -.2576433 | 0.194944 | -1.32 | 0.186 | | | -.6397255 | | 0.124439 |
| L4. .4194446 | 0.228656 | 1.83 | 0.067 | | | -.0287137 | | 0.867603 |
| Leduc |  |  |  | | |  | |  |
| L1. .5305069 | 0.423894 | 1.25 | 0.211 | | | -.3003096 | | 1.361323 |
| L2. -.0585198 | 0.598171 | -0.1 | 0.922 | | | -1.230913 | | 1.113873 |
| L3. .6378401 | 0.510809 | 1.25 | 0.212 | | | -.363327 | | 1.639007 |
| L4. .2188349 | 0.425897 | 0.51 | 0.607 | | | -.6159084 | | 1.053578 |
| LHT |  |  |  | | |  | |  |
| L1. -.776615 | 0.535699 | -1.45 | 0.147 | | | -1.826566 | | 0.273336 |
| L2. -.7902864 | 0.486728 | -1.62 | 0.104 | | | -1.744257 | | 0.163684 |
| L3. -.4612924 | 0.433827 | -1.06 | 0.288 | | | -1.311578 | | 0.388994 |
| L4. -.2644262 | 0.417186 | -0.63 | 0.526 | | | -1.082095 | | 0.553243 |
| Lagr |  |  |  | | |  | |  |
| L1. -.1145997 | 0.442666 | -0.26 | 0.796 | | | -.9822088 | | 0.753009 |
| L2. .3726885 | 0.429034 | 0.87 | 0.385 | | | -.4682021 | | 1.213579 |
| L3. -.1554475 | 0.345498 | -0.45 | 0.653 | | | -.8326105 | | 0.521716 |
| L4. .4016329 | 0.458209 | 0.88 | 0.381 | | | -.4964395 | | 1.299705 |
| LDef |  |  |  | | |  | |  |
| L1. -.7012314 | 0.634427 | -1.11 | 0.269 | | | -1.944685 | | 0.542223 |
| L2. -.1927326 | 0.89589 | -0.22 | 0.830 | | | -1.948645 | | 1.56318 |
| L3. 1.390916 | 0.842494 | 1.65 | 0.099 | | | -.2603404 | | 3.042173 |
| L4. .0075204 | 0.487305 | 0.02 | 0.988 | | | -.9475796 | | 0.96262 |
|  |  |  |  | | |  | |  |
| \_cons 1.253657 | 1.386666 | 0.9 | 0.366 | | | -1.464158 | | 3.971471 |
| Leduc |  |  |  |  | | |  | |  |
|  | Lgdp |  |  |  | | | |  |  |
| L1. .0073361 | 0.033357 | 0.22 | 0.826 | | | | -.0580428 | 0.072715 |
| L2. -.0794844 | 0.036522 | -2.18 | 0.030 | | | | -.1510657 | -0.0079 |
| L3. .0073964 | 0.037591 | 0.2 | 0.844 | | | | -.0662805 | 0.081073 |
| L4. -.0628581 | 0.044092 | -1.43 | 0.154 | | | | -.1492765 | 0.02356 |
| Leduc |  |  |  | | | |  |  |
| L1. .4957242 | 0.081739 | 6.06 | 0.000 | | | | .3355179 | 0.655931 |
| L2. -.1228901 | 0.115345 | -1.07 | 0.287 | | | | -.3489626 | 0.103183 |
| L3. .0376106 | 0.098499 | 0.38 | 0.703 | | | | -.1554444 | 0.230666 |
| L4. -.1831332 | 0.082126 | -2.23 | 0.026 | | | | -.3440967 | -0.02217 |
| LHT |  |  |  | | | |  |  |
| L1. .4401366 | 0.103299 | 4.26 | 0.000 | | | | .2376745 | 0.642599 |
| L2. .6559204 | 0.093856 | 6.99 | 0.000 | | | | .4719664 | 0.839875 |
| L3. -.1834273 | 0.083655 | -2.19 | 0.028 | | | | -.3473879 | -0.01947 |
| L4. -.0426027 | 0.080446 | -0.53 | 0.596 | | | | -.2002738 | 0.115068 |
| Lagr |  |  |  | | | |  |  |
| L1. -.6984236 | 0.085359 | -8.18 | 0.000 | | | | -.8657247 | -0.53112 |
| L2. .0136052 | 0.082731 | 0.16 | 0.869 | | | | -.1485437 | 0.175754 |
| L3. -.2327804 | 0.066622 | -3.49 | 0.000 | | | | -.3633577 | -0.1022 |
| L4. -.6031847 | 0.088356 | -6.83 | 0.000 | | | | -.7763599 | -0.43001 |
| LDef |  |  |  | | | |  |  |
| L1. .4972063 | 0.122337 | 4.06 | 0.000 | | | | .2574311 | 0.736982 |
| L2. -.3438927 | 0.172755 | -1.99 | 0.047 | | | | -.6824852 | -0.0053 |
| L3. -.607898 | 0.162458 | -3.74 | 0.000 | | | | -.9263098 | -0.28949 |
| L4. -.0250171 | 0.093967 | -0.27 | 0.790 | | | | -.209189 | 0.159155 |
| \_cons 3.309935 | 0.267391 | 12.38 | 0.000 | | | | 2.785859 | 3.834011 |
| LTH |  |  |  |  | | | |  |  |
|  | Lgdp |  |  |  | | | |  |  |
| L1. -.0143433 | 0.053641 | -0.27 | 0.789 | | | | -.1194782 | 0.090792 |
| L2. -.0718428 | 0.05873 | -1.22 | 0.221 | | | | -.1869517 | 0.043266 |
| L3. .2297974 | 0.06045 | 3.8 | 0.000 | | | | .1113186 | 0.348276 |
| L4. .1452261 | 0.070903 | 2.05 | 0.041 | | | | .0062579 | 0.284194 |
| Leduc |  |  |  | | | |  |  |
| L1. .5899446 | 0.131444 | 4.49 | 0.000 | | | | .332319 | 0.84757 |
| L2. -.1208708 | 0.185485 | -0.65 | 0.515 | | | | -.484415 | 0.242673 |
| L3. .2612274 | 0.158395 | 1.65 | 0.099 | | | | -.0492218 | 0.571677 |
| L4. -.3026361 | 0.132065 | -2.29 | 0.022 | | | | -.5614794 | -0.04379 |
| LHT |  |  |  | | | |  |  |
| L1. -.1939215 | 0.166114 | -1.17 | 0.243 | | | | -.519498 | 0.131655 |
| L2. .2832281 | 0.150928 | 1.88 | 0.061 | | | | -.0125859 | 0.579042 |
| L3. .3057008 | 0.134524 | 2.27 | 0.023 | | | | .0420379 | 0.569364 |
|  | L4. .1948076 | 0.129364 | 1.51 | 0.132 | | -.0587411 | | | 0.448356 |
| Lagr |  |  |  | |  | | |  |
| L1. -.2395318 | 0.137265 | -1.75 | 0.081 | | -.5085663 | | | 0.029503 |
| L2. .1667021 | 0.133038 | 1.25 | 0.210 | | -.0940474 | | | 0.427452 |
| L3. -.4309519 | 0.107134 | -4.02 | 0.000 | | -.6409315 | | | -0.22097 |
| L4. -.1429759 | 0.142085 | -1.01 | 0.314 | | -.4214567 | | | 0.135505 |
| LDef |  |  |  | |  | | |  |
| L1. .2733433 | 0.196728 | 1.39 | 0.165 | | -.1122359 | | | 0.658923 |
| L2. .051618 | 0.277804 | 0.19 | 0.853 | | -.492868 | | | 0.596104 |
| L3. .1711303 | 0.261247 | 0.66 | 0.512 | | -.3409034 | | | 0.683164 |
| L4. -.29226 | 0.151107 | -1.93 | 0.053 | | -.5884244 | | | 0.003904 |
| \_cons .2742582 | 0.429987 | 0.64 | 0.524 | | -.5685015 | | | 1.117018 |
| Lagr |  |  |  |  | |  | | |  |
|  | Lgdp |  |  |  | |  | | |  |
| L1. -.2178262 | 0.074118 | -2.94 | 0.003 | | -.3630949 | | | -0.07256 |
| L2. -.1576817 | 0.08115 | -1.94 | 0.052 | | -.316732 | | | 0.001369 |
| L3. .279084 | 0.083525 | 3.34 | 0.001 | | .1153774 | | | 0.442791 |
| L4. .086649 | 0.09797 | 0.88 | 0.376 | | -.1053685 | | | 0.278667 |
| Leduc |  |  |  | |  | | |  |
| L1. .3078508 | 0.181621 | 1.7 | 0.090 | | -.0481201 | | | 0.663822 |
| L2. .2372766 | 0.256292 | 0.93 | 0.355 | | -.265046 | | | 0.739599 |
| L3. .6407372 | 0.218861 | 2.93 | 0.003 | | .211778 | | | 1.069696 |
| L4. -.2943888 | 0.18248 | -1.61 | 0.107 | | -.6520422 | | | 0.063265 |
| LHT |  |  |  | |  | | |  |
| L1. -.2023358 | 0.229525 | -0.88 | 0.378 | | -.652197 | | | 0.247525 |
| L2. -.3433359 | 0.208543 | -1.65 | 0.100 | | -.7520731 | | | 0.065401 |
| L3. -.1338384 | 0.185877 | -0.72 | 0.472 | | -.4981512 | | | 0.230474 |
| L4. .1016116 | 0.178747 | 0.57 | 0.570 | | -.2487261 | | | 0.451949 |
| Lagr |  |  |  | |  | | |  |
| L1. -.0266105 | 0.189664 | -0.14 | 0.888 | | -.3983455 | | | 0.345125 |
| L2. -.0424155 | 0.183823 | -0.23 | 0.818 | | -.4027028 | | | 0.317872 |
| L3. -.5706296 | 0.148032 | -3.85 | 0.000 | | -.8607663 | | | -0.28049 |
| L4. -.0430049 | 0.196324 | -0.22 | 0.827 | | -.4277922 | | | 0.341782 |
| LDef |  |  |  | |  | | |  |
| L1. -.4989425 | 0.271826 | -1.84 | 0.066 | | -1.031712 | | | 0.033827 |
| L2. .0636616 | 0.383852 | 0.17 | 0.868 | | -.6886751 | | | 0.815998 |
| L3. .3199748 | 0.360974 | 0.89 | 0.375 | | -.3875213 | | | 1.027471 |
| L4. .1333984 | 0.20879 | 0.64 | 0.523 | | -.275823 | | | 0.54262 |
| \_cons 1.719716 | 0.59413 | 2.89 | 0.004 | | .5552434 | | | 2.884188 |
| LDef |  |  |  |  | |  | | |  |
|  | Lgdp |  |  |  |  | | | |  |
|  | L1. -.0681074 | 0.02238 | -3.04 | 0.002 | -.1119712 | | | | -0.02424 |
| L2. .0010496 | 0.024503 | 0.04 | 0.966 | -.0469755 | | | | 0.049075 |
| L3. -.1294024 | 0.02522 | -5.13 | 0.000 | -.1788335 | | | | -0.07997 |
| L4. -.0543773 | 0.029582 | -1.84 | 0.066 | -.1123569 | | | | 0.003602 |
| Leduc |  |  |  |  | | | |  |
| L1. -.1459682 | 0.05484 | -2.66 | 0.008 | -.2534534 | | | | -0.03848 |
| L2. .4288607 | 0.077387 | 5.54 | 0.000 | .2771847 | | | | 0.580537 |
| L3. -.1999459 | 0.066085 | -3.03 | 0.002 | -.3294698 | | | | -0.07042 |
| L4. .555294 | 0.0551 | 10.08 | 0.000 | .4473008 | | | | 0.663287 |
| LHT |  |  |  |  | | | |  |
| L1. .1512077 | 0.069305 | 2.18 | 0.029 | .0153725 | | | | 0.287043 |
| L2. -.0984228 | 0.06297 | -1.56 | 0.118 | -.2218407 | | | | 0.024995 |
| L3. .0423459 | 0.056126 | 0.75 | 0.451 | -.0676581 | | | | 0.15235 |
| L4. -.5629974 | 0.053973 | -10.43 | 0.000 | -.6687817 | | | | -0.45721 |
| Lagr |  |  |  |  | | | |  |
| L1. -.2061793 | 0.057269 | -3.6 | 0.000 | -.3184244 | | | | -0.09393 |
| L2. -.4077956 | 0.055505 | -7.35 | 0.000 | -.5165841 | | | | -0.29901 |
| L3. .1261813 | 0.044698 | 2.82 | 0.005 | .0385747 | | | | 0.213788 |
| L4. -.2556801 | 0.05928 | -4.31 | 0.000 | -.3718663 | | | | -0.13949 |
| LDef |  |  |  |  | | | |  |
| L1. .7839829 | 0.082078 | 9.55 | 0.000 | .6231136 | | | | 0.944852 |
| L2. -.4450145 | 0.115904 | -3.84 | 0.000 | -.672182 | | | | -0.21785 |
| L3. .2554134 | 0.108996 | 2.34 | 0.019 | .0417854 | | | | 0.469041 |
| L4. .1733586 | 0.063044 | 2.75 | 0.006 | .0497945 | | | | 0.296923 |
| \_cons 1.06043 | 0.179397 | 5.91 | 0.000 | .7088183 | | | | 1.412042 |

**Appendix D**

**Trend of variables (a)**



(b)



**Source:** Own Estimation

**DATA USED**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 |
| GDP | 2.60 | 2.00 | 5.00 | 4.40 | 2.60 | 6.20 | 2.80 | 1.80 | 0.40 | 1.40 | 3.60 |
| education | 8.28 | 25.82 | 26.20 | 26.26 | 26.18 | 26.02 | 25.79 | 25.47 | 22.67 | 18.64 | 15.15 |
| Health | 5.66 | 20.65 | 21.30 | 21.48 | 21.49 | 21.40 | 21.23 | 20.99 | 18.70 | 15.39 | 12.51 |
| agriculture | 7.07 | 6.18 | 4.84 | 4.67 | 4.95 | 5.53 | 6.40 | 7.57 | 8.23 | 8.38 | 8.55 |
| defence | 2.30 | 4.66 | 5.51 | 4.24 | 3.52 | 3.29 | 3.06 | 2.91 | 2.65 | 2.28 | 1.92 |

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 |
| GDP | 4.79 | 3.58 | 4.10 | 4.80 | 4.90 | 6.08 | 7.2 | 6.86 | 7.8 | 7.40 | 6.7 |
| education | 9.64 | 14.48 | 8.88 | 9.47 | 22.17 | 23.97 | 23.26 | 21.77 | 11.28 | 8.85 | 9.02 |
| Health | 5.24 | 5.32 | 6.91 | 7.97 | 8.79 | 9.76 | 9.23 | 13.48 | 7.50 | 10.28 | 7.56 |
| agriculture | 2.16 | 2.72 | 4.58 | 7.45 | 6.38 | 4.92 | 4.33 | 7.31 | 11.01 | 6.26 | 3.77 |
| defence | 1.93 | 1.99 | 2.46 | 2.29 | 2.17 | 2.31 | 2.52 | 1.85 | 2.29 | 2.13 | 1.66 |

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
| GDP | 7.14 | 7.00 | 6.04 | 7.00 | 6.40 | 6.90 | 7.30 | 7.00 | 7.1 |
| education | 9.11 | 7.72 | 12.28 | 17.61 | 16.88 | 19.02 | 17.14 | 17.45 | 17.20 |
| Health | 6.16 | 7.09 | 4.85 | 10.38 | 8.94 | 8.48 | 8.21 | 8.00 | 8.10 |
| agriculture | 2.49 | 4.30 | 6.70 | 7.78 | 6.85 | 7.26 | 4.98 | 5.46 | 4.45 |
| defence | 1.22 | 1.43 | 1.40 | 0.90 | 0.90 | 0.90 | 1.00 | 1.00 | 1.00 |