THE IMPACT OF DISAGGREGATED GOVERNMENT EXPENDITURE ON ECONOMIC GROWTH: EVIDENCE FROM MALAWI

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MASTERS OF ARTS (ECONOMICS)

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DECLARATION

This thesis is my own original work and it has not been submitted to any other institution for similar purposes. Acknowledgements have been duly made where other people's work have been used. I bear the responsibility for the contents of this paper.

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Full Legal Name

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Signature

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Date

CERTIFICATE OF APPROVAL

The undersigned certify that this thesis represents the student's own work and effort and has been submitted with our approval.

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Second Supervisor

DEDICATION

I dedicate this work to my Parents, Brothers and Sisters, for all the love, endurance and support. Thank you and God bless you abundantly.

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First, I thank the almighty God, for his grace has been sufficient for me. To Him be the glory and honour.

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ABSTRACT

Understanding the impact of government expenditure in promoting economic growth is becoming increasingly important in Malawi, given the increased government expenditure and sluggish economic growth. This study investigates the impact of disaggregated government expenditure on economic growth in Malawi using time series data from 1980 to 2019, focusing on sectoral government expenditures in education, health, transport and communication and agriculture. The objective of the study was to establish whether components of government expenditure have any impact on economic growth. Employing the Auto-Regressive Distributed Lag (ARDL) model, the study found that the growth effects of government expenditure vary at disaggregated levels. The study results show that health public expenditure has positive long run impact on economic growth in Malawi. The study also show that government spending on transport and communication sector has positive effect on economic growth in Malawi in the long-run. Results from the study, however, reveal that government spending in education and agriculture sectors has an insignificant impact on economic growth in the long-run. Short-run results revealed that government expenditure on health, education, agriculture and transport and communication sectors have a significant impact on economic growth in Malawi. Given the positive and significant long-run impact of government spending in the health and transport and communication sector, the study recommends that reforming public expenditure in favour of these two sectors is paramount in stimulating long-term economic growth in Malawi. The positive impact of government expenditure in the health sector also supports the call for Government of Malawi under the Abuja Declaration to ensure that it allocates at least 15% of budgetary funds every year towards health sector in order to promote human capital development and economic growth.

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ARDL:	Auto-Regressive Distributed Lag
CAADP:	Comprehensive Africa Agriculture Development Programme
CGE:	Computable General Equilibrium
CVA:	Construction Value Added
ECT:	Error Correction Term
FDI:	Foreign Direct Investment
FISP:	Farm Input Subsidy Program
GDP:	Gross Domestic Product
GFSM:	Government Finance Statistics Manual
GMM	Generalised Method of Moments
GoM:	Government of Malawi
HIPC-MDRI:	Highly Indebted Poor Country-Multilateral Debt Relief Initiative
ICT:	Information Communications technology
IFPRI:	International Food Policy Research Institute
IMF:	International Monetary Fund
KPAs:	Key Priority Areas
MGDS:	Malawi Growth Development Strategy
MoAFS	Ministry of Agricultural and Food Security
MPER:	Malawi Public Expenditure Review
MW2063:	Malawi Vision 2063
NTMP:	National Transport Master Plan
NSO:	National Statistics Office
OLS:	Ordinary Least Squares
PP:	Philip Perron
RBM:	Reserve Bank of Malawi
SPEED:	Statistics of Public Expenditure for Economic Development
SSA:	Sub-Saharan Africa
SWAp:	Sector Wide Approach

VECM: Vector Error Correction Model

WDI: World Development Indicators

CHAPTER ONE

INTRODUCTION

1.1 Background

Government plays an important part in economic activities of every nation through spending, enterprising and regulating. Ross, et al., (2009) argues that governments perform different functions with an aim of upholding the economic framework, allocating resources efficiently, correcting market failure and promoting equity. Abdullahi (2000) and Al-Yousif (2000), argue that government ensures that public goods are provided adequately. Government provides for goods and services that are not fully produced by the market and these include good roads, education, health and defence to mention few. In order to provide public goods, government mobilises resources through different ways such as taxes, fees, commissions and debt. Musaba, et al., (2013) argues that in most developing countries, governments use public expenditure as the main instrument in promoting economic growth in order to achieve macroeconomic objective of sustainable economic growth. In order to achieve this objective, governments particularly those in developing countries resort to spending more than revenue they generated.

Economic theory has not postulated strong conclusions on the relationship between government spending and economic growth. Results from empirical studies on the impact of government expenditure on economic growth is also inconclusive. Sunday and Elizabeth (2012) argues that composition of public expenditure has also attracted the attention of economists in recently. Due to insufficient revenue collected by government, it is of great importance to categorise productive and non-productive government expenditure in order to achieve allocative efficiency. Allocation of government resources without considering the impact on the economy may lead to greater distortions in the economy and can be detrimental to economic growth.

There is limited knowledge on how different components of government expenditure affect economic growth. This question is becoming increasingly important for at least two reasons. First, most sectors in developing countries require more budgetary funding allocations yearly hence the need to establish an appropriate way of allocating government resources. After the fiscal adjustment programs, most developing countries find it hard to choose when performing fiscal restraint such as determining which government expenditure to increase or cut. Policymakers should have knowledge on relative effects of different government expenditures to economic performance when making budget reallocation decisions. Another reason is that the World Bank carries out Public Expenditure Reviews (PERs) of different countries periodically, to evaluate the mix of public expenditures, among other things. An empirical analysis on how different government expenditures affect economic growth will be helpful to these evaluations.

Malawi continues to experience rising levels of public expenditure and sustained budget deficits and this has resulted to public debt to cover the deficit. Meeting the Malawi 2063 (MW2063) which is aimed at transforming Malawi into a self-reliant and wealthy industrialized country requires the inclusion of higher expenditures on productive social spending and more efficient government spending. Government expenditure has continued to rise as a result of increased demand for public goods such as health, education, roads, communication and power. Given the competing uses of public funds, what is important is how government should allocate expenditure across different economic sectors to achieve sustainable economic growth. Government of Malawi (GoM) continues to prioritise the budget for education, agriculture, transport and infrastructure, and health care.

As expressed in different development plans and strategies, sustainable economic growth is one of the major macroeconomic objectives of the GoM. Despite the massive annual spending, Malawi continues to experience weak and volatile economic growth. Malawi's real GDP per capita increased by 1.3% on average between 1999 and 2020, lagging behind the 2.7% average for non-resource-rich Sub-Saharan African (SSA) economies (World Bank, 2017). Malawi remains among the world's poorest countries

and this is evident that the increasing government expenditure in Malawi has not achieved meaningful growth.

1.2 Research Problem

A fundamental question in growth theory asks whether increasing government expenditure promotes economic growth. On one hand, government spending on health care and education increases productivity of labour. In addition, government investment on transport and communications infrastructure also promotes domestic private investment thereby boosting economic growth (Alshahrani & Alsadiq, 2014). Barro and Sala-i-Martin (1992) argues that government spending on education and defense are public investment and affect productivity of the private sector. However, increased government expenditure may hamper economic growth when such spending is financed by increased taxes and borrowing. Furthermore, to continue remaining in power and popular especially during election periods, governments officials and politicians spend and invest more on unproductive activities that can be undertaken by the private sector more efficiently. Therefore, government sometimes misallocates resources and this may impede the growth of national output (Olulu et al., 2014).

There is no consistent empirical evidence on the relationship between government expenditure and economic growth. Empirical studies done on the impact of government expenditure on economic growth have found different results (Samuel & Oruta, 2021). For instance, according to Kormain and Bratimasrene (2007), there is a significant and positive relationship between government expenditure and economic growth. In contrast, Husnain, et al., (2011) found a significant but negative relationship. Akpan (2005) found the relationship between government expenditure and economic growth to be insignificant. Sunday and Elizabeth (2012), using the vector Autoregressive (VAR) approach in Nigeria, found that expenditure on education does not enhance economic growth whereas expenditure on health and agriculture has a positive impact on economic growth. Nurudeen and Usman (2010) using a disaggregated method of analysis found results similar to Sunday and Elizabeth (2012) regarding education and health expenditures. On the other hand, Ditimi (2011) by using multivariate co-integration approach concludes that expenditure on agriculture had a significant influence on economic growth while expenditure on education, health and transport and communication had insignificant influence on economic growth. Saad and Kalakech (2009) evaluated the impact of public spending on education, defense, health and

agriculture in Lebanon and found results contrary to those of Ditimi (2011). In the long-run, Saad and Kalakech (2009) found that expenditures on education are found to be positively significant and expenditures on defense showed a negative relationship with the economic growth. However, expenditures on health and agriculture were found to be insignificant. In the short-run, their results revealed negative relationships between educational and health spending whereas, agriculture and defense spending was found to be statistically insignificant.

Musaba et al., (2013) in Malawi by using co-integration analysis evaluated the growth effects of government expenditures in agriculture, education, health, and defense, social protection and transport and communication. Their study found that short-run results showed no significant relationship between government sectoral expenditure and economic growth, which is contradictory to findings of Saad and Kakalech (2009). In the long-run, Musaba et al. (2013) found that expenditure on agriculture and defense has a positive and significant effect, whereas expenditures on education, health, social protection and transportation and communication were negatively related to economic growth. These contrasting results provided an opening that required further study particularly in Malawi.

This study aims at filling the gap in the literature on the impact of government expenditure components on economic growth in Malawi. Unlike Kormain and Brahmasrene (2007), Husnain et al., (2011) and Akpan (2005) who used aggregated government expenditure, this study focuses on public expenditure at a disaggregated level to ensure that specific contribution of each component of public spending is well investigated. Li and Liang (2010), Acosta-Ormaechea and Morozumi (2013), Gisore, et al., (2014), Fan and Rao (2003), Bose, Hague and Osborn (2007) conducted studies on the relationship between government expenditure and economic growth on cross-country basis. In this respect, different countries produce different result of the impact of sectoral expenditure on economic growth. Therefore, studies should be country specific in order to capture the effects of each sector's expenditure on economic growth. In Malawian case, the number of studies done so far is limited and further study is still required. This study utilises the most recent data and a larger sample size (40 observations) compared to the study by Musaba et al., (2013) who used a smaller sample of 27 observations. The analytical approach (VAR) adopted by this study is also different from previous study by Musaba et al., (2013). The VAR analytical approach

has several essential advantages. The approach efficiently corrects for any possible endogeneity among the dependent variables. Another key advantage of the ARDL approach is that it helps to avoid the uncertainties generated by unit root pre-testing as it can be applied regardless of whether the series are I(0) or I(1). Another advantage with this approach is that it can be applied to studies having a small sample size and both the short-run and long-run relationship can be estimated simultaneously.

The disaggregated expenditure approach adopted by the study will establish specific sector expenditures that have significant impact on economic growth in light of more recent evidence. The choice of variables included in this study was made in line with prioritised sectors outlined in the MGDS III designed by the Government to improve Malawian economy. These sectors were also chosen due to the fact that a substantial share of total government spending is allocated to these sectors. The study seeks to add knowledge to the existing literature by providing empirical evidence on how government can efficiently allocate its resources in consistent with policy objectives.

1.3 Objectives of Study

The main objective of this study is to investigate the impact of disaggregated government expenditure on economic growth in Malawi. The specific research objectives are as follows:

i) To investigate the impact of public health expenditure on economic growth in Malawi

ii) To examine the impact of education public expenditure on economic growth in Malawi

iii) To analyse the impact of agriculture public expenditure on economic growth in Malawi

iv) To examine the impact of transport and communication public expenditure on economic growth in Malawi

1.4 Study Hypotheses

Based on the study objectives, the following hypotheses were tested;

Null hypotheses:

H_0: Disaggregated government expenditure on education does not have a significant positive impact on economic growth in Malawi.

H_0: Disaggregated government expenditure on health does not have a significant positive impact on economic growth in Malawi.

H_0: Disaggregated government expenditure on agriculture does not have a significant positive impact on economic growth in Malawi.

H_0: Disaggregated government expenditure on transport and communication does not have a significant positive impact on economic growth in Malawi.

1.5 Significance of the Study

Issues of government expenditure trend and its impact on economic growth are essential to the understanding of public sector economy. Neither empirical proof nor theory provides straightforward answers to the question of how composition of government expenditure affects economic growth. Based on theory, rationale for government provision of goods and services relies on the failure of markets to provide public goods, covering costs in the existence of economies of scale and internalisation of externalities. However, this theoretical notion does not define rules when determining which component of government expenditure to be cut or increased. Therefore, it is important for government to have knowledge on how each component of government expenditure contributes to economic growth before deciding which expenditure to increase or cut.

This study was motivated by the increasing level of government spending, low rates of economic growth and insufficient public investment in key economic sectors that the Malawian economy has been facing in recent years. Most government expenditure is undertaken to attain economic growth. However without knowledge of the effects of such expenditures on growth, such decisions to spend or increase expenditure are speculative. The knowledge from this study will help the GoM to achieve targeted expenditures which promote economic growth. This study significantly contributes to the formulation of Malawian fiscal policy by providing an insight on the impact of government spending on economic growth. The results of this study provide policy makers and decision makers with an inherent understanding of allocation of public expenditure from the general budget based on contribution to growth. The study also stirs the need for further research in this area of study.

1.6 Organization of the Study

The study has been organised in six chapters. Chapter One introduces the study's background and objectives. Chapter Two provides an overview economic growth and government spending in Malawi. Chapter Three reviews relevant literature on government spending and economic growth. Chapter Four focuses on research methodology. Chapter Five provides an analysis and interpretation of results and Chapter Six concludes by summarising the results, offering study implications.

CHAPTER TWO

AN OVERVIEW OF GOVERNMENT EXPENDITURE AND ECONOMIC GROWTH IN MALAWI

2.1 Trends in GDP Growth in Malawi

Malawi's economy is heavily dependent on agriculture, with limited diversification and mostly agro-based manufacturing. The economy of Malawi has been characterized by periodic episodes of macroeconomic volatility since independence. External shocks, poor reform implementation, inadequate fiscal discipline, and severe weather shocks are among the factors that have contributed to the country's uncertain macroeconomic environment and low growth. Economic instability caused by poor spending management has resulted in massive fiscal deficits, causing the Government to borrow funds on the domestic market, crowding out the private sector in the process and putting pressure on interest rates, inflation, and exchange rates. Malawi has one of the lowest investment rates in SSA and less structural transformation as a result of the country's economic instability and this has maintained the country's pattern of poor economic growth. GDP growth has generally been low and volatile, with at least period 2003-2010 showing high and relatively stable growth as can be observed in Figure 1 below.

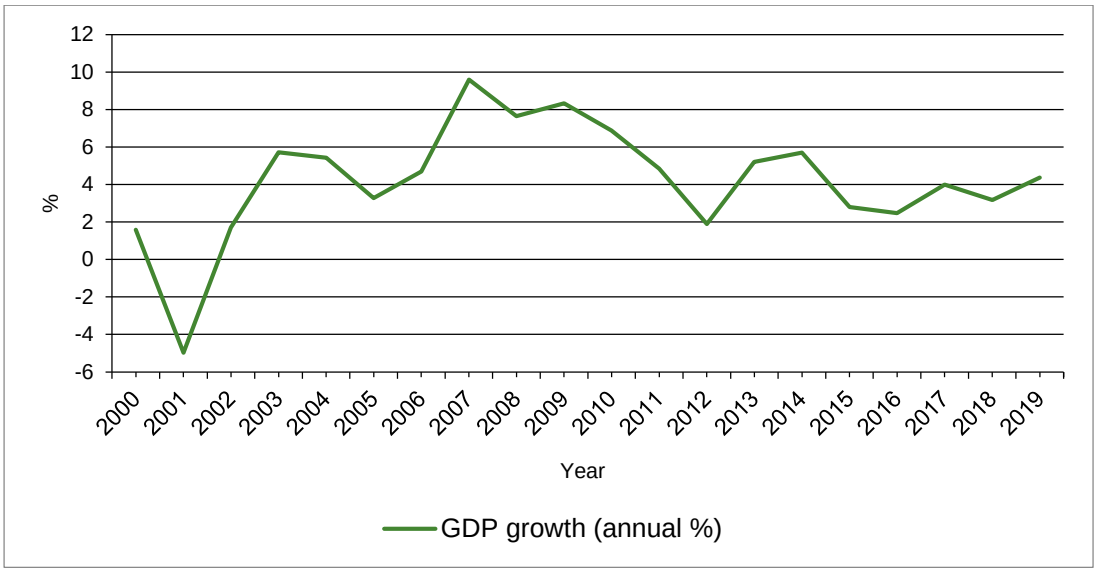

Figure 1: Trend of Real GDP Growth (2000-2019)

Data source: World Bank World Development Indicators (WDI)

Despite the 2005 drought that put more than 5 million people in risk of starvation and the 2007-2008 global financial crisis, the economy exhibited some resiliency between 2003 and 2010. The coming into power of a new government in 2004 gave the country a new impetus for growth and development plan. Malawi also completed the HIPC-MDRI (Highly Indebted Poor Country-Multilateral Debt Relief Initiative) in 2006 which freed up further fiscal space. This period also had improved yields for both the country's main staple crop and the main cash crop as a result of a combination of favourable weather during this period (aside from the 2005 drought) and the introduction of subsidized fertilizer. Inflation stemming from the combined effect of reduced monetary and fiscal pressures remained in single digits from 2007 to 2011.

This period of high and relatively stable growth (2003-2010) was brief. Due to macroeconomic instability, fiscal indiscipline, and climate shocks, the economy experienced falling growth trends from 2011. Real GDP growth slowed to 1.9% in 2012, compared to an average of 6.4% between 2006 and 2010. When the International Monetary Fund (IMF) program went off course due to major policy imbalances in 2011, external budget support was discontinued. As a result, Malawi had significant foreign exchange and gasoline shortages, contributing to a slowdown in economic activity. As a result of fiscal overspending, the budget deficit increased from 2.9% of GDP in 2011 to 6.9% in 2012. (World Bank, 2019).

In mid-2012, the government enacted numerous crucial measures in order to avoid a crisis. A depreciation of 50% of the Malawi Kwacha (MWK) followed by the establishment of a floating exchange rate regime were among the policies that helped the economy recover. The government liberalized foreign exchange markets and implemented an automatic fuel price adjustment mechanism. In the short term, this resulted in a slowdown in growth from 4.9% in 2011 to 1.9% in 2012, as well as 35% spike in inflation by the end of 2012. GDP growth, on the other hand, picked up in 2013, hitting 5.2%. Although the floating of the Kwacha in 2012 aided in the slow build-up of foreign exchange reserves, it added uncertainty into the budgeting process over the cost of imports. The IMF and other donors were able to resume budget support as a result of the liberalization.

Floods and droughts in early 2015, followed by another drought in 2016, had a significant detrimental impact on agricultural productivity and energy generation. With the impact of the weather shocks that slowed the economy for two years in a row, the agriculture sector however recovered, resulting in a comeback in Malawi's economic growth rate, which increased from 2.5% in 2016 to 4.0% in 2017. Stronger monetary policy and the accumulation of foreign exchange reserves resulted in a stable exchange rate and low inflation since 2017. In order to maintain macroeconomic stability, the Reserve Bank of Malawi (RBM) stopped financing government deficits in 2018. However, because to dry spells and a fall armyworm infestation, growth slowed to 3.2%. This had a major impact on agro-processing and households' disposable incomes, which in turn affected demand for services. The dry spells also adversely affected generation of electricity and its contribution to growth. GDP growth rate in 2019 reached 5.7%, despite the impact of Cyclone Idai which affected agriculture production. Malawi's GDP slowed to 1.7% in 2020, down from 5.7% in 2019. The COVID-19 outbreak, which resulted in a temporary lockdown of the economy caused this slowdown in GDP growth. As a result, economic activity was subdued, particularly in tourism, the lodging and food subsectors, agriculture, and transportation. Manufacturing and mining are two more industries that have been impacted by the COVID-19 outbreak.

GDP per capita growth for Malawi has been slower compared to other developing countries that were at a comparable level of development in the mid-90s as depicted in Figure 2 below.

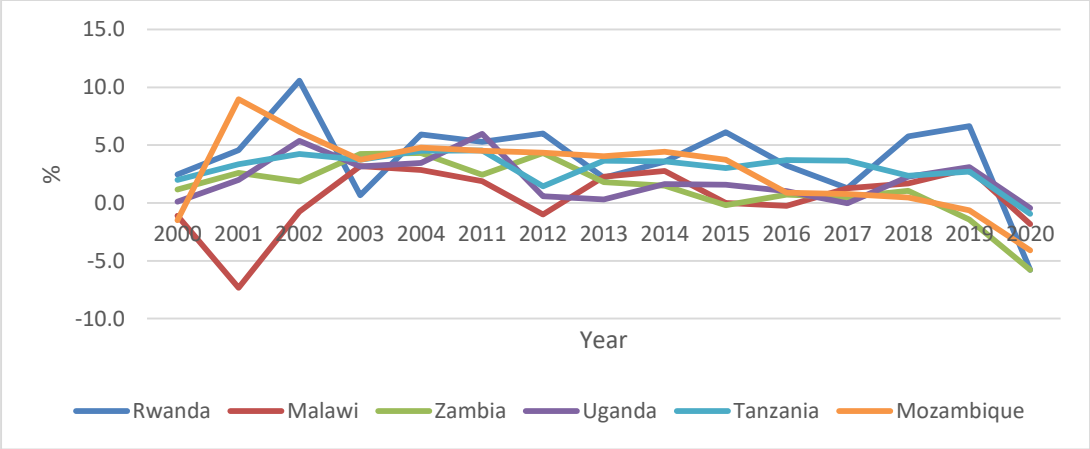

Figure 2: Malawi's Real GDP per Capita Growth and its Peers (annual %)

Data source: World Bank World Development Indicators (WDI)

2.2 Government Expenditure in Malawi

In Malawi, weather shocks have resulted in a drop in agricultural output as well as a slow-down in economic activity. As a result, revenue for the government has decreased. Government finances are frequently destabilized by a lack of sufficient revenue and increasing spending. Apart from harsh weather shocks, weak economic policies also play a key role in explaining Malawi's macroeconomic instability, with the government sustaining higher expenditure levels despite decreased lower revenue collected. Following the Cashgate[1] scandal in 2013, most on-budget donor funding support was withdrawn, reducing grants and external financing. Despite the fact that the funding envelope shrunk, total spending continued to increase since 2013. High levels of recurring expenditure in Malawi squeeze out development spending, which is needed to promote growth. Malawi has to rebalance its spending to maintain long-term viability and to boost the budget's development impact (World Bank, 2019).

2.3 Economic Growth and Government Expenditure in Malawi

Figure 3 below shows trend of public expenditure and economic growth in Malawi over the period of 2002 to 2019.

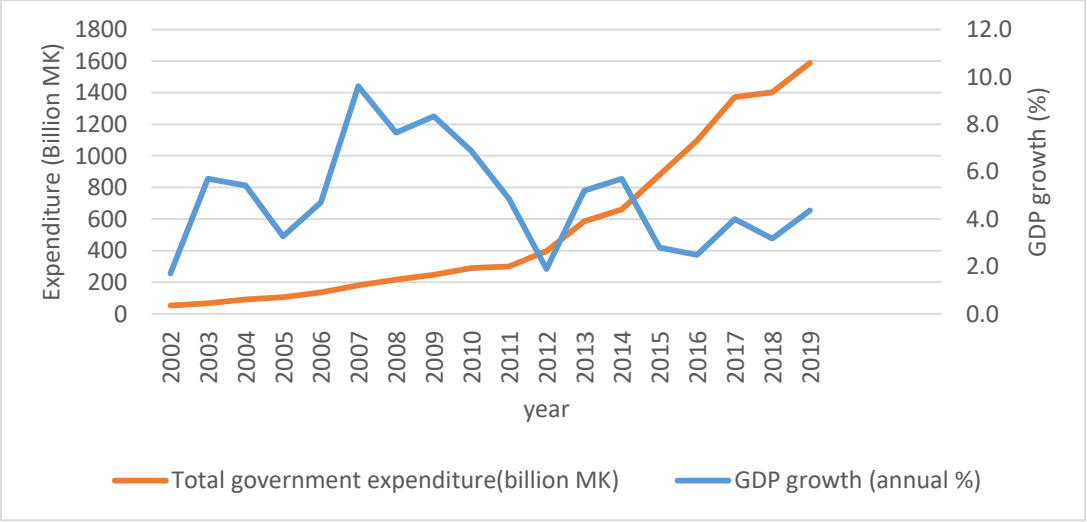

Figure 3: Trend of Public Expenditure and GDP Growth in Malawi (2002-2019)

Data source: World Bank World Development Indicators (WDI) and International Monetary Fund

[1] Capital Hill, Malawi's seat of government, was the scene of a financial scandal including looting, theft, and corruption.

An overview of trend of public expenditure growth from 2002-2019 shows an upward trend of public expenditure in Malawi reflecting expansion of overall government size. Despite the increase in public expenditure, Malawi is characterised by slow and volatile economic growth as depicted by Figure 3. In this regard, the rise in public expenditure and changes in the components of public expenditure have raised concerns regarding the sustainability of the growth process in the economy. With the view to understand as to how public expenditure plays as a central instrument in promoting economic growth, it is also useful to analytically classify the various components of public expenditure in terms of their influence on the economy.

2.4 Budget Process in Malawi

A well-functioning budget process enables governments to allocate resources towards areas that make the greatest contribution to their national objectives (DFID, 2001). In Malawi, the budget process is guided by a directive known as the Financial Calendar issued by the Ministry of Finance (MoF) to all Ministries, Departments and Agencies (MDAs). This directive has a schedule to ensure that plans and budgets are prepared, approved, appropriated and executed accordingly. In general, there are five phases in the budget process; budget planning, submission, hearings, summation and budget approval.

In the budget planning phase, all public bodies are required to perform all the budget preparation activities, including mid-year program review for the current year, prioritization of activities and the development of work plans for the upcoming fiscal year. The budget submission phase starts with a budget call letter issued by the MoF to all MDAs. The budget call letter includes recurrent and capital budget ceilings, priority or focal areas to be considered in preparing the budget and submission date of the budget request by the MDAs to the respective finance and economic development institutions at all jurisdiction. Ministerial (and sectoral where relevant) ceilings are determined by the MoF, guided by the, MGDS, Public Sector Investment Program (PSIP) and budget performance data. These ceilings are reviewed each year based on the current estimates of the overall resource envelope, and indicative ceilings are communicated to MDAs. The MDAs are required to respond to the budget call by preparing their budget according to the guidelines in their action plan. If an MDA fails

to submit its budget request within the time specified in the budget call letter, MoF recommends a budget based on past information that it has.

The MoF then conducts budget hearing with MDAs where the latter defend their proposed activities and budgets. Based on this discussion and government policies and priorities, the total expenditure ceiling, and allocated ceiling for each MDA, the requested budget is reviewed, adjusted and consolidated. The summation phase involves summation of the recommended budget by MoF to be presented to the Cabinet. The cabinet reviews and recommends the budget. After the recommended budget is reviewed and adjusted by the MoF and approved by Cabinet, it is then presented to the National Assembly for approval and annual appropriation. Parliament reviews, proposes amendment and approves the budget.

2.5 Composition of Public Expenditures in Malawi

The Malawi Growth and Development Strategy (MGDS) is one of the key development strategy documents that guide the formulation and implementation of the National Budget Cycle in Malawi. Allocations in the National Budget for Malawi are made in line with priorities areas outlined in the MGDS. The MGDS sets out the medium term priorities for achieving Malawi's medium to long-term ambitions. The Malawi Growth Development Strategy (MGDS III) emphasizes the need of investing in areas that generate growth through their linkages in the economy. The Strategy's five Key Priority Areas (KPAs) include health, agriculture, education, transportation, and ICT infrastructure. The KPAs will have a multiplier impact that will help Malawi's economy as a whole. Malawi's government spending displays a strong commitment to education, with education spending accounting for the major part of government spending over the years. Agriculture and health are the next two sectors with a larger share as shown in Figure 3.

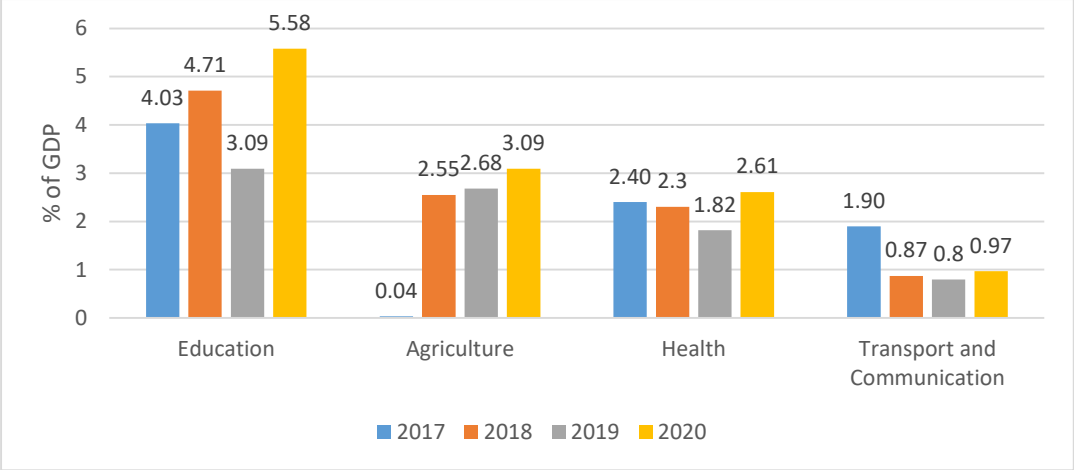

Figure 4: Composition of Government Expenditure

Data Source: Statistics of Public Expenditure for Economic Development

2.5.1 Government Expenditure on Agriculture

Agriculture is the backbone of Malawi's economy, accounting for about a third of the country's GDP and employing the majority of the workforce. The sector also contributes to foreign exchange and food security, and its interconnections with other industries help to drive industrial growth. Unfortunately, challenges like climate change, post-harvest losses, lack of agriculture diversification, small landholdings, and poor water management limit the agriculture sector's potential.

The introduction of the Farm Input Subsidy Program (FISP) in 2005/06 resulted in an increase in maize production, allowing the country to achieve national food self-sufficiency. Every year, FISP consumes a large share of the Ministry's resources. Malawi is one of the few countries on the continent to have exceeded the Comprehensive Africa Agriculture Development Programme (CAADP) target of spending at least 10% of its national budget on agriculture, according to the 2013 Malawi Public Expenditure Review (PER) by the World Bank. Agricultural expenditures accounted for about 19% of total national expenditures on average between 2010 and 2013. Despite the fact that agriculture is the country's principal source of economic growth, between 2011 and 2014, agricultural sector growth averaged only 3.8% of GDP, way below the CAADP objective of 6%. Public policymakers are interested in determining whether government spending in agriculture support or stifle agricultural growth (World Bank, 2013).

2.5.2 Government Expenditure on Transport

Transportation sector in Malawi is critical in supporting trade and growth. Other productive sectors in the country, such as agriculture, tourism, mining, trade, and oil and gas are supported and facilitated by this sector. The sector receives a significant portion of funding from the government and development partners, indicating the importance of transportation.

Transportation is at the top of the GoM's development priority list and is among the five KPAs identified in the MGDS III. The GoM also developed the National Transport Master Plan (NTMP) 2017-2037 in March 2018, which aims at guiding a sustainable integrated multi-modal transportation industry for the next two decades. Transportation and ICT are critical to the acceleration of other sectors' growth. Access to secure, affordable, and sustainable transportation and ICT is essential for every country's economic competitiveness (Malawi Government, 2017).

Efficient transportation and communication networks are linked to social and economic benefits that have multiplier effects such as increased market access, job creation, and investment growth. ICT is at the heart of modern business, productivity, trade, and social progress. The GoM contributes MK30 billion to the transport sector on average every year, the most of which goes to the road sector. For the NTMP to be implemented successfully over the next twenty years, the GoM must allocate MK100 billion yearly. Malawi allotted MK88.3 billion in the 2019/20 financial year, which is less than the MK100 billion required to successfully execute the NTMP (JICA, 2020).

2.5.3 Government Expenditure on Education

The MGDS III highlights education as one of Malawi's top five national goals. Education is important for industrial progress and socioeconomic development since it fosters skill development. As a result, long-term investment in this sector is crucial for the development of human capital. Education spending progressively accounts for the large proportion of total government spending. Education accounted for 18% of total government spending in the 2011/12 fiscal year, followed by agriculture (13%) and health (11%). Overall, spending in the education sector climbed from MK 18.4 billion in 2007/08 to MK 51.3 billion in 2012/13. The establishment of a pooled fund to support the education System Wide Approach (SWAp) aided in raising on-budget financing in

an attempt to give an appropriate response to the challenges affecting Malawi's education sector (World Bank, 2013).

Wages and salaries consume a large portion of sector's budgets, leaving few funds for vital supplies like books, desks, and other teaching and learning tools. Between 2013/14 and 2017/18, recurrent costs consumed an average of 85% of the national education budget for the Ministry of Education (UNICEF Malawi, 2018). This means that, on average, just 15% of the funding was allocated to development activities such as school construction during this period. According to public expenditure tracking surveys in the education sector, disbursement of education resources such as School Improvement Grants takes long (CSEC, 2017). Inefficiencies in government expenditure on education sector in Malawi are also exacerbated by centralized system for purchase of teaching and learning resources (World Bank, 2013).

2.5.4 Government Expenditure on Health

Improved health system is critical for increased national productivity and economic prosperity. Other areas of the economy, such as education, agriculture, and manufacturing are also affected by health sector. Improved domestic finance of the health sector is a priority for MGDS III. Because donor support accounts for a large portion of the sector's funding, health spending is subject to external shocks. Health spending increased from MK 14 billion to MKW 72 billion between 2002-03 and 2008-09. This was owing to the SWAp partnership's ability to attract significant funding from other sources. From 2012 to 2018, total health spending as a percentage of GDP has been rising (World Bank, 2013).

CHAPTER THREE

CONCEPTUAL FRAMEWORK AND LITERATURE REVIEW

3.1 Introduction

This chapter covers concepts, theories, and empirical literature relevant to this study.

3.2 Conceptual issues

3.2.1 Concept of economic growth

Economic growth is described as a stable process in which the economy's productive capacity is increased in order to boost national output and income (Mohr, 2015). According to Bowden (1992), any country's economic progress is dependent on the organization and development of a better labor force, as well as the acquisition of more and better capital. The rate at which real output increases over time characterises of economic growth. Economic growth is measured by the annual growth rate of real GDP or its annual percentage rise, according to Fourie (1999).

3.2.2 Concept of government expenditure

Government spending is the amount of money spent by the government on products and services such as health, social security, education, infrastructure, and defense. Government spending can be broken down into functional and economic categories. Functional classification presents the expenditure in terms of function and sector and economic category categorises it into the consumption or investment expenditure. Consumption expenditure refers to the expenditure on goods and services by households, whereas investment expenditure relates to the production and acquisition of productive capital goods (Mohr, 2015).

Total spending is sometimes divided into three basic areas by the World Bank and the International Monetary Fund (IMF) namely social spending (education, health, nutrition, and safety nets), economic spending (agricultural and infrastructure), and public administration and defense spending. Government spending can also be

into expenditures with long-term or short-term welfare goals (Ali & Fan, 2007). Short-term expenditures include welfare spending or social safety nets, while long-term expenditures include investments in human and physical capital (infrastructure, education, health, and technology).

Government expenditure is described by the Government Finance Statistics Manual (GFSM) (2014) as costs incurred by the government for the provision of services such as education, defense, administration, and preservation of the country's economy. Spending on transfer payments to retirees, the unemployed, and the disabled, as well as debt repayment and spending on subsidies and grants to business, are all examples of government spending. The terms, government expenditure or spending and public expenditure or spending are used interchangeably in literature because they are closely linked.

3.3 Theoretical Review

Government expenditure, as a fiscal policy tool, plays a critical part in an economy's development. Different theories discuss the relationship between government spending and economic growth. The theoretical underpinnings of the Keynesian theory, the Harrod-Domar growth model, the endogenous growth model, the Classical Theory of Growth, and the Solow Neoclassical Theory of Growth are discussed here.

3.3.1 Keynesian Theory

High levels of government consumption, according to traditional Keynesian macroeconomics, are expected to enhance employment, profitability, and investment, thereby increasing aggregate demand through multiplier effects. Depending on the amount and efficacy of expenditure multipliers, government spending raises aggregate demand, which leads to greater output. The government injects money into the economy through spending on different sectors of the economy. When an economy is in a recession with low levels of labor and capital and unemployment, Keynes (1964) recommended that government spending should be used to create jobs and exploit resource capital that has been underutilized. If the government does not intervene, a severe downturn in economic activity may never cease, according to Keynes. The Keynesian hypothesis is pertinent to this research since it argues for more government spending to enhance employment, profitability, and investment. Government spending is viewed as a fiscal policy instrument by Keynesians in order to attain short-term

stability and a greater long-run growth rate. They advocate for expansionary policies to remedy short-term fluctuations and raise the long-term steady-state growth rate during economic downturns. As a result, according to Keynesian theory, government spending is required to boost economic growth. This theory is more applicable to developed countries where output is demand driven since most of the goods are made in industrialised countries.

The most serious flaw in Keynesian theory is that it ignores the problem of inflation, which occurs as a result of increased government expenditure (Muthui et al., 2013). Budget deficits occur when government spending is not matched by an increase in receipts. The use of easy monetary policy to finance these budget deficits leads to a rise in inflationary expectations as credit and liquidity expand. As a result, nominal interest rates rise, putting a damper on private expenditure (Loizides & Vamvoukas, 2005). This means that fiscal deficits suffocate the private sector as well.

3.3.2 The Harrod-Domar Growth Model

The Harrod-Dommar growth model, a major model in the Keynesian paradigm, provides some insights into the mechanics of economic growth, according to Romer (1996). This growth model was based on Rostow's research on economic growth stages. The model proposes that the net national savings ratio and the national capital-output ratio are jointly responsible for GDP growth. A high level of savings in a given economy indicates that funds are available for businesses to borrow and invest. This leads to an increase in business capital stock as well as greater output of products and services, resulting in enhanced economic growth.

According to the Harrod-Domar model, in order to identify an equilibrium growth rate (g) in the economy, a balance between supply and demand for a nation's output must be maintained. Saving is a function of the supply side's level of GDP (Y), expressed as $S = sY$, and the level of capital (K) required to produce an output Y is expressed as $K = rY$ where r is the capital output ratio. Investment (I) is a significant component of both the demand for an economy's output and the growth of its capital stock. Thus, $\Delta K = r\Delta Y = I$. Therefore, the equilibrium rate of growth (g) is given by $g = \frac{\Delta Y}{Y} = \frac{s}{r}$ (Romer, 1990). This finding explains how the economy grows in such a way that the increase in the economy's ability to produce is balanced by the increase in sectoral

demand for the economy's product. This result tells us how the economy grows such that the growth in the capacity of the economy to produce is matched by the sectoral demand for economy's output (Barro & Sala-i-Martin, 2004). This growth model is applicable to developing economies since it emphasizes the importance of governments encouraging savings through various sorts of incentives, such as tax cuts and technical developments, in order to reduce the economy's capital production ratio and promote economic growth.

3.3.3 Endogenous Growth Theory

Paul Romer and Robert Lucas developed an endogenous growth theory. According to the theory, if productivity is to rise, the labor force should be given more resources such as physical capital, human capital, and technology on a constant basis. The endogenous growth model explains the relationship between government spending and economic growth by considering public expenditure composition as one of the economic growth factors (Sanz & Velazquez, 2001). When market forces fail in the endogenous growth model, governments implement regulations to improve resource allocation. According to the notion, the government should focus its resources primarily on human capital development, such as increasing education and health care, as well as providing incentives for individuals to contribute to the economy.

Technical change can be promoted by suitable policies, according to the endogenous growth model. Technical change is considered a variable that can be impacted by policy actions, and it should be incorporated in the production function alongside labor and capital. Consumption taxes, investment and research subsidies, and moving resources from consumption to investment are all examples of government policies that influence economic growth. Reduced economic growth happens when government spending discourages investment by imposing greater taxes on businesses above what is required to fund their investments, as well as by removing incentives to save and accumulate capital (Folster & Henrekson, 1997).

3.3.4 Classical Theory of Growth

The Classical economists' view of the impact of government expenditure on economic growth is the opposite of the Keynesian hypothesis. Classical economists particularly Adam Smith advocated minimum government intervention in providing public goods, law and order and those investments that cannot be adequately provided by private

sector due to their high risk or unprofitable nature (Jibir & Aluthge, 2019). The Classical view is based on the argument that increase in government spending will not result in an increase in the national output. Thus, government spending is seen as the destabilising force in the development of the economy of a country rather than the driving force of economic growth as the Keynesian economists has postulated. Classical economists believe in the magical powers of the invincible hand (free markets) to guarantee full employment equilibrium in the economy.

According to the Classical economists, the economy should be left to operate on its own and only prescribed a limited role for the government to play such as to promote the rule of law. This is because they saw government intervention in the economy as a serious problem which can stifle growth and therefore lead to less output. Therefore, the Classical economists argue that the state should perform the minimum number of functions essential to the existence of society such as to ensure the maintenance of internal security and to establish and maintain law courts for the settlement of disputes among citizens (Chipaumire, et al.,, 2014).

Classical economists believe that increases in government expenditure, unless financed by money creation and thus changes in the monetary policy would not affect either employment or the price level (Ju-Huang, 2006). This is because if government spending increases while money supply is fixed, the government will compete with the private firms in the money market which then push interest high. Higher interest rates discourage private investment and lead to the undertaking of public investments. This is because the costs of financing loans will be high for the private firms. Therefore, according to the Classical view an increase in government spending with money supply constant will not lead to an increase in income but will only substitute private business investments with the public programs (Froyen, 2008). This because the government has an advantage that it can borrow at any level of interest rates as they can print money or increase taxes to refinance the loan borrowing costs. Massive government spending necessitates the imposition of higher taxes. Higher taxes deter private sector workers and investors from working and investing. Therefore, in the Classical view, increases in government spending have no effect on the long-run economic growth of a country. This means that there is no causality between government spending and economic growth.

This hypothesis has a flaw in that it overlooks the role of public sector services as an input to the private sector, particularly through education, which improves workers' abilities. In addition to government spending, the idea ignores a number of other factors that influence interest rates in the economy.

3.3.5 The Solow Neoclassical Theory of Growth

Robert Solow and Trevor Swan devised the Solow growth model in 1956, which is considered a continuation of the Harrod-Domar model. According to the theory, all countries have equal aggregate production functions, and economic growth is driven by technology, capital accumulation, and labor force in any economy. This means that if economies have the same rate of depreciation, savings, labor force growth, and productivity growth, they will conditionally converge to the same level of income (Durlauf et al., 2001). The following is the neoclassical growth model:

$$\Delta k = sf(k) - (\delta + n)k \quad (3.1)$$

In the equation above, k represents the growth of the capital-labor ratio, which is referred to as capital deepening in the model. Savings, $sf(k)$, depreciation, δ , and distributing the existing quantity of capital per worker to new workers joining the labor force, nk, are important factors in k's growth.

Economic growth is influenced by the labor force and capital accumulation, according to this concept. Policymakers rely extensively on this model, according to Todaro and Smith (2011), since it predicts that countries with higher levels of investment and capital per worker have higher levels of per capita output. Physical and human capital are the two types of capital. Physical capital boosts output by raising labor productivity and directly offering useful services. In the sense that people with talents are more productive than those without. Human capital also boosts economic growth. Education and on-the-job training are two ways to invest in human capital.

The government affects labor and capital productivity by directly subsidizing investments that the private sector could not offer in a timely manner owing to market failure. It can also be influenced by the effective delivery of some essential public services that are required to create perfect conditions for entrepreneurship and long-term investment. Government also increases labour and capital productivity by funding

its own activities in a way that does not influence private sector savings, investment decisions, or overall economic activity (Burda & Wyplosz, 2001). This paradigm demonstrates how government spending has an impact on growth by altering capital and labor markets, as well as the development of technological progress as measured by total factor productivity. The model, on the other hand, posits that the long-run growth rate is determined by population increase and the rate of technological progress, both of which are exogenous. As a result, the impact of government spending on growth via production variables is only deemed temporary.

One of the neoclassical growth theory's flaws is that it places too much emphasis on a perfectly autonomous process of technological improvement and fails to account for major disparities in technology between countries. Furthermore, this hypothesis does not clearly explain why some countries remain poor while others become wealthy, or why some countries grow rapidly while others do not.

3.4 Theoretical Framework on Government Expenditure and Economic Growth

This section examines various theoretical frameworks for explaining the relationship between government spending and economic growth.

3.4.1 Wagner's Organic State Theory

Wagner claimed that government spending is an endogenous component driven by national income growth, implying that economic expansion causes an increase in government spending rather than the other way around (Garba & Abdullahi, 2013). According to Wagner, the expansion of an economy and the growth of government activities have a functional relationship in which the government sector expands faster than the economy. Long-term influences, rather than short-term changes in government spending, were emphasized in the hypothesis (Wagner, 1911). The idea explains why more protective and regulatory functions are needed to keep up with expanding economic affluence. Furthermore, as countries become wealthier, demand for public goods such as healthcare, cultural services, and education tends to rise.

Wagner's law can be applied to modern progressive governments interested in expanding the public sector of the economy. However, it does not provide a precise quantitative relationship between the increase in public spending and the increase in

economic growth. This is because Wagner's research was based on actual historical events. In addition, Wagner's theory lacks a well-defined theory of public choice. The idea assumes that the state makes decisions independently of society members, who, in reality, have the ability to defy the Wagner law's mandates.

3.4.2 Musgrave-Rostow's Theory

According to this theory, government spending is a requirement for economic development, and its level is closely tied to a country's development phases. In the early stages of economic growth and development, government investment as a percentage of overall investment is larger (Musgrave & Rostow, 1961). The high proportion of government spending is due to the government providing social infrastructure expenditures such as health care, law and order, education, transportation and road infrastructure, and other human capital investments needed to prepare the economy for take-off into the middle stages of social and economic development (Musgrave & Musgrave, 1989). As a result, government spending will continue to climb, as the majority of these projects are considered capital intensive (Edame & Fonta, 2014). According to the hypothesis, market failures characterize the early stages of growth, which might frustrate the push for maturity and that the government should be involved to address these market failures.

In the middle stages of growth, the government continues to provide investment products, but public investment is a complement to private investment growth. The income maintenance stage is connected with policies and programs that rise greatly in comparison to other government expenditures to redistribute benefits (Musgrave & Musgrave, 1989). The flaw in this theory is that it believes that government spending is the sole source of economic growth, ignoring the private sector's role to development.

3.4.3 Peacock and Wiseman's Political Constraint Model

Peacock and Wiseman devised another theory that deals with the development of government spending. Peacock and Wiseman undertook a study of government spending growth in the United Kingdom (UK) from 1891 to 1955 in 1961. The theory of Peacock and Wiseman (1961) arose from a study based on Wagner's law. They were among those who criticised Wagner's law. They rejected Wagner's organic state theory in favour of a political hypothesis that the government enjoys disbursing more money

while society dislikes paying more taxes, and that the government must take into account the wishes of its citizens. According to the theory, government operations may increase, but not in the way Wagner predicted (Peacock & Wiseman, 1961). The theory goes on to say that government spending is primarily reliant on income collection. According to the hypothesis, industrialization boosts government spending and improves revenue collection, which is mostly through taxation. This model posits that government is constrained by a tolerable amount of taxation. When the economy grows, tax revenue rises at a steady rate, allowing government spending to increase (Peacock & Wiseman, 1961). Political theories and hypotheses about government expenditures, such as those of Peacock and Wiseman, as well as Wagner and others, contributed to explain how government spending grows.

This model is not comprehensive because government expenditures are also funded by a variety of sources, including aid, domestic and external borrowing, and revenue from the sale of goods and services generated by the government. As a result, taxation is not the only source of revenue for the government (Brown et al., 1996).

3.4.5 The Armey Curve theory

The Armey Curve theory (Armey, 1995) proposed that the size of government has an impact on economic growth. The theory assumes that there is an optimal size of government expenditure to show the relationship between government spending and economic progress.

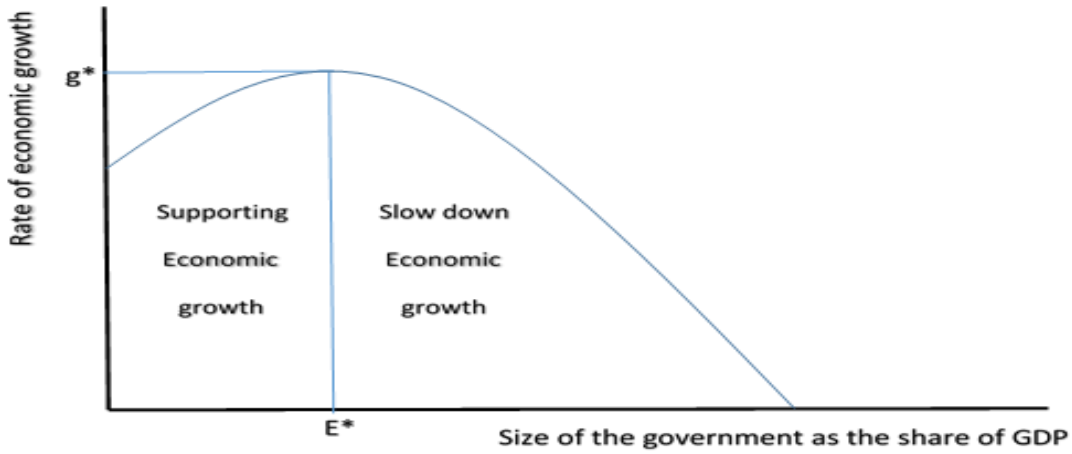

Figure 5: Armey Curve

Source: Dick Armey (1995).

As seen in Figure 4, a state without a government generates the minimum growth in GDP growth. This is due to a lack of property rights protection and the rule of law. However, if the government assumes full control of economic decision-making and full ownership of resources, economic growth is stifled but eventually ceases. The fall in private investment can be explained by greater taxes, fewer free markets, and the crowding-out effect. The Armey Curve also reveals a government E^* size that is associated with maximum economic growth. Increasing government spending results in a decline in economic growth to the right of E^*. This stage varies by country and is dependent on characteristics such as family size as well as economic ones such as the economy's openness (Leach, 2002).

The Armey Curve was designed to examine the impact of government size on economic growth. As a result, other factors that could affect the economy, such as educational investments, capital accumulation, or technological growth, are excluded from this theory. This theory is also more generalized in that it ignores country-specific issues and assumes that every country follows the same model.

3.5 Summary of theoretical literature

This study looked at many theories that explain the relationship between government spending and economic growth. Keynesian theory ignores inflation, which is created by increasing government spending. Wagner's organic state theory is only applicable to a limited extent because it only considers the demand side of the economy. The flaw in Peacock and Wiseman's hypothesis, on the other hand, is the assumption that there is some tolerable level of taxation that works as a restraint on government spending. The Musgrave-Rostow theory assumes that government plays the most important role in development and ignores public sector productive expenditure. Technical change, according to neoclassical growth theory, is exogenous and cannot be altered by policy.

The endogenous growth hypothesis allows the impact of government spending to be traced throughout the economy and gives the government a role in the process of economic growth. According to the theory, labor force should be supplemented with more resources in order to boost productivity. This resource could be physical capital, human capital and knowledge capital (technology). According to this theory, government policies, notably fiscal policy, have an impact on long-run growth. In

conclusion, the development of endogenous growth theory has made it possible to trace the impact of government spending throughout the economy and can be applied to measure its impact on economic growth. The general implication of the endogenous theory is the need for government to direct its resources mostly towards human capital development, such as the improvement of health care and education sectors, and to provide incentives for individuals in the economy to acquire the necessary skills to contribute towards the economy. The government can achieve this by designing and financing macroeconomic policies that can help in this regard, since new knowledge enhances productivity and is available to the private sector at virtually zero marginal cost. In Malawi, government spending as a fiscal policy instrument is used to achieve economic growth and other macroeconomic objectives. Therefore, the endogenous theory of growth appears to be the most applicable, and it was used in this study.

3.6 Empirical Review

This chapter examines research on the link between economic growth and government spending. The review is organized as follows: Section 3.6.1 concentrates on cross-country empirical investigations, while Section 3.6.2 discusses literature on African countries. The empirical review is summarized in Section 3.6.3.

3.6.1 Cross-Country Empirical Studies

Various studies have been carried out on the relationship between government spending and economic growth, but the results have been mixed. The outcomes vary based on the countries considered and the methodology used, among other things.

Devarajan, et al., (1996) used data from 43 developing nations from 1970 to 1990 to study how the composition of public expenditure affects steady-state growth. Using Ordinary Least Squares (OLS), the study demonstrated that increasing recurrent expenditure has positive and statistically significant growth effects. The study did, however, find that capital components have a negative impact on per capita income growth. The research also found that developing countries misallocate government spending in favour of capital spending at the expense of current spending.

On 51 middle-income developing countries, Guseh (1997) did a similar analysis on the relationship between government expenditure and economic growth. The OLS method was used to analyse data from 1960 to 1985. Government expenditure has a negative impact on economic growth, according to the findings of the study. According to the

study, most emerging countries' resources are distributed inefficiently and so do not contribute to economic growth.

Bose et al. (2007) used time series data on both capital and recurrent expenditure for the period 1970 to 1990 to conduct a disaggregated analysis of 30 developing nations in order to examine the effects of public expenditure on economic growth. They used the three-stage least squares (3SLS) method because they believed that some omitted factors could lead to false regression and skewed estimates between variables. The empirical findings revealed that the share of government capital expenditure in GDP is positively and significantly associated to economic growth, but the growth effect of recurrent expenditure was significant for the set of nations studied. They discovered that government total expenditure on education is the only expenditure that has a positive and significant impact on growth at the disaggregated level.

Fan and Rao (2003) used data from 43 developing nations from 1980 to 1998 to examine the trends, determination, and impact of several types of government spending. According to the findings, government spending on health and agriculture was particularly effective in fostering growth in Africa, while spending on education, agriculture, and military had a positive impact on growth in Asia. In Latin America, however, all categories of government spending, with the exception of health, were determined to be statistically negligible. The study by Fan and Rao (2003) provides an insight on the effects of agriculture and education expenditure on economic growth in Africa.

Using a disaggregated approach and employing a balanced panel fixed effect model with data from 1980 to 2010, Gisore, et al. (2014) investigated how government expenditure contributes to economic growth in East Africa. The study suggested that government expenditure on defense and health should be prioritised if government is to achieve economic growth. Government spending on agriculture and education, on the other hand, had no effect on economic growth because these expenditures affect the economy's demand side.

Carter, et al., (2013) used time-series data from Barbados from 1976 to 2011 to investigate the sector's expenditure impact as well as the influence of total government spending on economic growth using the Unrestricted Error Correctional Model and Dynamic Ordinary Least Squares. The findings of the study revealed that education

spending had a negative and significant influence on economic growth, both in the short-run and long-run. It was discovered that spending on social security and health care had minimal impact on economic growth. According to Carter et al. (2013), total government spending has a negligible impact on economic growth. According to Carter et al. (2013), reallocating government spending from one sector to another may have growth-promoting impacts without requiring a change in government spending levels. The impacts of reallocating government spending on growth are highlighted in this study. Unlike Carter et al. (2013), who used Dynamic Ordinary Least Squares and the Unrestricted Error Correctional Model to analyse time-series data from 1976 to 2011, this study employs the ARDL model to analyse data from Malawi from 1980 to 2019.

Using the IMF's Government Finance Statistics (GFS) yearbook dataset for the period 1970-2010, Acosta-Ormaechea and Morozumi (2013) investigated the influence of government expenditure reallocation on economic growth. The results of the study, which included 56 countries and used dynamic panel Generalised Method of Moments (GMM) estimators, showed that government expenditure on education has a positive and statistically significant effect on economic growth when this expenditure is offset by a reduction in social protection spending. The findings also revealed that capital investment appears to have a greater impact on economic growth than current spending. The study backs up the idea that reallocating spending leads to increased economic growth. Studies by Acosta et al. (2013) and Carter et al. (2013) contribute to a better knowledge of the impact and scrutiny of government spending reallocations.

Bingxin, et al., (2009) measured the impact of government spending on economic growth of developing countries by using panel data analysis. The study found that in Africa, government spending specially on human capital was strong in promoting economic growth. In Asia, spending on human capital, agriculture, and education promotes economic growth. In Latin America, government spending components had not any significant impact on economic growth. The study provide several lessons about spending for developing countries. First, numerous type of government expenditure have different impacts on economic growth, indicating improve efficiency of government spending can be achieved by reallocating among sectors. Second, government should increase allocating budget for productive sectors and reduce spending for unproductive sectors such as defense. Third, compared to the other regions, Africa should increase spending in agriculture, especially on agricultural

research and development. The spending for this sector is important for poverty reduction in the region due to the fact that most of the people live in rural areas and their economy based on agriculture.

Donald and Shuanglin (1993) investigated the differential effects of various forms of expenditures on economic growth for a sample of 58 countries. Their findings indicated that government expenditures on education and defence have positive influence on economic growth, while expenditure on welfare has insignificant negative impact on economic growth. Niloy, et al., (2003) used a disaggregated approach to investigate the impact of public expenditure on economic growth for 30 developing countries in 1970s and 1980s. Their study confirmed that government capital expenditure in GDP has a significant positive relationship with economic growth, but the share of government current expenditure in GDP was found to be insignificant in explaining economic growth. At the sectoral level, the study found that government investment and expenditure on education are the only variables that had significant effect on economic growth.

Li and Liang (2010) investigated the impact of government spending on economic growth in East Asia using panel data from 1961 to 2007. The impact of government education spending on economic growth was shown to be fragile, according to the study. The findings of the study revealed that health has a greater impact on economic growth than education. According to the study, human capital should be spent on health rather than education. Unlike this study, which uses time series data from 1980 to 2020, Li and Liang (2010) employed a panel data set from 1961 to 2007. This study looks at the impact of four types of government spending on economic growth in Malawi, whereas Li and Liang's analysis only looked at health and education spending in East Asia.

3.6.2 Studies on African Economies

An examination of the literature on African economies reveals the relationship between government spending and economic growth. Using data from 1979 to 2008, Nurudeen and Usman (2010) investigated the effects of government expenditure on economic growth in Nigeria, categorizing it as total recurrent expenditure, total capital expenditure, and government expenditure on education. Using the Error Correction Model (ECM), the study's findings suggest that the three types of spending had a

negative influence on economic development. Increasing government expenditure on health, transportation, and communication, on the other hand, increased productivity and economic growth, according to the study. Inuwa (2012), Efobi and Osabuohien (2012), Ebiringa and Charles (2012), and Chude and Chude (2013) investigated the same relationship in Nigeria using the cointegration model technique and data from 1961 to 2010, 1970 to 2014, 1977 to 2011, and 1977 to 2012, respectively and came to similar conclusions. The research indicated that just two categories of government expenditure, capital investment and education, had a statistically significant impact on economic development.

Husnain et al. (2011) studied the interrelationship among public spending, Foreign Direct Investment (FDI) and economic growth in case of Pakistan for the period 1975 to 2008 using simple accounting framework. Their study show that public expenditure retard economic growth whereas FDI is positively associated with growth and this effect remains strong until public spending grow less than 6% per annum. Beyond this level, positive effects of FDI become fragile which suggest that excessive involvement of government in economic activity may hinder the beneficial effects of FDI. The study suggested that this result may be attributed to large proportion of public spending on non-development expenditure like defense and interest payments on debt in Pakistan.

Ebong et al. (2016) used the OLS approach to conduct another disaggregated analysis in Nigeria, utilizing data from 1970 to 2012. The study's goal was to show how important it is for the government to structure its spending in order to achieve growth. The study showed that channelling government investment toward infrastructure and education in Nigeria was not only important, but also that the extent of the externalities from these expenditures in boosting the productivity of both physical and human capital had a large economic impact.

Fedderke, et al., (2006) used time series data from 1875 to 2001 to investigate the relationship between economic infrastructure investment, such as transportation, roads, and housing, and economic growth in South Africa. Using the Vector Error Correction Model (VECM), the study found that infrastructure investment not only leads to economic growth, but also has a stable impact, regardless of whether the larger specification or the parsimonious growth model is used. The study concluded that infrastructure spending has a direct influence on output by increasing marginal capital

productivity. This is supported by a research undertaken by Nhlapo (2013), which looked at how government spending on construction contributes to economic growth in South Africa. Using GDP, Gross Fixed Capital Formation, and Construction Value Added (CVA) data from 1969 to 2011, Nhlapo (2013) discovered evidence of a substantial association between government expenditure on building activities and economic growth.

Nworji, et al., (2012) using data from 1970 to 2009 looked at how government spending affected economic growth in Nigeria. According to the study, government spending on economic services had a negligible negative impact on economic growth. Capital expenditure on transfers had a little positive influence on economic growth, according to the study's findings. According to the study, recurrent expenditure on transfers, as well as capital and recurrent investment on community and social services, were found to have a considerable significant impact on economic growth.

The findings of Nworji et al., (2012) contradict those of Soli, et al., (2008), who concluded that government capital investment has a negative influence on economic growth whereas government recurrent expenditure has a favourable impact, albeit not immediately but after two years. According to Nworji, et al., (2012), some sectors have a detrimental impact on economic growth, while others have a positive impact.

Using data from 1970 to 2010, Egbetunde and Fasanya (2013) used the bound testing (ARDL) approach to analyze the short-run and long-run relationship between government expenditure and growth in Nigeria. In contrast to findings of Nworji et al., the study found that total government spending has a negative impact on growth. However, the study's findings revealed that recurrent government spending had a small but considerable positive impact on economic growth, which is consistent with the findings of Nworji et al., (2012). The only difference is that Nworji et al. were more detailed about which sectors were targeted for recurrent expenditure. The research by Egbetunde and Fasanya is similar to the study since they both use time-series data. In addition, like Egbetunde and Fasanya (2013), this study looks at data for 40 years and uses ARDL for analysis.

Loto (2011) investigated the growth effects of government expenditure in Nigeria over the period 1980 to 2008 with a particular focus on sectoral expenditure by applying Johansen cointegration technique and Error Correction Model. In the study, five key

sectors were selected: security, health, education, transportation, and communication and agriculture. Results from the study revealed that in the short-run, expenditure on agriculture was found to be negatively related to economic growth. The impact of education, although also negative, was not significant. The impact of expenditure on health was found to be positively related to economic growth. Although expenditure on national security, transportation and communication were positively related to economic growth, the impacts were not statistically significant. The study added that it is possible that education expenditure could be positive in the long-run if brain drain is kept in check.

Abu and Abdullahi (2010) used disaggregated analysis to investigate the effect of government expenditure on economic growth in Nigeria, for the period 1970 to 2008 using the co-integration and error correction methods. The result reveals that government total capital expenditure, total recurrent expenditure and government expenditure on education have negative effect on economic growth while, government expenditure on transport and communication and government expenditure on health lead to an increase in economic growth. Sunday and Elizabeth (2012) also explored the growth effects of government expenditure in Nigeria using data from 1962 to 2007, with a particular focus on sectoral expenditures. Employing autoregressive models (VAR) methodology, the study revealed that government spending on education has a positive effect on economic growth in the long-run and negative impact in the short-run. On the other hand, they find that spending on defense has a negative effect on economic growth in the long-run and insignificant impact in the short-run. As to health spending, it is negatively correlated to growth in the long-run and there is insignificant linkage in the short-run. Finally, spending on agriculture is found to be insignificant in both cases. Accordingly, they suggested that the allocation of government resources towards the education sector should be favoured in order to enhance growth.

Oluwatoyin and Fagbeminiyi (2015) studied government spending on health and its effect on health outcomes in Nigeria using data from 1979 to 2012. This study made use of the Johansen Co-integration and the Vector Error Correction Model (VECM) econometric technique to determine the long-run relationship between public spending on health and health outcomes. The study found that public spending on health has a significant relationship with health outcomes in Nigeria. Therefore, based on the

findings, the study recommended that government should increase and restructure the public expenditure allocation to the health sector.

A study by Ditimi (2011) in Nigeria using VECM, examined the linkage between the components of government spending and economic growth in Nigeria. This study examined the relationship between components of government expenditure (that is, agriculture; education; health and transport and communication) and economic growth with data spanning from 1970 to 2010. The result of the study showed that expenditure on agriculture had a significant impact on economic growth while expenditure on education, health and transport and communication had insignificant impact on economic growth. Based on the findings, this study suggests the need for a reversal in declining budgetary allocation to the educational and health sector in order to provide the sectors with the needed revenue which is necessary in influencing aggregate output of the economy. A similar study in Nigeria by Peter, et al., (2015) found that agricultural spending has positive impact on economic growth. This study recommended that increase spending on agriculture to improve economic growth because, most of the poor people live in rural areas and their source of income based on agriculture. Therefore, the sector can secure food and create job opportunity for the society. In addition, the study recommended that government should increase spending for productive sectors.

John and Warren (2012) investigated the effect of the composition of public expenditure on economic growth using data from 1972 to 2008 in Kenya. Using ordinary least squares method, the study found that expenditure on education promotes economic growth though expenditure on economic affairs, transport and communication were also significant. On the other hand, expenditure on agriculture has negative impact on economic growth while expenditure on health and defense were found to be insignificant to growth. This finding was attributed to the sector being focused on crop farming rather than mechanized farming. Kalio (2000) also examined the effect of different components of government expenditures on GDP growth using OLS method for a sample of time data (1970 to 1992) on Kenya. The study concluded that government expenditure on education, defence, and agriculture had a positive effect on GDP growth and that government expenditure on health and transport and communication were negatively related to economic growth.

Mwafaq (2011) investigated the impact of public expenditures on economic growth in Jordan using a time series data for the period 1990-2006 by employing different regression models. By testing the related data of government expenditures (recurring expenditures, development investment expenditures, transfer payment, and interest payment) and GDP of Jordan at the aggregate level, the study found that government expenditure at the aggregate level has positive impact on the growth of GDP which is compatible with the Keynesian's theory. The study also found that interest payment is proven to have no influence on GDP growth.

Kormain and Brahmasrene (2007) analysed the economy of Thailand with the Granger causality tests. They found that government expenditures and economic growth are not co-integrated. However, the study indicated a one-dimensional relationship as causality runs from government expenditure to growth. Furthermore, the study found a significant positive impact of government spending on economic growth. Akpan (2005) used a disaggregated approach in investigating the components of Government expenditure (that include capital, recurrent, administrative, economic service, social and community services, and transfers) that enhance growth in Nigeria. Using data from 1970 to 2001, the study found no significant relationship between economic growth and most of the components of government expenditure.

Musaba et al. (2013) used VECM and time series data from 1980 to 2007 to investigate the impact of government spending on economic growth in Malawi. The findings of the study was that in the short-run, there is no substantial association between government spending and economic growth. Long-term results, however, demonstrated that defense and agriculture spending had a positive and significant impact on economic growth. Government spending on health, education, transportation, and communication, as well as social protection, was significant but negatively related to economic growth.

In case of Ethiopia, Teshome (2006), observed the impact of various components of government spending on the growth of real GDP for the period 1960 to 2003 using Johansson Maximum Likelihood Estimation procedure. In the co-integration analysis, the study found that there is single co-integrating vector which implies that there is long-run relationships among the variables. The long-run result showed that expenditure on human capital has a significant positive impact on growth of real GDP.

Investment (productive) government spending displayed a negative but insignificant impact on growth of real GDP, revealing inefficiency and poor quality nature of public investment. In the short-run, all components of government expenditure did not have significant meaning in explaining economic growth.

Musaba, et al., study is similar to this study in that both look at the impact of government sectors on economic growth using data from Malawi. However, compared to Musaba et al., (2013), who employed 27 observations, this study employs a substantially larger data sample (40 observations). The flaw in the study by Musaba et al. (2013) is that they chose a smaller sample size, which diminishes the power of study and raises the margin of error. In comparison to Musaba et al. (2013), this study used a different analytical approach (ARDL model) (2013).

In Zambia and Tanzania, Jung and Thorbeeke (2001) used a Constrained General Equilibrium (CGE) model to examine the influence of government education spending on economic growth, human capital, and poverty. According to their study, government spending on education boosts economic growth. According to the findings, a sufficiently high degree of physical investment is required to optimize the benefits of educational spending. This research also found that a well-targeted education spending pattern is beneficial in reducing poverty. At the time of this study, Zambia and Tanzania were both regarded as deeply indebted poor countries.

Using data from 1965 to 1996 and the OLS approach, Kweka and Morrissey (2000) investigated the impact of government spending on economic growth in Tanzania. According to the findings of Kweka and Morrissey's study, productive expenditure has a negative impact on economic growth. It was also found that consumer spending, particularly private consumption, has a significant impact on economic growth. The study concluded that government spending on human capital investment is minimal, owing to the fact that any effects would take a long time to manifest. This finding contradicts Jung and Thorbeeke's (2001) findings, who found that government spending on education had a beneficial impact on economic growth. The study makes a significant contribution by stating that it should not be assumed that government spending always promotes growth.

3.6.3 Summary of Empirical Review

According to the studies that have been evaluated, there is no consensus on the impact of disaggregated government expenditure on economic growth. All the studies reviewed above are mainly similar to this study in the sense that they study the relationship between government expenditure and economic growth. The reviewed studies considered the following as independent variables; total government expenditure, expenditure on education, expenditure on health, expenditure on agriculture, expenditure on infrastructure, recurrent, and capital expenditures. The studies examined are rich in information and have shed light on the relationship between government spending and economic growth. These studies establish that the impact of government expenditure on economic growth varies at disaggregated level. The studies help to inform policymakers as to which sectors have an impact in stimulating economic growth and therefore sectoral disaggregation of government expenditure as adopted by this study. The review found that VECM, ARDL, ECM, and OLS are the most often employed research approaches.

CHAPTER FOUR

METHODOLOGY

4.1 Introduction

The methods used in the study are described in this chapter. The research's theoretical framework and empirical model are given. This chapter also covers data description, data source, and analysis method.

4.2 Theoretical Framework and Model Specification

The study employs a modified version of Ram's (1986) model and is based on endogenous growth theory model. The model incorporates government expenditure into the growth model hence the model is applicable to this study. This model captures the inter-sectoral productivity differentials of government expenditure and shows how government expenditure adds to output in the private sector via the externality effect. Ram created and deployed this model to examine the impact of government size on economic growth in 70 developed and developing countries. Many studies, including Alshahrani and Sadiq (2014), Hasnul (2015), Alexiou (2009), and Yasin (2000), have utilized the model to investigate the impact of government spending on economic growth. As a result, the model is theoretically appropriate for this study.

Private sector output (P) and public sector output (G) were used to derive the Ram model. Both sectors allocate capital (K) and labor (L) such that: $K = K_P + K_G$ and $L = L_P + L_G$. The level of output produced by the government sector affects the private sector's output. This formulation represents the beneficial effects of government sector on the private sector (P).

The following are the production functions for the two sectors:

$$P = P(K_P, L_P, G) \tag{4.1}$$

$$G = G(K_G, L_G) \tag{4.2}$$

Equation (4.1) expresses production of the as a function of private sector capital (K_p), private sector labour (L_p) and government externalities (G) in the form of infrastructure,

taxes and other government interventions. The equation (4.2) shows that the public sector's production is a function of capital (K_G) and labor (L_G).

The total factor inputs (L and K) is then expressed as follows:

$$L = L_P + L_G \tag{4.3a}$$

$$K = K_P + K_G \tag{4.3b}$$

Equation (4.3) is formed by combining equations (4.1) and (4.2), where the country's economic production is equal to both private and public sector production.

National income: $Y = P + G$ (4.3c)

This implies: $Y = f(L, K, G)$, $Y = P(K_P, L_P, G) + G(K_G, L_G)$ (4.3)

Equation (4.4) below is obtained by total differentiation of equation (4.3):

$$dY = P_K dK_P + G_K dK_G + P_L dL_P + G_L dL_P + P_G dG \tag{4.4}$$

Equation (4.4) shows that private sector's marginal factor productivity of capital (K) is represented by P_K, while the public sector's is represented by G_K. The marginal factor productivity of labor in the two sectors is represented by P_L and G_L, respectively, whereas the marginal externality effect of the public sector on the private sector is represented by P_G.

Labour in two different sectors has different degrees of productivity in any economy, and therefore we assume constant productivity differential of labour in both sectors represented by δ. When $\delta > 0$, labour productivity in the public sector is higher. When $\delta < 0$, labour productivity in the private sector is higher, and $\delta \neq 0$. This means that:

$\frac{G_L}{P_L} = (1 + \delta)$ that is $G_L = P_L(1 + \delta)$ (4.5)

The growth rate of relevant variables in the public sector is denoted by G_K, while the growth rate of relevant variables in the private sector is denoted by P_K. δ denotes the rate of productivity in both industries. Capital is treated as distinct in each sector, and we do not have to assume a constant productivity differential between capital in each sector as was the case with labor. Equation (4.6) is obtained by substituting equation (4.5) into equation (4.4):

$$dY = P_K dK_P + G_K dK_G + P_L dL_P + P_L dL_G + (1+\delta)P_L dL_G + P_G dG$$

(4.6) Rearranging equation (4.6) will give equation (4.7) and (4.8):

$$dY = P_K dK_P + G_K dK_G + P_L dL_P + P_L dL_G + \delta P_L dL_G + P_G dG \quad (4.7)$$

$$dY = P_K dK_P + G_K dK_G + P_L(dL_P + dL_G) + \delta P_L dL_G + P_G dG \quad (4.8)$$

Differentiating equation (4.2), and using equation (4.5), we can rewrite:

$$dG = G_K dK_G + G_L dL_G = G_K dK_G + (1+\delta)P_L dL_G$$

This implied:

$$\frac{dG}{(1+\delta)} - \frac{G_K}{(1+\delta)} dK_G = P_L dL_G \quad (4.9)$$

Substituting (4.9) into (4.8) and collecting terms:

$$dY = P_K dK_P + G_K dK_G + P_L(dL_P + dL_G) + \delta\left[\frac{dG}{(1+\delta)} - \frac{G_k}{(1+\delta)} dK_G\right] + P_G dG$$

$$dY = P_K dK_P + G_K dK_G + P_L dL_P + P_L dL_G + \delta\left[\frac{dG}{(1+\delta)} - \frac{G_k dK_G}{(1+\delta)}\right] + P_G dG$$

$$dY = P_K dK_P + P_L dL_P + G_K dK_G + \left[\frac{dG}{(1+\delta)} - \frac{G_k dK_G}{(1+\delta)}\right] + \delta\left[\frac{dG}{(1+\delta)} - \frac{G_k dK_G}{(1+\delta)}\right] + P_G dG$$

$$dY = P_K dK_P + P_L dL_P + G_K dK_G + (1+\delta)\left[\frac{dG}{(1+\delta)} - \frac{G_k dK_G}{(1+\delta)}\right] + P_G dG$$

$$dY = P_K dK_P + P_L dL_P + G_K dK_G + dG - G_K dK_G + P_G dG$$

$$dY = P_K dK_P + P_L dL_P + (1+P_G)dG \quad (4.10)$$

Assuming the existence of a linear relationship between average output per unit of labour the marginal products of labour in each sector in the economy,

that is $P_L = \left(\frac{Y}{L}\right)$

Letting $dK_P = I$ (gross investment), and substituting it into (4.10), then dividing through by Y gave:

$$\frac{dY}{Y} = \frac{P_K I}{Y} + \frac{P_L dL_P}{Y} + \frac{(1+P_G)dG}{Y}$$

$$P_L = \frac{Y}{L}$$

$$\frac{dY}{Y} = P_K \frac{I}{Y} + \frac{\frac{Y}{L}dL_P}{Y} + \frac{(1+P_G)dG}{Y} \quad (4.11)$$

However, assuming that $P_K = \alpha$, $(1 + P_G) = \lambda$ and including a coefficient for $\frac{dL_P}{Y}$ variable, the equation (4.11) becomes:

$$\frac{dY}{Y} = \alpha \frac{I}{Y} + \beta \frac{dL_P}{L} + \lambda \frac{dG}{Y} \quad (4.12)$$

The basic model for regression estimation is formed by Equation (4.12), which corresponds to Ram's (1986) equation.

The variables in Ram's model were described as: I = Gross investment which includes government investment represented by government capital expenditure, $\frac{dL}{L}$= Human capital development expenditure on health and education which captures the change in the quality of labour force, dG = Government consumption expenditure. The model implies that growth ($\frac{dY}{Y}$) responds to the ratio of gross investment (I) to GDP, growth of labour force $\frac{dL}{L}$ and the ratio of government consumption expenditure to GDP ($\frac{C_g}{Y}$).

Government spending affects economic growth through various channels. Capital expenditure is the part of the government spending that goes into the creation of assets like schools, colleges, hospitals, roads, land, bridges, dams, railway lines, airports and seaports. Government capital expenditure also covers the acquisition of equipment and machinery by the government in agriculture, health, transport and communication and education sectors. Government infrastructure spending has a direct impact on economic growth through boosting the economy's capital stock. Government expenditure on capital goods adds to a country's physical capital (infrastructure) which, in turn, complements private sector productivity and increase growth in the process.

Government expenditure on human capital (labour) is measured by the health and education spending. Human capital, along with physical capital, plays an indispensable role in economic development. Human capital formation entails spending on education, health and training. Spending on education and health is justified in endogenous growth theory (Lucas, 1988; Romer, 1990). Lucas (1988) held the view that public spending on education and health promotes human capital, which in turn contributes to economic growth. Romer (1990) highlighted the role of spending on research and development in economic growth. More specifically, in respect of the endogenous growth theory,

technological progress, which increases productivity and accelerates the pace of growth, can be determined within the model through the formation of human capital. Spending on education and health helps promote efficiency, knowledge and inventions, all of which contribute to the economic growth of a country. Government spending on health and education may also have an externality effect on economic growth by raising the marginal productivity of privately supplied production components. The basic idea is that a highly educated and healthier workforce is expected to be relatively more productive. Government spending on goods and services may also boosts the economy's aggregate demand.

4.3 The Empirical Model Specification

Equation (4.12) estimates the effects of total government expenditure on economic growth. However, as discussed earlier, different components of government spending may have different effects on economic growth. Thus, to incorporate this hypothesis in our model, the study disaggregates total government expenditure into four components (expenditure on agriculture, health, education, transportation and communication). The study uses different components of government expenditure to better understand the effect of each component on growth. To eliminate the effects of changes in trade policies, the estimation included trade openness as a control variable in our regressions. Therefore, we will estimate the following growth equation expressed below:

$$GDP = f(agri, hea, edu, trco, opn) \tag{4.13}$$

From equation (4.13), the model specification is given as:

$$\dot{Y}_t = \alpha_0 + \alpha_1 edu_t + \alpha_2 hea_t + \alpha_3 agri_t + \alpha_4 trco_t + \alpha_5 opn_t + \varepsilon_t \tag{4.14}$$

The variables used in this study are gdp = real GDP growth rate proxy for economic growth, edu =government expenditure on education, hea =government expenditure on health, agri =government expenditure on agriculture, trco =government expenditure on transport and communication, and opn =openness to trade.

4.4 Description and Measurement of Variables used in the study

GDP growth rate (gdp): This is the rate at which the gross domestic product grows. GDP is the total value of all final goods and services produced within the boundaries of a country in a specific period of time. GDP growth rate is used as a proxy for economic growth.

Expenditure on Agriculture (agri) includes government expenditures such as the purchase of modern agricultural equipment, agricultural inputs, and the recruiting and training of agricultural personnel, among other things. Good agricultural investment, in the form of food security, is both a necessity for human survival and a source of raw materials for industrial use. Thus, apriori expectation is positive sign. Agriculture spending by the government is expressed as a percentage of GDP.

Expenditure on Education (edu): This spending includes both current and capital expenditures for education, including primary, secondary, higher education, and research and development. Purchase of learning equipment, pay for teachers and lecturers, and the development of learning infrastructure such as school buildings, lecture halls, and offices are examples of this spending. Education spending is used as a proxy for human capital development, which has an impact on the labor force. According to Schultz's human capital theory and later by Becker (1993), education spending has a favourable impact on economic growth. The *apriori* expectation is positive sign. Government expenditure on education is expressed as a percentage of GDP.

Expenditure on Health (hea): All government spending on health services such as medical equipment, health products, hospital services, public health services, outpatient services, medical equipment, health research and development (R&D), and salaries for nurses and doctors are included in this category. It is used as a proxy for changes in human capital that affect the labor force. Health spending is expected to have a positive relationship with growth. It is expressed as a percentage of gross domestic product (GDP).

Expenditure on transport and communication (trco): Infrastructure projects supported by the government such as roads and railways, and communication networks such as fiber optic cable connection layouts are included in this spending. Government spending on transportation and communication is predicted to correlate positively with economic growth. It is expressed as a percentage of gross domestic product (GDP).

The study's control variable is **trade openness (opn)**. It is calculated as a ratio of the sum of exports and imports to GDP. It is expected that the more Malawi engages in international trade, the growth-related benefits to the industrial sector would increase.

4.5 Data Source

In this study, secondary annual time series data from 1980 to 2019 was used (See Appendix 4). The annual data on different components of government spending was sourced from Statistics of Public Expenditure for Economic Development (SPEED) database compiled by the International Food Policy Research Institute (IFPRI). The SPEED database uses in-country or national sources, which include budget documents and statistical abstracts from government websites of ministries of finance, statistics bureaus, accountant generals' offices, and central banks. This database contains public expenditure data from 1980 to 2017 and the additional data on expenditure for 2018 and 2019 was extracted from economic reports and public expenditure reports. Annual GDP growth rates and trade openness data were obtained from the National Statistics Office (NSO). GDP growth rate was used as a dependent variable and a proxy for economic growth, whereas government spending on education, health, transportation and communication, and agriculture as independent variables, and trade openness as a control variable. All variables are expressed as percentages.

4.6 Methods of analysis

Descriptive statistics were used to present summaries of the data sample. In terms of econometric approaches, the research used the Philip Perron (PP) and Zivot-Andrews unit root tests to check all of the variables for stationarity or the presence of unit roots. The variables in the study had a mixed order of integration (I(1) and I(0)), hence the study employed ARDL models developed by Pesaran, Shin and Smith (2001) for co-integration analysis. When dealing with variables that are integrated with different orders (I(0), I(1)) or fractionally integrated, or only integrated with order one I(1), the ARDL bounds test approach is ideal. Equation 4.14 is transformed to represent the ARDL bounds cointegration test model:

$$\Delta gdp_t = \varphi_0 + \sum_{i=1}^{p} \varphi_1 \Delta gdp_{t-i} + \sum_{i=1}^{p} \varphi_2 \Delta edu_{t-i} + \sum_{i=1}^{p} \varphi_3 \Delta hea_{t-i} + \sum_{i=1}^{p} \varphi_4 \Delta agri_{t-i} + \sum_{i=1}^{p} \varphi_5 \Delta trco_{t-i} + \sum_{i=1}^{p} \varphi_6 \Delta opn_{t-i} + \beta_1 \Delta gdp_{t-1} + \beta_2 \Delta edu_{t-1} + \beta_3 \Delta hea_{t-1} + \beta_4 \Delta agri_{t-1} + \beta_5 \Delta trco_{t-1} + \beta_6 \Delta opn_{t-1} + \varepsilon_t \quad (4.15)$$

In equation (4.15), gdp is the dependent variable while edu, hea, agri, trco and opn are independent variables. β_1 to β_6 and φ_1 to φ_6 are long-run and short-run elasticities respectively. Δ is a difference operator; p is the lag lengths and ε_t is an error term.

If the estimated F-statistic is larger than the upper bound of the critical values, the null hypothesis of no long-run relationship between the variables is rejected using the ARDL approach. Similarly, the null hypothesis cannot be rejected if the estimated F-statistic is less than the lower bound critical values. The following are the null and alternative hypotheses:

$H_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$ (No long-run relationship)

Against the alternative hypothesis

$H_1 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq 0$ (Long-run relationship exists)

The short-run and long-run models of equation (4.15) can both be estimated if cointegration is found.

The ARDL model can be stated as follows by re-parametering equation 4.15:

$$\Delta gdp_t = \varphi_0 + \sum_{i=1}^{p} \varphi_1 \Delta gdp_{t-i} + \sum_{i=1}^{p} \varphi_2 \Delta edu_{t-i} + \sum_{i=1}^{p} \varphi_3 \Delta hea_{t-i} + \sum_{i=1}^{p} \varphi_4 \Delta agri_{t-i} + \sum_{i=1}^{p} \varphi_5 \Delta trco_{t-i} + \sum_{i=1}^{p} \varphi_6 \Delta opn_{t-i} + \gamma ECT_{t-1} + \varepsilon_t \quad (4.16)$$

In equation (4.16), ECT is the error correction term in equation (4.16), and γ is the speed of adjustment parameter that measures the short-run speed of adjustment towards the long-run equilibrium. The statistically significant ECT coefficient is considered to be good it ranges between 0 and 1. ECT_{t-1} should be negative and significant number and if positive and insignificant value means explosive and not reasonable.

Diagnostic tests were run to determine the robustness of the regression model. Serial correlation was tested using the Breusch-Godfrey LM test, whereas heteroskedasticity was tested using the Breusch-Pagan-Godfrey test. The Jarque-Bera test statistic was used to verify the normality assumption. The Ramsey RESET test for omitted variables in the model was also used in the study.

4.7 Chapter Summary

The theoretical framework and empirical model specification were discussed in this chapter. In addition, the chapter discussed the analysis methodologies used in the study. The study used secondary data on government spending, mostly from the Statistics of Public Expenditure for Economic Development (SPEED) database, as well as annual

GDP growth in percentages from the National Statistical Office. The ARDL regression equation is used to analyse the data in this study.

CHAPTER FIVE

ECONOMETRIC ESTIMATION RESULTS AND INTERPRETATION

5.1 Introduction

This chapter covers descriptive statistics, unit root test findings, diagnostic test results and empirical analysis estimates.

5.2 Descriptive statistics

The study used actual data of the variables to measure the central tendency, dispersion and normality and results are presented in table 1 below.

Table 1 Descriptive statistics of variables (n=40)

Variables	Mean	Maximum	Minimum	Std. Deviation	Skewness	Kurtosis
gdp	3.57	16.73	-10.24	4.73	-0.54	5.08
agri	2.69	5.81	0.03	1.5	-0.15	2.45
hea	2.39	4.48	1.35	0.82	1.41	3.96
edu	3.86	5.61	2.4	0.86	0.21	2.27
trco	2.95	11.64	0.44	2.27	1.9	7.52
opn	0.6	0.91	0.42	0.1	0.84	3.45

Source: Author's estimations

The above table indicates the description of variables in the estimation. The table shows that on average, the lion's share of government expenditure goes to education (3.9%) followed by transport and communication (3.0), agriculture (2.7%) and lastly health (2.4%). The skewness, which measured the symmetrical nature of the data series, revealed that gdp and agri are negatively skewed while hea, edu and trco are positively skewed. Positive skewness indicates that the size of the right-handed tail is larger than the left-handed tail. Furthermore, the descriptive statistics show that standard deviation of agri, hea, edu, trco and opn had low variation from the mean. The standard deviation of 4.73 for gdp is higher indicating that the data deviates with greater margin from the mean.

5.3 Stationarity Test Results

Determining order of integration by unit root tests is the first stage in co-integration analysis. To assess the stationary levels of variables, the study used the Phillips-Perron (PP) and Zivot-Andrews unit root tests. Table 2 summarize the findings of the PP and Zivot-Andrews unit root testing at different levels. Detailed results are presented in the Appendix 1.

Table 2: Phillips-Perron (PP) and Zivot-Andrews Test Results

		Phillips-Perron (PP)		Zivot-Andrews		
		Level	1st Difference	Level	1st Difference	Order of Integration
Variable	Model	T-Statistics	T-Statistics	T-Statistics	T-Statistics	
gdp	Trend & Intercept	-7.923***	-15.192***	-8.561***	-14.466***	I(0)
agri	Trend & Intercept	-2.525	-6.548 ***	-3.787	-8.557***	I(1)
hea	Trend & Intercept	-5.063***	-8.909***	-6.362 ***	-9.111***	I(0)
edu	Trend & Intercept	-3.51	-10.402***	-2.989	-11.217***	I(1)
trco	Trend & Intercept	-4.934***	-9.703***	-6.088***	-11.654 ***	I(0)
opn	Trend & Intercept	-4.775***	-10.985***	-6.503***	-9.656***	I(0)

Source: Authors' compilation. *** Statistically significant at 1%.

Because of its robustness, the study adopted intercept and trend model specification for the testing. The results of both unit root tests demonstrated that the GDP rate (gdp), health expenditure (hea), transportation and communication expenditure (trco), and openness to trade (opn) are all stationary in levels. Agriculture (agri) and education (edu) spending, on the other hand, were found to be non-stationary. Unit root tests at first difference revealed that the series are stationary with a 95% confidence level.

This study therefore concludes that GDP growth rate, health spending (hea), transportation and communication expenditures (trco), and trade openness (opn) are all integrated to order zero (I(0)), while government spending on agriculture and education are integrated to order one (I(1)). This suggests possible existence of long-run equilibrium among the series used such that the regression of one on the other will not be spurious. Because we have a mix of order one and zero, we may confidently use the Pesaran, Shin, and Smith-ARDL methodology for cointegration analysis.

5.4 ARDL bounds test for cointegration

ARDL-Bounds test for cointegration was conducted and the results are presented in Table 3.

Table 3: ARDL Bounds test for cointegration results

Model Specification	F-Statistics	Level of Significant	Critical Value Bounds Lower Bound	Critical Value Bounds Upper Bound	Status
ARDL (3,4,4,4,0,4)	5.947***	1%	3.41	4.68	
		2.50%	2.96	4.18	Cointegration
		5%	2.62	3.79	
		10%	2.26	3.35	

Source: Authors' compilation. *** Statistically significant at 1%.

The computed F-statistic of 5.947 exceeds the upper bound critical values, implying that the null hypothesis of no long-run relationship is rejected at all levels of significance. As a result, the analysis concludes that the underlying variables have long-run cointegration.

5.5 Diagnostics Test

The findings of the diagnostic tests are presented in Table 4. Detailed results of diagnostics test are included in Appendix 2.

Table 4: Diagnostic Test Results

Diagnostic Test	chi2/F-Statistic	Probability
Breusch-Godfrey Serial Correlation LM test	3.256	0.0712
Breusch-Pagan-Godfrey test for heteroskedasticity	0.21	0.6489
Ramsey RESET test	0.51	0.6873
Jarque-Bera test	0.6021	

Source: Authors' compilation.

The findings of the Breusch-Godfrey LM test for residual serial correlation indicate that the estimated model has no autocorrelation problem. We fail to reject the null hypothesis of no autocorrelation among residuals based on the probability value produced from the test, which is greater than 5%. The Chi-squared (Chi2) from the Jarque-Bera test for normality is 0.6021, which is greater than 0.05, as seen in the table above. Therefore, the null hypothesis cannot be rejected, implying that residuals have a normal distribution. Because the p-value is greater than the conventionally accepted

5% level of significance, the heteroscedasticity test show that variables of the model are homoscedastic. Ramsey RESET test reveals that the model has no omitted variables since the p-value is greater than the 5% level of significance.

5.6 Discussion of results

Tables 5 shows the results of long-run coefficients while Table 6 shows results of the short-run dynamic from the estimation. Table 6 presents results of a joint significance test of each independent variable's short-run coefficients to evaluate overall significance. The R-squared is 0.96, while the adjusted R-squared is 0.88, implying that independent variables account for 96% of the variation in GDP growth rate. Table 5 shows that the F-test statistics have a probability of 0.0001, indicating that all of the coefficients are jointly statistically significant at the 1% significance level and that the model is well fitted.

The error correction term (ECT_{t-1}) has a significant and negative coefficient, implying that whenever there is a deviation between the actual and long-run equilibrium levels, there will be an adjustment back to long-run relationship in following periods to eliminate this discrepancy. The coefficient of the error term or the speed of adjustment towards equilibrium value is -0.366, indicating that the speed of adjustment towards long-run equilibrium is quite slow. This means that whenever there was a shock in the system, 37% of the discrepancy of actual economic growth from its equilibrium value is eliminated within a year.

5.6.1 Discussion of Long Run Results

In Table 5 below, the long-term findings are summarized and presented. Detailed results are presented in the Appendix 3.

Table 5: Estimated long-run regression results

Dependent variable: GDP				
Variable	Coefficient	Std. Error	T-Statistic	Prob.
C	-14.702	12.188	-1.21	0.253
agri	0.586	0.858	0.68	0.508
hea	3.764**	1.378	2.73	0.020
edu	-2.258	2.593	-0.87	0.402
trco	0.526*	0.265	1.98	0.073
opn	18.929	24.551	0.77	0.457

Source: Authors' compilation. ** statistically significant at 5% level (p <0.05); * statistically significant at 10% level (p < 0.10).

Health Expenditure: In the long-run, government spending on health (hea) confirms the a priori expectation that public health expenditure positively affects economic growth as shown in Table 5. Specifically, the coefficient of health expenditure is significant at 5%, implying that a 5% increase in health sector spending enhances real GDP growth by about 3.8% on average. This finding is consistent with that of Fan and Rao (2003), Loto (2012), Abu and Abdulahi (2010), and Teshome (2006), who found that health spending boosts economic growth. Oluwatoyin and Fagbeminiyi (2015) did an empirical study in Nigeria and found similar results. However, this finding contradicts previous studies by John and Warren (2012), Kalio (2000), and Devarajan et al. (1996), who found that government health spending has no effect on economic growth. A major contributory factor to these conflicting results could be due to differences in methodological procedures, estimating procedures, model specifications, study variables, sample size and type and period of estimation.

This study demonstrates the importance of public health spending in fostering Malawi's economic growth. The findings showed that government investment in the health sector had a favourable impact on economic growth through the development of human capital. Health is an important determinant of economic development such that a healthy population means higher productivity and higher income per capita (WHO, 2005). The contribution of health expenditure on economic development emanates from the health led growth hypothesis (Mushkin, 1962). The hypothesis considers health to be capital and therefore investments on health can lead to an increase in labour productivity, thereby increasing incomes. Bloom and Canning (2000) highlights that when labour is healthy, their incentive to develop new skills and knowledge is higher because they expect to enjoy long term benefits. However, when the labour force is characterized by workers with poor health, they turn to have an adverse effect on productivity (Cole & Neumayer, 2006).

Therefore, government spending on health should be viewed as an investment in the development of human capital that influences economic growth in Malawi. Workforce 2030, adopted at the World Health Assembly in 2016, articulates one of its objectives around the linkage between investments in the health workforce and improvements in

health outcomes, social welfare, employment creation and economic growth, arguing that the investment in human resources for health can deliver a triple return of improved health outcomes, global health security and economic growth (WHO, 2016).

Transport and communication expenditure: The coefficient of transportation and communication expenditure is 0.526 and significant at the 10% level of significance, implying that 1% increase in transportation and communication expenditure is associated with a 0.53% increase in GDP growth rate, holding other variables constant. This is in line with previous research studies by Narudeen and Usman (2010) and Fedderke et al. (2006), all of which found that infrastructure has a positive impact on growth.

The positive impact of transportation and communication spending supports theoretical assertion that countries should invest in transportation and communication infrastructure to achieve long-term economic growth. According to theory, improving transportation and communication reduces transportation costs lowers the overall cost of private output in an economy and increases company profits. Increased government spending on road infrastructure results in better roads that make it easier to transport raw materials and finished goods to and from the business premises.

Government spending on communications systems and transportation infrastructure increases the rate of private domestic investment which promotes economic growth. For inter-country market integration, lower unit costs of production and transactions, easier flow of goods and information, well-developed transportation and communication infrastructure is critical. According to this study, Malawi's economic growth is promoted by government spending on transportation and communication.

Agriculture expenditure: Government spending on agriculture is expected to have a positive impact on economic growth. Contrary to the apriori expectation, the long-run results show that government spending on agriculture has an insignificant impact on GDP growth rate. This discovery is consistent with findings by Kalio (2000). However, this result contradicts with previous findings by Ditimi (2011), Bingxin et al., (2009), Mwafaq (2011), Musaba et al., (2013) and Peter et al. (2015), who found that government spending on agriculture had a positive and significant impact on economic growth. This means that government expenditure on the agriculture sector has no long-

term impact on growth of the Malawian economy. The reason for this finding could be due to the components of agriculture spending. Recurrent expenditure in the agricultural sector are very dominant in Malawi. In this case, expenditure in the sector may have no impact on long-term economic growth.

Education Expenditure: According to the study findings, government spending on education is insignificant at any conventional significance levels and negatively associated with long-term economic growth in Malawi. This suggests that, despite the substantial share of government spending allocated to education, government expenditure in education does not contribute to economic growth in Malawi in the long-run. This result is consistent with findings of Niloy et al., (2003) but contradicts findings of Donald and Shuanglin (1993).

Theoretically, education expenditure is expected to boost economic growth. However, other factors such as the education sector's institutional structure may determine whether or not education sector investments have a major impact on growth in Malawi. This may be due to inefficiency with which expenditures in the education sector are converted into human capital stock which is necessary to economic growth. The education sector's weak spill-over effects fail to enhance the productivity of both human and physical resources. Another explanation about the insignificant effect of government education expenditure on economic growth could be that the expenditures in the education sector may be oriented towards unproductive expenditure. According to the 2019 Malawi Public Expenditure Review (PER) by the World Bank, close to 80% of the expenditure in the education sector is devoted to the payment of teachers' salaries. Thus, education expenditure is not oriented towards productive expenditure such as the construction of more educational institutions, the renovation of the existing education facilities and the construction of new and adequate learning facilities.

5.6.2 Discussion of Short Run Results

The short-run results are presented in Table 6 below. Detailed results are presented in the Appendix 3.

Table 6: Estimated short-run regression results

Dependent variable: GDP				
Variable	Coefficient	Std. Error	T-Statistic	Prob.
LD(gdp)	0.49	0.315	1.56	0.148
L2D(gdp)	0.463**	0.191	2.43	0.034
D1(agri)	2.283**	0.795	2.87	0.015
LD(agri)	0.205	0.852	0.24	0.815
L2D(agri)	0.732	0.997	0.73	0.478
L3D(agri)	-1.957*	0.903	-2.17	0.053
D1(hea)	0.796	1.248	0.64	0.537
LD(hea)	-5.928***	1.328	-4.46	0.001
L2D(hea)	-3.063*	1.454	-2.11	0.059
L3D(hea)	-3.738***	1.124	-3.32	0.007
D1(edu)	-1.273	2.26	-0.56	0.585
LD(edu)	3.827*	1.798	2.13	0.057
L2D(edu)	3.892**	1.464	2.66	0.022
L3D(edu)	5.253***	1.427	3.68	0.004
D1(trco)	0.718*	0.389	1.84	0.092
D1(opn)	-17.371*	8.295	-2.09	0.06
LD(opn)	-9.767	18.932	-0.52	0.616
L2D(opn)	-24.161*	11.446	-2.11	0.058
L3D(opn)	-10.498	8.709	-1.21	0.253
Ect(-1)	-0.366***	0.326	-4.19	0.002
R-squared	0.9617	F- Statistics	11.51	
Adjusted R-squared	0.8782	Prob(Fstatistic)	0.0001	
Durbin-Watson stat	2.386629			

Source: Authors' compilation. *** Statistically significant at 1% level ($p < 0.01$); ** statistically significant at 5% level ($p < 0.05$); * statistically significant at 10% level ($p < 0.10$).

Table 6 shows coefficients of the lagged levels of the variables which represent short-run elasticities. It can be observed that more than one coefficients of the variables were estimated for each of the variables except for trco, and F-test was used to determine whether the coefficients of the lagged levels of the variables are jointly significant. The joint significance test results are shown in Table 7 below. The joint significance test revealed that government spending on agriculture, health, education, transportation, and communication has a significant short-run effect on economic growth. Musaba et al., (2013) conducted a similar study for Malawi but concluded that there is no short-run relationship between government expenditure and economic growth in Malawi. The difference in the results from the two studies can be attributed to the heterogeneity of the underlying estimation techniques and sample sizes used by the studies. This study used a larger sample size (40 observations) compared to the study by Musaba et al. (2013) who used a smaller sample of 27 observations.

Table 7: Short-run Estimation of the ARDL model

Dependent variable: GDP					
Variable	agri	hea	edu	trco	opn
P-Values	0.0231**	0.0071***	0.0070***	0.0922*	0.0643*

Source: Authors' compilation. *** Statistically significant at 1% level ($p < 0.01$); ** statistically significant at 5% level ($p < 0.05$); * statistically significant at 10% level ($p < 0.10$).

In the short-run, government spending on health, education, and agriculture has a significant impact on economic growth although the coefficients of the lagged levels of the variables have distinct signs. In this case, the results do not reveal the direction of the impact.

At a 10% level of significance, the short-run results show that government investment on transportation and communication had significant and positive effects on growth similar to long-term results. According to the findings, when government spending on transportation and communication increases by 1%, economic growth increases by 0.7% on average. The findings imply that government spending on transportation and communication has a short-run positive impact on economic growth. In the short-run, the magnitude of affects is substantially greater than in the long-run. The degree of impacts is much higher in the short-run compared to the long-run. Government investment in the transport sector creates jobs directly through actual construction, operation, and maintenance requirements, as well as indirectly through multiplier effects across the economy.

This finding supports the argument of prioritizing expenditure on transportation and communication sectors to promote economic growth in Malawi. Trade openness has a negative and considerable influence on growth, according to the short-run results.

CHAPTER SIX

CONCLUSION AND POLICY IMPLICATIONS AND AREAS FOR FURTHER RESEARCH

6.1 Conclusion

The main objective of this study was to investigate the impact of disaggregated government spending on economic growth in Malawi using data from 1980 to 2019. The study looked into the impact of government spending on health, education, transportation, and communications, as well as agriculture, on economic growth in Malawi. The choice of variables included in this study was made in line with prioritised sectors outlined in the MGDS III designed by the Government to improve Malawian economy. These sectors were also chosen due to the fact that a substantial share of total government spending is allocated to these sectors. This study adds to contributes to previous knowledge by examining the precise effects of disaggregated government spending on economic growth in Malawi. This study assists the Government in identifying sectoral expenditures which are more productive in order to achieving economic growth. This analysis will assist policymakers to come up with appropriate public expenditure policies.

Using the ARDL model, the study indicated that government expenditure on health had a positive and statistically significant impact on economic growth. Thus, government spending on health is vital to Malawi's economic success. According to the study, government investment in the health sector has a favourable impact on economic growth due to the development of human capital. The empirical findings also demonstrated that government expenditure on transportation and communication has a positive and significant impact on Malawian economic growth in both the short-run and long-run. According to theory, improving transportation and communication infrastructure lowers transportation costs, which lowers the cost of private output and hence increases profits of firms. In the long-run, this study expected to find a positive and significant influence of government spending on education and agriculture on

economic growth. Government spending on these two sectors, however, was found to be insignificant.

The study's findings also revealed that public spending on agriculture, health, education, and transportation and communication has a significant short-term impact on economic growth. The specification and diagnostic tests indicates that the model is correctly specified and classical regression assumptions are not violated.

6.2 Policy Implications

The study recommends that GoM should focus on sectoral expenditures that are more productive in the Malawian economy. From a policy standpoint, the study findings suggest that GoM should prioritise health sector investment because it improves human capital formation and so promotes economic growth. The positive effect of government expenditure in health on economic growth strengthens the call for GoM under the Abuja Declaration[2] to devote at least 15% of the budgetary resources towards health sector in order to promote human capital development and achieve economic growth.

This study also recommends that Government should prioritize the transportation and communication sector when allocating budgets resources. Reallocating more government expenditure to the two productive sectors (health and transportation and communication) is critical not just for enhancing growth but also for achieving more sustainable fiscal adjustments in Malawi. According to the study, restructuring public spending, particularly putting more focus on health and transportation and communication sectoral expenditures fundamental for Malawi achieve long-term economic prosperity.

6.3 Study Limitations

The study only focused on the growth impacts of health, transport and communication, agriculture and education government expenditure in Malawi. However, the study did not include other sectors such as tourism, defence, social protection and natural

[2] Declaration, signed by African Union countries committing to spend at least 15% of its government budget on health each year for health sector development.

resources which also affect economic growth. The other shortcoming of this study is absence of disaggregated data (capital and recurrent) over the study period and variables. There was also limited literature to inform the study from the local perspective.

6.4 Areas of Further Research

This study proposes for further research and analysis on this topic. Growth effects of government expenditure at disaggregated levels have shown mixed results and this necessitates for in-depth studies on the topic. There is need for further studies on sectoral expenditure, but disaggregated further into capital and recurrent government expenditure for deeper policy prescription. More research should also be done to determine factors that influence allocation of government's budget for various sectors, particularly, demographic factors and the nature of the political process. Lastly, the study proposes for further research on the growth impact of government expenditure on other sectors such as tourism, defence, social protection and natural resources in Malawi.

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APPENDICES

Appendix 1: Philips Perron Tests

GDP

Null Hypothesis: GDP has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-7.923	0.0000
Test critical values:	1% level	-4.251	
	5% level	-3.544	
	10% level	-3.206	

*MacKinnon approximate p-value for Z(t)
Stationary in levels

Agri

Null Hypothesis: agri has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.525	0.3156
Test critical values:	1% level	-4.251	
	5% level	-3.544	
	10% level	-3.206	

*MacKinnon approximate p-value for Z(t)
Not stationary in levels

D(agri)

Null Hypothesis: D(agri) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.548	0.0000
Test critical values:	1% level	-4.260	
	5% level	-3.548	
	10% level	-3.209	

*MacKinnon approximate p-value for Z(t)
Stationary in first difference at 1% level (***)

Hea

Null Hypothesis: hea has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-5.063	0.0002
Test critical values:	1% level	-4.251	
	5% level	-3.544	
	10% level	-3.206	

*MacKinnon approximate p-value for Z(t)
Stationary in levels

Edu

Null Hypothesis: edu has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-3.510	0.0383
Test critical values:	1% level	-4.251	
	5% level	-3.544	
	10% level	-3.206	

*MacKinnon approximate p-value for Z(t)
Not stationary in levels

D(edu)

Null Hypothesis: D(edu) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-10.402	0.0000
Test critical values:	1% level	-4.260	
	5% level	-3.548	
	10% level	-3.209	

*MacKinnon approximate p-value for Z(t)
Stationary in first difference at 1% level (***)

Trco

Null Hypothesis: trco has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.934	0.0003
Test critical values:	1% level	-4.251	
	5% level	-3.544	
	10% level	-3.206	

*MacKinnon approximate p-value for Z(t)

Stationary in levels

Opn

Null Hypothesis: opn has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.775	0.0005
Test critical values:	1% level	-4.251	
	5% level	-3.544	
	10% level	-3.206	

*MacKinnon approximate p-value for Z(t)
Stationary in levels

Appendix 2: Diagnostic Tests

Breusch-Godfrey LM test for autocorrelation

lags(p)	Chi2	df	Prob > chi2
1	3.256	1	0.0712

Ho: no serial correlation

LM test for autoregressive conditional heteroskedasticity (ARCH)

lags(p)	Chi2	df	Prob > chi2
1	1.23	1	0.2674

Ho: no ARCH effects vs H1: ARCH (p) disturbance

Breusch-Pagan / Cook-Weisberg test for heteroskedasticity

Ho: Constant variance

Variables: fitted values of D.gdp

chi2 (1) = 0.21

Prob > chi2 = 0.6489

Ramsey RESET test

Ho: model has no omitted variables

F(3, 8) = 0.51

Prob > F = 0.6873

Appendix 3: ARDL Regression Results

Dependent Variable: GDP
Selected Model: ARDL (3, 4, 4, 4, 0, 4)
Sample: 1980-2019
Included observations: 36

	D.gdp	Coef.	Std.	Err.	t	[95% Conf. Interval]	
ADJ	L.gdp	-0.36627	0.326427	-4.19	0.002	-2.08473	-0.64781
LR	L.agri	0.586324	0.857686	0.68	0.508	-1.30143	2.474078
	L.hea	3.764381	1.377839	2.73	0.02	0.731778	6.796985
	L.edu	-2.25786	2.592584	-0.87	0.402	-7.9641	3.448382
	trco	0.525702	0.264939	1.98	0.073	-0.05742	1.108829
	L.opn	18.92904	24.55141	0.77	0.457	-35.1083	72.96633
SR	LD.gdp	0.489965	0.315073	1.56	0.148	-0.20351	1.183435
	L2D.gdp	0.462563	0.190559	2.43	0.034	0.043145	0.881981
	D.agri	2.283091	0.794616	2.87	0.015	0.534152	4.03203
	LD.agri	0.204501	0.85189	0.24	0.815	-1.6705	2.079498
	L2D.agri	0.732088	0.996652	0.73	0.478	-1.46153	2.925705
	L3D.agri	-1.95728	0.903375	-2.17	0.053	-3.94559	0.031038
	D.hea	0.796402	1.248385	0.64	0.537	-1.95128	3.544078
	LD.hea	-5.92832	1.327915	-4.46	0.001	-8.85104	-3.0056
	L2D.hea	-3.06633	1.453731	-2.11	0.059	-6.26598	0.133308
	L3D.hea	-3.7377	1.124255	-3.32	0.007	-6.21217	-1.26323
	D.edu	-1.27311	2.260342	-0.56	0.585	-6.24809	3.701867
	LD.edu	3.827031	1.797941	2.13	0.057	-0.13021	7.784273
	L2D.edu	3.892252	1.464154	2.66	0.022	0.66967	7.114834
	L3D.edu	5.253132	1.427069	3.68	0.004	2.112174	8.39409
	D.opn	0.718251	0.38939	1.84	0.092	-0.13879	1.575293
	LD.opn	-17.3708	8.294966	-2.09	0.06	-35.6279	0.886347
	L2D.opn	-9.76721	18.93223	-0.52	0.616	-51.4368	31.90235
	L3D.opn	-24.1611	11.44625	-2.11	0.058	-49.3542	1.031886
	L3D.opn	-10.4985	8.708907	-1.21	0.253	-29.6666	8.669717
	_cons	-14.7016	12.18799	-1.21	0.253	-41.5272	12.12403
R-squared		0.9617	F-statistic		11.51		
Adjusted R-squared		0.8782	Prob(F-statistic)		0.0001		
Durbin-Watson stat		2.386629	F-statistic				

Appendix 4: Data Used in the study

year	gdp	agri	hea	edu	trco	opn
1980	0.4067	3.5111	1.9132	3.1052	9.0976	0.6365
1981	-5.2901	4.8109	1.8311	3.9256	6.3361	0.5716
1982	2.5035	4.3553	1.5093	4.1193	3.8720	0.5134
1983	3.7187	4.6402	1.9569	3.8713	3.4482	0.4907
1984	5.3603	3.3033	2.1963	3.4181	3.9358	0.5480
1985	4.5710	2.6392	2.1487	3.4500	4.2352	0.5409
1986	-0.2148	4.4673	2.3937	3.6370	4.4423	0.4796
1987	1.6252	3.6960	1.9012	3.2356	3.7036	0.5326
1988	3.1773	3.2481	2.0682	3.5022	4.8237	0.5587
1989	1.3447	3.4522	2.1022	2.5003	4.6037	0.5330
1990	5.6923	2.6537	2.0029	3.2597	11.6416	0.5720
1991	8.7302	3.4158	1.8601	2.3975	2.6792	0.5258
1992	-7.3330	3.0304	2.0650	4.0730	2.9179	0.6566
1993	9.6918	2.3331	1.8845	3.6604	0.8139	0.4835
1994	-10.2402	3.2873	3.8054	4.8195	1.4732	0.9138
1995	16.7288	2.5807	1.7740	4.6680	0.4448	0.7846
1996	7.3167	1.4920	1.9445	4.0579	0.5384	0.5470
1997	3.7924	1.7719	2.2651	5.5783	1.4682	0.5494
1998	3.8953	2.0664	3.1510	4.5059	1.5608	0.7088
1999	3.0423	2.6285	2.5224	4.3361	3.2223	0.7132
2000	1.5761	1.3689	1.7992	3.5849	2.2838	0.6094
2001	-4.9750	2.5717	4.2788	4.8782	2.4241	0.6712
2002	1.7000	0.9809	1.6908	2.6591	0.6765	0.4190
2003	5.7056	1.3358	1.7902	2.7543	1.4937	0.5084
2004	5.4205	1.9949	1.6939	2.7503	3.4110	0.5147
2005	3.2687	1.5157	3.2892	3.0060	3.1375	0.5745
2006	4.7000	3.7713	1.8952	2.5944	2.9304	0.5436
2007	9.6000	4.5330	2.2059	3.0465	4.9313	0.5644
2008	7.6397	5.8094	4.4162	4.2453	1.9554	0.6197
2009	8.3281	5.1993	4.1653	3.8051	2.0242	0.5168
2010	6.8741	4.2051	4.4802	4.6279	4.5641	0.5765
2011	4.8541	3.2839	2.4508	3.6799	1.6578	0.4879
2012	1.8858	2.2483	1.3500	4.2000	2.1000	0.6788
2013	5.2000	0.0342	2.0900	5.4162	0.9000	0.7827
2014	5.7000	0.0479	2.2100	4.8398	1.2000	0.7333
2015	2.8000	0.0501	2.6700	5.6087	1.6000	0.6491
2016	2.4840	0.0583	2.7200	4.7486	1.7000	0.7791
2017	4.0000	0.0360	2.9600	4.0313	1.9000	0.6533
2018	3.1700	2.5500	2.3000	4.7100	0.8700	0.6899
2019	4.3692	2.6800	1.8200	3.0900	0.8000	0.6660