

**THE IMPACT OF FISCAL DEFICIT AND GOVERNMENT EXPENDITURE
ON ECONOMIC GROWTH IN MALAWI**

MASTER OF ARTS IN ECONOMICS

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UNIVERSITY OF MALAWI

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MASTER OF ARTS IN ECONOMICS

By

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Thesis submitted to the Faculty of Social Science, Department of Economics in partial
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DECLARATION

I, the undersigned hereby declare that this thesis is my own original work which has not been submitted to any other institution for similar purposes. Where other people's work has been used, acknowledgements have been made.

MIRRIAM KWINDANI

Signature

Date

CERTIFICATE OF APPROVAL

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

Signature: _____ **Date:** _____

Maxton Tsoka, PhD (Associate Research Professor)

SUPERVISOR

DEDICATION

To my dear mother, Ellah,

And my wonderful boys, Zikomo and Luso,

For always being there for me.

ACKNOWLEDGEMENTS

Firstly, I give thanks to the Almighty God for giving me the grace to start and finish the programme. I cannot thank You enough, all glory be unto You!

With a special feeling of gratitude to my family and specifically to my dear mother, my source of strength whose moral, spiritual and emotional encouragement was extraordinary. To Zik and Luso with love, for being really good boys who always wanted to see their mum finish her “school”. You have been my cheerleaders. My love for you cannot be quantified.

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Special thanks to my supervisor Associate Professor Maxton Grant Tsoka for the support and effort you put in polishing up my work. You were always there to assist, very responsive and a very rich pool of knowledge.

May God bless you all.

ABSTRACT

The study examined how fiscal deficit and the composition of government expenditure affected economic growth in Malawi from 1974 to 2021. Data collected from the Ministry of Finance and Economic Development, and World Development Indicators of the World Bank was analysed using Vector Error Correction Model (VECM). Results showed a negative relationship between fiscal deficit and economic growth in the long run and an insignificant relationship in the short run. Development expenditure showed a positive impact on growth both in the long and short run whereas recurrent expenditure had a negative impact on growth in the long run and no impact in the short run.

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LIST OF ABBREVIATIONS AND ACRONYMS

ADF:	Augmented Dickey-Fuller test
AIC:	Akaike Information Criteria
AIDS:	Acquired Immuno Deficiency Syndrome
ARDL:	Auto Regressive Distributed Lag approach
BBS:	Bangladesh Bureau of Statistics
BD:	Budget Deficit used interchangeably with FD
CIA:	Central Intelligence Agency
ECF:	Extended Credit Facility
ECM:	Error Correction Model
EG:	Economic Growth
FD:	Fiscal Deficit used interchangeably with BD
FISP:	Farm Inputs Subsidy Program
FPE:	Final Prediction Error
GDP:	Gross Domestic Product
GMM:	Generalised Method of Moments
Gross_Inv:	Gross Private Investment
HIPC:	Highly Indebted Poor Countries
HIQ:	Hannan-Quin Criterion
HIV:	Human Immunodeficiency Virus
IMF:	International Monetary Fund
INF:	Inflation
IS:	Investment/Saving curve
I(1):	Integration of Order One

LDC:	Least Developed Country
LGM:	Lagrange Multiplier
LM:	Liquidity Preference/Money Supply Equilibrium curve
LR:	Long Run
LRT:	Likelihood Ratio Test
MCC:	Millenium Challenge Corporation
MGDS:	Malawi Growth and Development Strategy
MoFEPD:	Ministry of Finance, Economic, Planning and Development
MPRSP:	Malawi Poverty Reduction Strategy Paper
OLG:	Overlapping Generations model
OLS:	Ordinary Least Squares
PP:	Philips-Perron test
Q1:	Quarter one
Q4:	Quarter four
RBM:	Reserve Bank of Malawi
REH:	Ricardian Equivalence Hypothesis
SADC:	Southern Africa Development Community
SD:	Standard Deviation
SIC:	Schwartz Information Criteria
SR:	Short Run
SUR:	Seemingly Unrelated Regression model
US:	United States
VAR:	Vector Auto Regressive model
VECM:	Vector Error Correction Model
WB:	World Bank

WBDI:	World Bank Development Indicators
ZAB:	Zero Aid Budget
ZDB:	Zero Deficit Budget
2SLS:	Two Stage Least Squares

CHAPTER 1

INTRODUCTION

1.1 Background of the study

Economic growth (EG) is a general increase in the production of goods and services over a specified period of time measured by growth in Gross Domestic Product (GDP) per capita. It is therefore achieved when the national output expands at a rate higher than the population growth resulting in an increase in a country's general living standards (Edame & Okoi, 2015). Due to its direct relation to standards of living, EG is one of the variables which are closely monitored by governments due to its impact on people's living standards. Improvement in the quality and quantity of the factors of production lead to increase in real GDP which results into higher real incomes and governments devoting more resources to social services, for example, health provision and education.

Economic growth is influenced by many factors which can be classified as direct and indirect factors. According to Boldeanu and Constantinescu (2015), direct factors for example, human and natural resources, as well as technology are also called supply factors and these have a direct effect on the value of a good and service. The indirect factors to a country's economic growth include: aggregate demand, savings rate, migration of labour, and budgetary and fiscal policies among others. These factors impact on growth differently as they depend on a country's state of development, major socio-economic factors influencing the economic growth at the particular time, and in

some cases components of the factors themselves, for example, the composition of public expenditure can exert a significant impact on the rate of growth.

Fiscal policy is one of the main tools governments use to attain EG. A government's fiscal policy is its plan for spending and taxation which if well implemented can nudge the economy in the desired direction (Baumol, 2010). Governments have a choice of implementing either expansionary or contractionary fiscal policy depending on the economic conditions their countries are passing through. Expansionary fiscal policy leads to a government experiencing a larger fiscal deficit (FD) than when it pursues the contractionary policy. Fiscal deficit is a result of government spending on investment and consumption that includes transfer payments exceeding revenues from ordinary taxes on incomes, goods and services, and non-tax revenues.

Most countries, both developed and least developed run budget deficits as opposed to a few which have a surplus budget. The Malawi economy has been run on deficit since attaining its independence in 1964 except for the years 2007 and 2008 when it had budget surpluses.

FDs are usually used to spur growth and mitigate a recession in a country through increased government spending or tax cuts. The composition of government expenditure leading to FD can have an impact on EG. Some studies have shown that capital (development) expenditure is growth inducing unlike recurrent expenditure (Umaru & Gatawa, 2014).

FDs can be financed using foreign sources, such as, loans and internal sources, for example, seigniorage and inflation tax revenue. These constitute government's interest earnings and payments which may be represented as $i((A - D^g))$ on domestic operations and $Ei^f(A^f - D^{gf})$ on foreign operations expressed in local currency by the nominal exchange rate E , i represents the interest rate, D government's outstanding debt and A stands for government's assets.

With all these adjustments, a government's budget identity can be written as follows in nominal terms:

$$\begin{aligned}(D^g - A) + H + E(D^{gf} - A^f) &\equiv P(GD) \\ &\equiv P(G - T) + i(D^g - A) + Ei^f(D^{gf} - A^f)\end{aligned}$$

The right hand-side of the identity defines the overall budget in terms of expenditure net of sources of revenues, so that a deficit means excess of expenditures over total revenues represented as $P(GD) > 0$ for a deficit and $P(GD) < 0$ for a surplus. The left hand-side represents the financing of the overall budget with H standing for monetary base or money financing.

There are three conflicting views on the impact on growth of FD if financed internally. From a neoclassical perspective, FDs increase current consumption in the short run but result in the long-term decline in private investment. This view assumes far-sighted individuals planning consumption over their own life cycles. FDs raise lifetime consumption by shifting taxes to subsequent generations. If economic resources are fully employed, increased consumption implies decreased savings. Interest rates must rise to bring capital markets into balance. Thus, persistent deficits “crowd out” private capital accumulation (Bernheim, 1989).

In contrast, the Keynesian view points out the “crowding in” which government deficit spending raises a country domestic production, which in turn encourages businesses to invest more. Keynes argued that government spending determines the levels of investment and income when the economy is operating below full employment rather than what the economy is capable of producing. With national income represented as:

$$Y=C+I+G+(X-M)$$

Where Y is GDP/production/income, C is consumption spending, I is private spending, G is government spending on investment and consumption which includes transfer payments and (X-M) is net exports.

Households use total income for the following purposes:

$$Y=C+S+T$$

Where S is total saving and T is total taxation net of transfer payments.

As such,

$$C+S+T=Y=C+I+G+(X-M)$$

Hence,

$$S+T=I+G+(X-M)$$

$$(S-I)=(G-T)+(X-M)$$

Total saving net of private investment should equal government deficit plus net exports.

An increase in government spending through deficit budget boosts the incomes of those who receive government contracts or benefit payments, who then go to do more spending or investment. Similarly, a tax cut has an immediate impact on aggregate demand. In an economy with underemployment, national income rises as a result deficits stimulate both consumption and national income (Bernheim, 1989).

Lastly, The Ricardian Equivalence Hypothesis (REH) posits that government deficits have no influence over macroeconomic conditions. Under this view, consumption is determined as a function of dynastic resources (that is, the total resources of a tax payer and all his descendants). Since deficits merely shift the payment of taxes to the future generations (the present discounted values of taxes and expenditures must match), they leave dynastic resources unaffected. Thus, deficit policy is a matter of indifference (Bernheim, 1989).

In Malawi, economic growth has been attributed to other economic factors and not directly as a result of government spending leading to deficit. According to Ngwira (2012), Malawi has gone through the following five phases of economic growth:

Table 1: Periods of Growth in Malawi

Phase Number	Period	Type of Growth and Causes
1	1964-1979	Rapid economic growth based on the development policy of preferential land and credit policies.
2	1979-1989	Slow economic growth due to collapse in terms of trade by 25%, high fuel prices, war in Mozambique blocking routes to ports, collapse in commodity prices.
3	1989-2003	Low economic growth caused by droughts of 1992, 1994, influx of refugees had negative impact on the economy. Price instability due to large fiscal deficits and exchange rate liberalisation.
4	2004-2009	Rapid growth, stabilisation enhanced growth and per capita income returned to its 1979 levels.
5	2010-2011	Low growth due to governance and human rights issues. Economic growth plummeted from 9% to 1.4%.

Source: Author's own computations

Ngwira (2012) pointed out that economic growth in Malawi is affected by droughts, lack of export diversification, energy shortages, education, terms of trade, and policy reversals resulting from change of political leadership.

Attainment of economic growth has been linked with implementation of sound fiscal management policies. Most of the economic and development strategies (for example, Malawi Poverty Reduction Strategy Paper (MPSRP), Malawi Growth and Development Strategy (MGDS I) (2006-2011), MGDS II (2011-2016) and MGDS III (2017-2022)) that have been implemented during the period under study, 1974 to 2021, recommended fiscal restraint as one of the ways the country can achieve macroeconomic stability and economic growth.

MPSRP pointed out that high fiscal deficits necessitated excessive government borrowing which in turn led to high interest rates and the crowding out of the private sector. MGDS I (2006-2011) budget framework was expected to stimulate economic growth and development. The fiscal policy objective was to maintain fiscal discipline and the underlying deficit was expected to average 0.2% of the GDP for the whole period so as to create a favorable macroeconomic environment. Total government expenditure was expected to average 39% of the GDP. MGDS II (2011-2016) largely aimed at restricting the growth of fiscal deficits and it was expected that government would boost its domestic resource mobilisation, consequently, reducing domestic mobilisation. It was planned that increased public investment would be geared towards export diversification and economic growth. Fiscal balances for the period were expected to be surplus balances averaging 1.5% of GDP. However, MGDS III (2017-2022) has projected fiscal overruns expected to average -1.98% of GDP as there are

recommendations to increase investment during the implementation period which will translate into growth in the medium term as such laying foundation for sustainable economic growth.

Budget formulation in Malawi is also guided by the macroeconomic programme under the International Monetary Fund (IMF) Extended Credit Facility (ECF) arrangement. One of the ECF indicators is implementation of sound fiscal management which includes fiscal discipline whereby the government spends within its means. In addition, successful conclusion of the ECF reviews and disbursements lead to more aid disbursements from other development partners. These disbursements boost government's revenues and reduce FD. Donor aid constitutes 40% of the government's budget support.

Despite the government's key fiscal objective being observing fiscal prudence, it has not managed to maintain its FD targets as stipulated in its economic and development strategies. For example, the period during which MPSRP was implemented was characterised with high fiscal deficits. MGDS I implementation saw a deviation of FDs from the overall 1% of GDP target to -2.9% of GDP. During the implementation of MGDS II, government adopted the zero-deficit budget and the zero-aid budget both of which resulted into government spending more than its budget leading to high budget deficits despite its target of having fiscal balance for this period averaging 1.5% of GDP surplus.

It is clear that fiscal deficits are inevitable despite the government's wish to spend within its means. This is due to the country's weak revenue base and poor fiscal management as evidenced in the mass public funds plunder of 2013 among other

factors. High budget deficits tend to result from the economy experiencing unplanned shocks, for example, food insecurity, and fuel price hikes, among others. This may lead to higher interest rates than could be attained if there was proper planning of the deficits as government engages in emergency borrowing to fund those expenditures.

This study seeks to investigate the effect of the FDs that government has run and expenditures on EG.

1.2 Statement of the problem

Despite being challenged by a narrow domestic resource base, fiscal policy in Malawi has been traditionally expansionary. About 30-40% of the government's budget is typically donor funded, and disruptions in the flow of such funding usually instigate recourse to borrowing. In 1984/85, the overall deficit as a percentage of total government expenditure stood at 6.51%, increasing thereafter to 36.17% as of 1993/94 fiscal year.

In the last 30 years, fiscal policy conduct in Malawi has not been frugal. Between 1990 and 2020, the country has registered only six fiscal surpluses after grants. These deficits become wider and the surpluses collapse to only two if we take out grants. As argued by Mangani (2021), the aging infrastructure: hinders private sector investment and growth, limits the government's capacity to raise revenues domestically, and necessitates both foreign and domestic borrowing. Public debt has thus risen sharply from around US\$1.7 billion dollars to around US\$6.1 billion in December 2020. Interest payments have equally crept up from US\$0.2 billion in January 2013 to around US\$0.4 billion in December 2020. The continued accumulation of fiscal deficits and

debt build up shows that the country is lacking requisite strategies to finance its expenditure patterns.

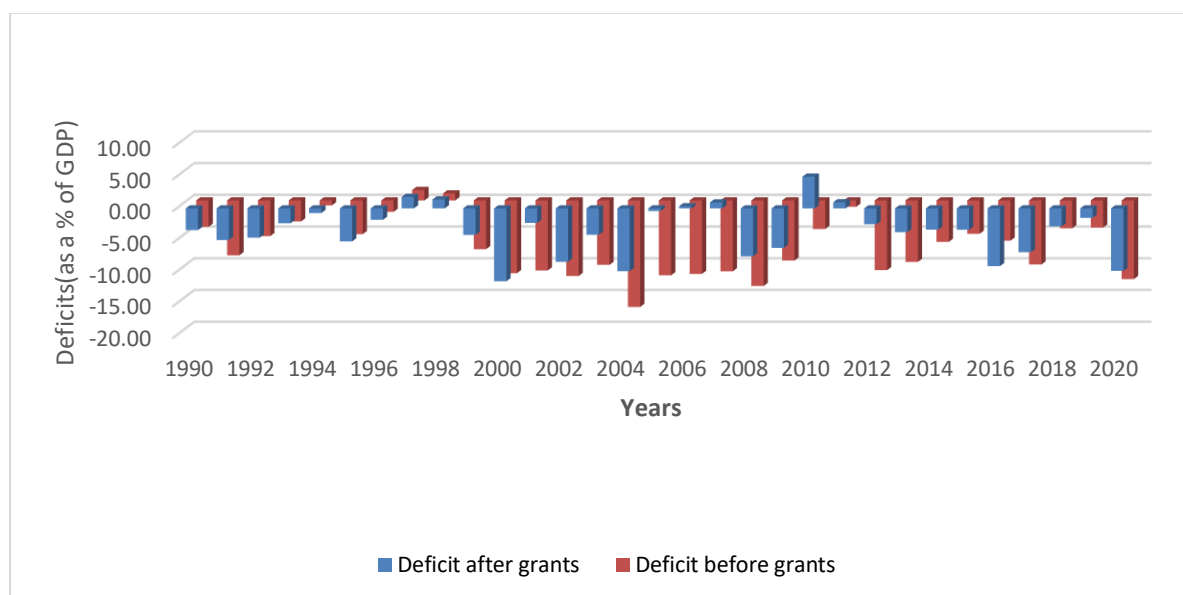


Figure 1: Government Deficit in Malawi

Source: *Ministry of Finance, Economic Planning and Development*

The above notwithstanding, we have also noted that, theoretically, there are three conflicting views of the impact of fiscal deficit on economic growth. Malawi has been experiencing slow economic growth while at the same time experiencing continued fiscal deficits. The Malawi government's budget is formulated with fiscal discipline as an underlying assumption as a way of enhancing the macroeconomic environment that will lead to economic growth. It was noted that this has not always been the case as government continually ends up running fiscal deficits that are higher than planned. It was also noted that the practice of fiscal restraint was supported by various government's economic and development strategies and macroeconomic programme of our development partners. Until recently, balanced budgets were seen as the only way of achieving economic growth despite the challenges of having expenditure over runs which lead to macroeconomic instability as they are usually as a result of

emergency expenditures made to address a shock in the economy. This study intends to establish the impact these deficits have had on the country's economic growth. A positive relationship can assist the government whether it has sufficient resources or not in the wake of illusive donor aid to still carry on with its economic growth and development agenda by implementing budget deficits.

1.3 Objective of the study

The objectives of the study are:

- (a) To investigate the impact of government deficit on EG in Malawi
- (b) To investigate the impact of recurrent expenditure on EG in Malawi
- (c) To assess the impact of development expenditure on EG in Malawi

While the effects of components of fiscus can be looked at from both the revenue and expenditure side, this paper has limited itself to the expenditure side.

1.4 Study Hypotheses

The following null hypotheses are to be tested:

- (a) Government deficit does not determine the rate of EG.
- (b) Recurrent expenditure has no impact on EG.
- (c) Development expenditure has no impact on EG

1.5 Significance of the study

Many studies have come up with different findings on the impact of a fiscal deficit on economic growth. There is no consensus as to the actual impact of FD on EG. The results differ from country to country and from one period to another. Empirically, there are three possible outcomes from the relationship, positive outcome supporting the

Keynesian theory, negative as argued by the Neoclassicists and neutral relationship in support of the REH. The knowledge of the effects of the fiscal deficit on economic growth and the type of government expenditures that are growth-enhancing can assist authorities to make informed decisions during budgeting that can lead to output growth thereby improving the economic growth rates of the country.

1.6 Scope of the study

The study was carried out using annual data for the period starting 1974 to 2021. The data was collected from Ministry of Finance and Economic Development, Reserve Bank of Malawi and World Bank. The cut-off point of the observation period is due to the fact that the published data currently available goes up to 2021.

1.7 Outline of the paper

The study is outlined as follows: Chapter Two gives a brief overview of the Malawi Economy as a way of putting the study into context; Chapter Three describes literature review; Chapter Four presents the methodology used in this study; Chapter Five presents a discussion of results, and finally Chapter Six outlines the study conclusion, policy recommendations and study limitations.

CHAPTER 2

OVERVIEW OF THE MALAWI ECONOMY

2.1 Chapter overview

This chapter gives a brief background of the Malawian economy and paints a picture of the context in which the study was conducted. Additionally, it also gives a brief background of the economic growth and fiscal deficits the country has experienced.

2.2 Background of Malawi's economy

Bordered by the republic of Tanzania to the north, Zambia to the west (and north west) and Mozambique to the south (including south-east and south west), Malawi, a landlocked south-eastern African country has a total surface area of 118,484 km of which 94,276 km is water. The country has one of the youngest age structures in the Africa region with about 34% of the population¹ aged between 15 and 34 years while only 4.2% of the population is 65 years and above, 50% is aged 15-64 years (NSO, 2020). While this youthful demographic dividend could be tapped into and bridge the productivity gap in Malawi, youth unemployment² is worrisomely high in the country. Ironically, the current generations of the youth are generally better educated³ than their predecessors in Malawi. As a case in point, average net enrolment in primary and secondary school has respectively jumped to 88% and 14.5% in 2020 from 83.8% and 9.9% in 2010.

¹ As of 2020, the total population was estimated at 19.1 million with an average growth rate of 2.9%

² estimated at 21% as of 2013

³ This statement has been made basing on school enrolment rates and education attainment. It may not necessarily be true when we take into consideration the quality of education particularly in Malawi.

The economy of Malawi is predominantly fuelled by rain-fed agriculture. Although the contribution of the agricultural sector to gross domestic product (GDP) in Malawi has been decreasing⁴ over the past three years, it still remains the largest contributing sector (MoF, 2020). It comprises two main subsectors: smallholder farmers and estate farmers. Despite being resource poor, smallholder farmers produce about 80% of Malawi's food and 20% of its agricultural exports. The estate subsector is the nation's principal foreign exchange earner. While it contributes only about 20% of the total national agricultural production, it provides over 80% of agricultural exports mainly from tobacco, sugar, tea, and, to a lesser extent, tung oil, coffee and macadamia. Maize, being a staple food crop, is the most cropped food crop in Malawi and accounts for more than two-thirds of caloric availability (Ecker & Qaim, 2011). As of 2019/2020 cropping season, maize was cultivated on 76% of all plots cultivated in Malawi, on an average plot area of 0.8 acres (NSO, 2020).

As of 2017, about 51.5% of the population were living below the national poverty line and 18.5% of the multidimensionally poor were living in severe poverty (NSO, 2018). The country has reported slow economic growth, averaging about 1.5% between 2019-2020 which is 3.6% points lower than the growth rate registered in 2019 (RBM, 2021). In 2021, the GDP growth is projected to rebound to 6.1%, owing to anticipations of a speedy economic recovery following plans to procure COVID-19 vaccines. Although the GDP has marginally declined from 0.38 to 0.32 in the rural areas from 2010, economic inequality at national level remains as high as 0.42. Worrisomely, inequality extends to aspects of political participation, employment, education, and health.

⁴ According to MoF (2020), the sector's contribution to GDP was 28.2%, 27.3%, and 27.1% in the years 2017, 2018, and 2019 respectively.

Likewise, gender inequality remains high at 0.619, way above the sub-Saharan average of 0.569.

The private sector in Malawi is relatively small and comprises of formal and informal businesses. The informal sector is active with, for example, the size of the informal financial sector as large as that of the formal financial sector (Chipeta & Mkandawire, 1992). This poses a challenge to the government of tax revenue collection as such its tax base is weak. Consequently, this has an impact on government's expenditure as less tax revenue is collected.

2.3 Economic growth

Malawi's economy has been achieving a substantial EG since its independence in 1964 based on agricultural exports. The economy is mainly agriculture-based and its exports are dominated by tobacco, tea, coffee, cotton and sugar. Agriculture accounts for one-third of the GDP and 90% of export revenues. The performance of the tobacco sector is key to short term growth as tobacco accounts for more than half of the exports (CIA, 2016).

Adverse weather conditions have a big impact on the economy. For example, due to the country's dependence on agricultural commodities, the prolonged and persisting drought of 1991, 1994, and 2002 led to periods of slow or negative growth due to the drought, and external factors like lower prices of commodities and fluctuations of demand on the international market. However, in 2006, the government introduced the Farm Inputs Subsidy Program (FISP) which subsidised the price of fertilizer to farmers. This coupled with good weather led to high agricultural production and high growth.

In the early 1990s, government embarked on economic reforms, for example, public spending cuts, privatisation program, stronger fiscal discipline and greater accountability. These reforms were supported by loans from the World Bank (WB) and IMF stabilisation programs. This led to a significant increase in GDP per capita. In the 2000s, there was some investment in manufacturing of clothing which was exported to other countries, for example, the United States (US).

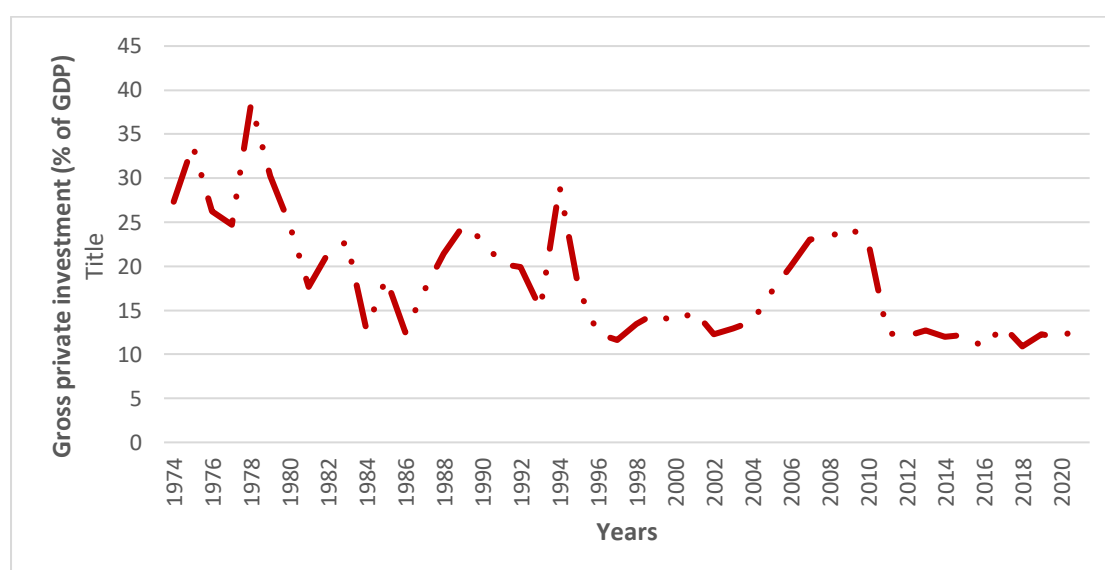


Figure 2: Gross Private Investment

Source: *Computations using WDI (2020) data set*

Apart from agriculture, the economic performance of Malawi relies on economic assistance from the WB, IMF and individual nations. The approval for debt relief by the IMF in 2006 under the Highly Indebted Poor Countries (HIPC) program led to a positive impact on the economy. Likewise, the granting by the US of the eligibility status to receive financial support within the Millennium Challenge Corporation (MCC) initiative to Malawi led to a positive impact on economic growth and relieved pressure on the government's budget. The country experienced smaller budget deficits and surpluses during the years 2007 and 2008 as depicted in Figure 1.

Apart from the shock of droughts and heavy debt burden, the country suffered from other shocks like the Mozambican civil war of 1977 to 1992 which had a negative impact on the country's exports. Mozambique borders Malawi on the east and southwest and its sea ports are some of the major ports Malawi uses for transportation of its commodities for international trade.

HIV/AIDS pandemic that started in the late 1990's was another shock that had a negative effect on the EG due to loss of workers thereby reducing productivity. In addition, there was an increase in healthcare costs that government incurred on people suffering from the disease. Apart from the economy's vulnerability to external shocks, such as weather and health, the country suffered from other challenges during the period of study which affected the economy negatively. These included: shortage of energy, with about 10% of the population having access to electricity, low infrastructure, manufacturing base and technology also led to low productivity and resulted into low growth rates (World Bank, 2018).

The withholding of assistance by Malawi's development partners in 2011 due to negative IMF review and governance issues had a profound effect on the economy which led to fuel shortages leading to low productivity and therefore hindering transportation and failure to pay for the country's imports.

2.4 Budget deficit

Malawi just like most countries use the budget to influence the economy through its spending on consumer goods and/or investment. The country has been run on FD since its independence in 1964. The government relies on taxation and other non-tax revenue, for example, government fees, loans and donor assistance for implementation of its

budget. For instance, with expenditure of about 1.2 trillion Malawi kwacha up from 1.1 trillion Malawi Kwacha in the previous fiscal year, against total expenditure of about 1.7 trillion Malawi Kwacha up from about 1.4 trillion Malawi Kwacha in the previous fiscal year, overall budget balance in 2019/2020 fiscal year stood at a deficit of about 555 billion Malawi Kwacha up from 330 billion Malawi Kwacha in 2018/2019 fiscal year (see Table 1).

Table 2: Malawi's Fiscal Policy Table

	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/2020
Revenue and Grants	472390	520328	609580.390	759070.402	1000457.22	1065716	1,120,75	1,225,720
Revenue	296625	441146	530188.8002	627088.5334	852751.6988	931157	1,005,615	1,098,607
Tax revenue	268942	388360	462907.625	564000	750144.477	839229.7	968,929	1,030,081
Non-tax revenue	27683	52786	67281.175	63088.5333	102607.221	91927.3	36,686	68,526
Total expenditure	480953	647237	792138.669	972335.864	1199504.13	1414083	1,451,48	1,781,346
Overall balance	-8563	-126909	-182558.27	-213265.46	-199046.9	-348,366	-330,730	-555,626
Financing	30082	137751	164292.565	213265.425	248301.95	338185.3	330,730	555,626
Net foreign	32574	44604	69995.231	66265.425	104631.95	157029.5	63,902	58,922
Net domestic	-2492	93147	94297.3347	59000	42345	225811.8	266,828	496,703

Source: RBM (2021)

The ever-increasing government expenditures against a small resource base exacerbated by revenue underperformance and misallocation of public funds have over the years seen Malawi running persistent deficits with heavy domestic and external borrowing. However, in recent times, the country's development partners withdrew their budget support due to loss of confidence in the government's economic management which resulted from the IMF Executive Board disapproving the Extended Credit Facility (ECF) program for the period in 2011. Another reason for withdrawal of donor support was their dissatisfaction with how the government was handling governance issues. In reaction to these issues, the government implemented the types of budgets tabled in 3.

Table 3: Other types of budgets implemented over the years

Financial Year	Type of Budget
2011/2012	Zero deficit budget (ZDB)
2014/2015	Zero aid budget (ZAB)

Source: Author's computation

A ZDB can either be a surplus budget or a balanced budget and a ZAB can be a deficit budget, a balanced budget or a surplus budget. These budgets did not bring the anticipated results and in most cases, they brought economic hardships like devaluation of Kwacha leading to fuel shortages, and consequently low productivity. Due to the government having a small resource envelope, it has faced challenges to run a balanced or a surplus budget hence the persistent FDs experienced during the period under study. However, the country had a surplus budget in 2007 and 2008 (see the budget deficit graph above) due to successful implementation of the FISP and the debt relief under HIPC program in 2006.

There are two types of government expenditure: development expenditure (DE) and recurrent expenditure (RE). DE is mainly investment spending by government on infrastructure projects, and community and welfare services, among others. RE represents government's consumption in the process of providing services to its citizens. In Malawi, government spends more on RE than DE. See the graph below.

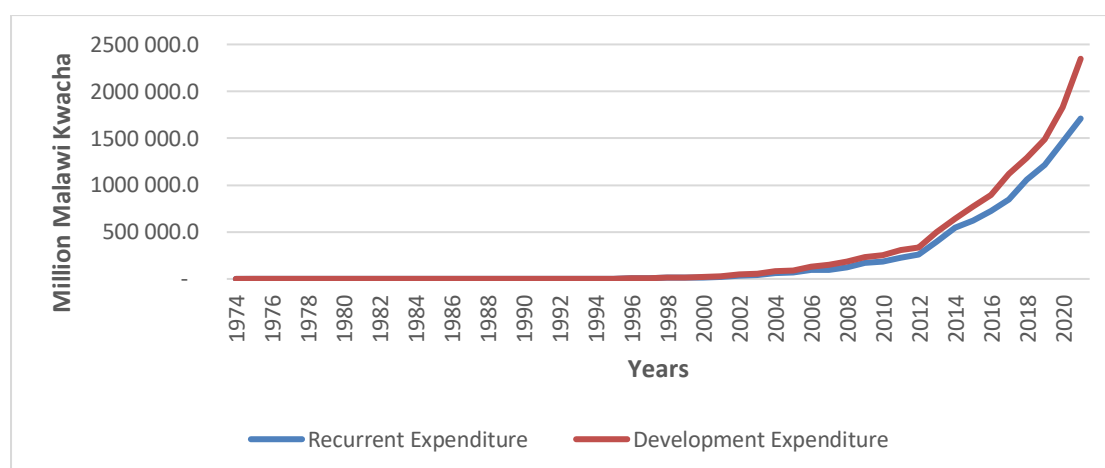


Figure 3: Recurrent and Development Expenditure trends

Source: *Ministry of Finance, Economic Development*

This could be due to the government having a large public sector as such necessitates more funds to be used for it to provide different services to its citizens. A large public sector could be the result of low private investment in the country.

The size of budget deficit depends on the amount of revenue available through taxation and other non-tax sources, and the size of the activity government wants to spend on, for example, more funds are required to conduct a general election as such government expenditures during election years are high. During droughts, more funds are required to purchase foodstuffs usually from outside the country.

The fiscal deficit in Malawi is permanent as the government budget has generally been run on deficit basis since 1964. The government sector in the economy is large evidenced by the presence of many public institutions and government activities in the areas of health and education among others. Like most governments, the government of Malawi (GoM) depends on tax revenue and other sources of revenue to finance its budget. In recent times, we have seen GoM's resource partners freezing budget aid due to the purported public financial mismanagement and GoM's failure to meet some governance issues. This resulted in the worsening of the government's budget position and as such perpetuated the implementation of budget deficits in the country.

Despite the government running on a FD almost yearly since independence in 1964, there has been a significant increase in growth rates throughout the period of study and figure 3 below provides the recent data from WBDI (2020).

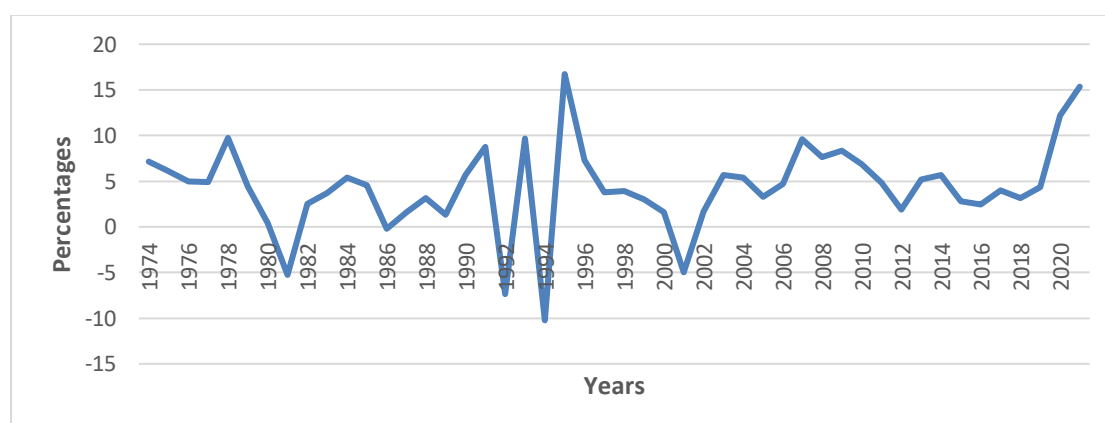


Figure 4: Malawi's Economic growth

Source: Author's computations using WBDI (2020) data set

It is not yet established as to whether the growth rate would be much higher if the budget was balanced or had surpluses, or if the FDs have no effect on the EG of the country in cases where all other factors are held constant.

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

The focus of this chapter is to give a brief overview of the theoretical and empirical perspectives that explain the relationship between government budget deficit and economic growth in an economy so as to put my analysis into its proper context. The first part deals with the theoretical analysis of the impact of budget deficits on EG and the final part provides the empirical literature review on the subject matter.

3.2 Theoretical Literature Review

There are three conflicting views on the impact on growth of budget deficits namely the neoclassical perspective, the Keynesian theory and the Ricardian-Barro Equivalence Hypothesis.

3.2.1 The Keynesian Theory

Keynes (1936) states that governments should solve problems in the short run rather than wait for market forces to fix things over the long run. The Keynesian theorists argue that the economic systems do not necessarily turn to full employment, rather, the autonomous components of aggregate demand affect the rate of growth of an economy. The Harrod-Domar Model, a Keynesian model, suggests that the rate of growth depends on the level of savings and capital-output ratio (Harrod, 1939; Domar, 1946). Bernheim (1989) explains that the availability of a significant proportion of the population of

myopic or liquidity constrained consumers means they have high propensities to consume out of current disposable income. Any tax reduction produces immediate and quantitatively significant impact on aggregate demand. With underemployment in economy's resources, the national income rises, thereby generating second effects of the Keynesian multiplier. The Keynesian model assumes the possibility that some economic resources are unemployed. It also presupposes the existence of a large number of myopic, liquidity constrained individuals. This guarantees that aggregate consumption is very sensitive to changes in disposable income.

Keynesians argue that deficits stimulate consumption and national income; as such savings and capital accumulation are not negatively affected. Tas (2003), points out that in the simplest Keynesian model, increasing the budget deficit causes output to expand and if the money supply is fixed by having the deficit financed by government debt, interest rates must rise and private investment falls.

Keynesians also argue that deficits cannot crowd out private investment as increased aggregate demand changes the profitability of private investment and leads to a higher level of investment at any given interest rate. Deficits stimulate aggregate saving and investment even though they raise interest rates, as such, they are beneficial for economic growth (Mavodyo, 2020).

However, opponents of the theory pointed out its ineffectiveness to solve a crisis like that experienced by advanced economies in the 1970s of both inflation and slow growth, also called stagflation. Fiscal policy alone could not solve the problem as such it was agreed that monetary policy should be used together with fiscal policy to alleviate

the crisis. Campbell and Mankiw (1989) proposed a simple alternative characterisation of time series data on consumption, income and interest rates. This gave rise to the New Keynesian Theory which maintained that money can have an effect on output in the short run but believed that in the long run expansionary monetary policy leads to inflation only (Jahan et al., 2014).

Other opponents of the theory stated that at full employment, real deficits crowd out private investment and raise the rate of inflation. Keynesians focus on temporary deficits and by failing to distinguish between temporary and permanent deficits, they provide misleading information to policy makers (Bernheim, 1989).

3.2.2 The Neoclassical Perspective

The neoclassical school of thought argues that increases in budget deficits lead to increases in interest rates which further lead to “crowding out” of private investment as the private sector will borrow at higher interest rates. As a result, budget deficits are detrimental to economic growth (Solow, 1956). According to Bernheim (1989) budget deficits have an impact on growth in the long run. Tas (2003) argues that the neoclassical framework concerns the effects of permanent deficits. He points out that if consumers are rational, farsighted and have access to perfect capital markets, then permanent deficits significantly depress capital accumulation and temporary deficits have either a negligible or perverse effect on most economic variables.

The Neoclassical theory is based on the assumptions that the consumption of each individual is determined as the solution to an intertemporal optimisation problem, where both borrowing and lending are permitted at the market rate of interest.

Individuals have finite lifespans. Each consumer belongs to a specific cohort or generation and the lifespans of successive generations overlap. Finally, market clearing is generally assumed in all periods (Tas, 2003).

Permanent deficits reduce the interest sensitivity of savings and larger increases in interest rates are required to bring the capital market into equilibrium. However, the availability of liquidity constrained consumers leads to a conclusion that permanent deficits depress capital accumulation. This supports the Neoclassical argument that fiscal deficits crowd out private investment and has a negative relationship with output growth.

Like most theories, the neoclassical perspective is criticised for its unrealistic assumptions. The assumption of rational behaviours ignores the vulnerability and irrationality in human nature. Its overdependence on mathematical approaches means empirical science is missing in the study. This is not adequate to explain the actual economy especially on the interdependence of an individual with the system (CFI team, 2022).

3.2.3 The Ricardian Equivalence Hypothesis

Barro (1974) demonstrated that under reasonable conditions which involve overlapping generations of persons with finite lives, tax payers will capitalise the future obligations that public debt issue embodies. Buchanan (1976) explained that to the extent that this capitalisation occurs, government bonds do not add to the perceived net wealth in the economy as such Barro (1974) inferred that the substitution of debt for tax finance will exert no expansionary effect on total spending. Barro (1989) observed that for a given

path of government spending, a deficit-financed cut in current taxes leads to higher future taxes that have the same present value as the initial cut. This result follows from the government budget constraint which equates total expenditure for each period (including interest rates) to revenues from taxation or other sources, and the net issue of interest-bearing public debt.

The underlying assumptions of REH are that individuals are forward looking and have perfect foresight, and also that the government budget is intertemporally balanced.

Rode and Coll (2012) explain that the impact on real income is the same whether government expenditure is tax financed or bond financed. The IS curve shifts left whether government follows the tax or bond financing. Due to high expenditure, government issues bonds whose interest is paid in future and increases the expenditure. Essentially, government substitutes the current tax that it could have imposed to finance its expenditure with future tax. The timing of taxes does not affect an individual's lifetime budget constraint, it cannot alter his consumption decisions which result in budget deficits both temporal and permanent have no real effects (Bernheim, 1989).

The REH has received criticism from some authors. One of them is Bernheim (1989) who pointed out that the existing body of theory and evidence on intergenerational transfers casts very serious doubt on the validity of the Ricardian assumptions. He stated that it was likely that a large fraction of the population neither makes nor receives transfers, and that many existing transfers are motivated by considerations other than altruism.

This study argues that the Neoclassical theory holds for Malawi because of the crowding out of private investment which could be a result of the fiscal deficits the country has been having for a long time and which has led to slow growth.

3.3 Empirical Literature Review

Many studies have been conducted on the subject matter with conflicting results. There is a lot of literature available on the subject under study from developed and developing parts of the world like Asia, America, the Middle East and other countries in the Sub-Saharan Africa. However, these countries cannot be compared with Malawi as they differ in their main economic activities, natural resource endowments, and population size among other factors. According to this review, no study of similar nature has been done in Malawi, as such, a study from Zimbabwe has been included as it is geographically closer to home and has elements of similarities, like closed economy and similar culture among others.

Going through the empirical literature, I will start by discussing studies which concluded that budget deficits are corrosive to economic growth thereby supporting the neoclassical perspective of the impact of BD on economic growth. It should also be mentioned that I have included a study which used two different data sets: one from its national source and the other from WDBI. The results were different showing that sometimes the source of data can have a big impact on the results.

Zuze (2016) investigated the relationship between fiscal deficit and economic growth in Zimbabwe for the period 1980-2015. The study employed Vector Auto Regression (VAR) model together with variance decomposition and impulse response functions to

analyse the relationship. The study results revealed that there is a negative relationship between budget deficit and economic growth.

Nkalu (2015) evaluated the effects of budget deficits on interest rates, inflation, and economic growth in Nigeria and Ghana using Seemingly Unrelated Regression (SUR) model and Two Stage Least Squares (2SLS). The study demonstrated that budget deficit has statistically negative effects on interest rate, inflation, and economic growth thereby supporting the neoclassical argument that budget deficit slows the growth of the economy through resources crowding out.

Kurantın (2017) analysed the empirical literature on the sources of budget deficit and their policy implications on the processes of sustainable economic growth and development in Ghana. The study concluded that there is an adverse impact of continued budget deficit on the processes of economic growth and development.

Fatima et al. (2012) pointed out that for a country to achieve sustainable economic growth, a balanced budget is necessary. They investigated the true impact of the budget deficit on the economic growth of Pakistan. Regression analysis was used to ascertain the impact of budget deficit on the GDP. They concluded that the negative impact of the budget deficit on economic growth is because governments are short of the resources to meet their expenses in the long run. Savings and revenues are not enough to meet their expenses. In addition, the Pakistan government must utilise its underutilised resources to overcome the problem of budget deficit to avoid inflation which has a negative impact on GDP.

Haider (2016) investigated the true impact of the budget deficit on GDP growth in Bangladesh using the VAR model. The results of the study were that there are cointegrating relationships among budget deficit, inflation and exchange rate, and that there is a negative impact of budget deficit on GDP growth.

However, there are several studies whose results pointed at a positive relationship between budget deficit and economic growth thereby supporting the Keynesian school of thought. I present below a discussion of such studies.

Mavodyo (2020) conducted a study to investigate the empirical evidence on the budget deficit-economic growth nexus and the deficit spending channels that are growth stimulating in South Africa over the period 1980 to 2018. The Dynamic Ordinary Least Squares (DOLS) model was used and the results showed that budget deficit is growth promoting and that budget deficit is growth stimulating if it is channeled towards export-oriented industrialisation of ores and metals.

Umaru and Gatawa (2014) studied the impact of fiscal deficit and a disaggregated government expenditure on economic growth in Nigeria from 1970 to 2011 using Auto Regressive Distributed Lagged (ARDL) approach. They also investigated the nature and direction of causality between economic growth and the explanatory variables. The study results revealed that a percentage increase in fiscal deficit expands the national output by 10.05% while a 10% increase in government capital expenditure in Nigeria increases the growth rate of the economy by 62.21%. The results also showed that recurrent expenditure has no significant impact on economic growth. It further revealed that there is a unidirectional causality running from capital expenditure to economic

growth and no causality between recurrent expenditure and economic growth, and also between fiscal deficit and economic growth. The conclusion from the study was that the deficit budget and capital expenditure in Nigeria are growth-inducing.

Antwi (2013) evaluated budget deficit sustainability of Ghana between 1960 and 2010 using the present value budget constraint approach. The study found that reduction in government expenditure is not an option as such Ghana's tax net should be expanded to capture all "taxable" individuals and firms to ensure that expenditures do not move too far from revenue. Any policy to increase expenditure in Ghana should consider past and present values of government revenue. This is because expenditure and revenue take temporal precedence over each other.

Fawwaz (2016) measured the impact of government expenditures on economic growth in Jordan during the period between 1980-2013. The multiple linear regression model was employed and was analysed using the Ordinary Least Squares (OLS) model. They found that there is a positive impact for both total government expenditure and current government expenditure on economic growth which supports the Keynesian theory.

Eminer (2015) analysed the impact of budget deficit on economic growth in North Cyprus. ARDL approach was employed to estimate the relationship between the variables. He noted that North Cyprus has the characteristics of a developing country and it operates in isolation from other countries. The study found that the government of North Cyprus makes both productive and non-productive expenditures and budget deficit is an important instrument of economic growth. Budget deficits and all kinds of expenditures are related to economic growth.

Some empirical work shows that some studies produced results which showed either a negative or positive relationship between BD and economic growth by changing other factors. In the case of these studies a change of data source and BD financing affected the outcome. Whereas other studies produced results which are ambiguous.

Hussain and Haque (2017) analysed the relationship between fiscal deficit and economic growth in Bangladesh for the period 1993-1994 to 2015-2016 using two different data sets, one from the Bangladesh Bureau of Statistics (BBS), a local source, and the other from World Bank Development Indicators (WBDI), as a foreign source. The Vector Error Correction Model (VECM) was employed. Using the BBS data, they found that there is a positive and significant relationship between the two variables in Bangladesh which supports the Keynesian view that government expenditure will result in higher economic growth. The findings from the WBDI indicated that the impact of fiscal deficit on economic growth is mild but negative and significant at the 5% level. This contradicts the Keynesian theory, but is in accord with the neoclassical theory which asserts that fiscal deficits lead to a drop in GDP.

Adam and Bevan (2005) examined the relationship between fiscal deficits and growth for a panel of 45 developing countries for the period 1970-1999. A simple Overlapping Generations (OLG) model of savings behavior which was then embedded in an endogenous growth model with a fairly elaborated government sector was set up. They described government expenditure as productive or unproductive and that there is an output tax which is growth-inhibiting. They also pointed out that there are two types of spending, and five ways of financing it, citing taxes, grants and three forms of deficit finance namely: printing money, issuing domestic or external debt. Their analysis found

that the impacts on growth of taxes and grants are reasonably straight forward and also that the impact of the deficit is likely to be complex, depending on the financing mix and the outstanding debt stock. Deficits may be growth-enhancing if financed by limited seigniorage and growth-inhibiting if financed by domestic debt and to have opposite flow and stock effects if financed by external loans at market rates.

Roy and Van der Berg (2009) analysed how the United States budget deficit affects US economic growth. Time-series data for the 1973-2004 period was applied to a simultaneous equation model to estimate the various direct and indirect effects of budget deficits on growth. They found that an increase in budget deficits slows growth and also that the “twin” current account deficit which the model showed which accompanies budget deficits increase growth, as a result, they concluded that the overall relationship between budget deficits and economic growth is ambiguous.

There is also evidence that the REH holds for some countries as shown in the study by Dao and Doan (2013) which evaluated the long run relationship between budget deficit and other macroeconomic variables so as to investigate the impact of deficit on the economic development in Vietnam. The ARDL approach was employed to analyse quarterly data from 2003 Q1 to 2012 Q4. The study found that there is a long run causality running from budget deficit and government expenditures to economic growth. Budget deficit was found to have negative but insignificant effect on economic growth rate, thus, in accord with the REH of no relationship between the variables.

Several studies indicated a positive relationship between budget deficit and economic growth. However, the results showed that the deficit was growth inducing depending

on the composition of government expenditure. Specifically, capital expenditure was more growth inducing than recurrent expenditure. Additionally, one study concluded that excessive capital expenditure could inhibit growth whereas recurrent expenditure on the margin could have a positive impact on growth.

Edame and Okoi (2015) examined the relative impact of fiscal deficit on economic growth in Nigeria during the military and democratic regimes. The study employed Chow endogenous break test, unit root and cointegration tests. The study found that fiscal deficits had a significant growth impact during the military regime and had no significant impact during the democratic regime. Additionally, the study's results indicated that interest rates did not have a significant growth-impact during both regimes, while the gross fixed capital formation had a significant growth impact during both regimes.

Ndambiri, et al. (2012) explored the determinants of economic growth based on a panel data of 19 Sub-Saharan African countries. They used Generalised Method of Moments (GMM) to account for factors that influence the growth of the economies in the region. The study results indicated among other things that physical capital formation contributes to the economic growth in the region, whereas some variables such as government expenditure led to negative economic growth.

Saleh (2003) conducted a theoretical and empirical overview using econometric models to analyse the relationship between budget deficits and macroeconomic variables. This was done in order to derive substantive conclusions to such a relationship with the aim to construct or develop a macroeconomic model for analysing the impact of budget

deficit on macroeconomic variables. Some of the outcomes of this study indicated that both the method of financing and the components of government expenditure could have different effects. As such it is crucial to distinguish between current and capital expenditure when evaluating the impact of fiscal policy on private investment and output growth. He also found that the impact of public investment on private investment are ambiguous but much of the empirical literature finds a significantly negative effect of public consumption expenditure on growth, whereas the effects of public investment expenditure are found to be positive though less robust.

Devajaran, et al (1996) investigated the relationship between the composition of public expenditure and economic growth. A simple, analytical model was derived from the model developed by Arrow and Kurz (1970) where consumers derive utility from private consumption and public capital stock, and also from a model by Barro (1990) which takes government expenditure to be complimentary with private production. Both models assume that all government spending is productive. The results suggested that expenditures which are normally considered productive, for example, capital expenditure could become unproductive if there is an excessive amount of them and current expenditures are productive at the margin as they are squeezed by capital expenditure.

Sennoga and Matovu (2010) examined the interrelationships between public spending composition and Uganda's development goals including economic growth among others. A dynamic Computable General Equilibrium (CGE) model was used to study the interrelationships. They found that public spending composition influences economic growth and improved public sector efficiency. This coupled with re-

allocation of public expenditure away from unproductive sectors to productive sectors leads to higher GDP growth rates. This paper's major contribution is that investments in agriculture and infrastructure including roads and affordable energy contribute to higher economic growth rate.

Onifade, et al. (2020) analysed the impacts of government expenditures on economic growth with respect to capital expenditure, recurrent expenditure and the government fiscal expansion in the context of the Nigerian economy. Pesaran's ARDL approach was applied to carry out the impact analysis using annual time-series data from 1981 to 2017. The study found government recurrent expenditures to be significantly impacting on economic growth in a negative way, while the positive impacts of public capital expenditures were not significant to economic growth over the period of the study.

3.4 Critique of the Existing Literature

There have been many studies conducted on the impact of BD on EG with conflicting results. Most, if not all, of the studies reviewed are using the three theoretical models of which my paper will be using one of them. The results of the studies were either negative, positive, neutral or ambiguous. It was shown that results can be affected by other factors which an investigator should be aware of.

Some of the studies under review took a disaggregated approach to analyse the impact of fiscal deficit on economic growth. This is important as apart from looking at the impact of the whole deficit on growth, disaggregating it according to the type of expenditure could give more insight as to how various expenditure types composing

the deficit affect growth. This can lead to better and informed choices when coming up with a government budget. As such, this study will also take the same approach.

From the theoretical review, we have seen that fiscal deficits affect economic growth in three ways, namely: positive, negative and neutral. According to the review, in Malawi, government expenditure is made without following proper strategies of economic growth which are usually inconsistent year in, year out. There is need for government to come up with medium- and long-term policies on how it plans to use fiscal policy to influence growth.

The results of this study will show the theoretical perspective which holds for this country which in turn can guide government to formulate a growth-focused fiscal policy. There is no study that has been made on this topic yet, as such, this study aims to cover the gap.

CHAPTER FOUR

METHODOLOGY

4.1 Introduction

This chapter describes in detail the research methodology which will be followed in the study. In particular, it discusses issues of model specification, data collection and analysis.

4.2 Model Specification and Estimation Technique

4.2.1 Theoretical Model

The theoretical model is specified in the form of the Solow model with a Cobb-Douglas production function form. Many of the recent empirical studies applied the Neoclassical growth model (Dufrenot et al., 2010; Pindiriri, et al., 2016). These studies used either a linear equation form in terms of growth rate or a homogenous production function to find the effect of trade on economic growth. The study shall adopt the Augmented Cobb-Douglas Endogenous Growth Model with the inclusion of budget deficits. In specifying our model of how the government budget deficit affects economic growth, we begin with the well-known *sources of growth* equation that is derived from the neoclassical production function. Suppose, for example, that Y , A , K , and L are real GDP, total factor productivity, capital stock, and labor stock, respectively, and the neoclassical production function takes on the familiar Cobb-Douglas form:

$$Y = F(K, A, L) = AK^\alpha L^{1-\alpha} \quad (1.0)$$

Converting equation (1) into natural logs and differentiating with respect to time, yields:

$$\dot{Y} = \dot{A} + \alpha\dot{K} + (1-\alpha)\dot{L} \quad (1.1)$$

Where, $\dot{Y}$, $\dot{A}$, $\dot{K}$ and $\dot{L}$ are the growth rates of real GDP, total factor productivity, capital, and labor, respectively. One can test the effect of the budget balance in a single regression equation based on equation (1.1), the basic sources of growth equation, by adding the budget balance to equation (1.1). Specifically, we could specify:

$$\dot{Y} = \alpha + \beta\dot{K} + \theta\dot{L} + \eta\left(\frac{BB}{Y}\right) \quad (1.2)$$

4.2.2 Econometric Empirical Model

Adapting a model used by Roy and Berg (2009), we will run the two separate models; one the fiscus (except the revenue side components) plus the conditioning variables:

Model 1: Impact of BD on economic growth

$$\ln GDP_{capita_t} = \alpha + \beta Gross_Inv_t + \theta BD_t + \phi INF_t + \eta_t$$

Model 2: Impact of fiscus components on economic growth

$$\ln GDP_{capita_t} = \alpha + \beta Gross_Inv_t + \lambda DE_t + \delta CE_t + \phi INF_t + \eta_t$$

where, GDP_capita , is the real GDP per capita; $Gross_Inv$ is the gross private investment as a percentage of GDP; BD is the primary budget deficit as a percentage of GDP; DE is development expenditure as a percentage of GDP; RE is recurrent expenditure as a percentage of GDP; INF is inflation rate. Log of per capita GDP will

be used since a change in per capita GDP theoretically means a change in EG. Most growth models express growth in per capita terms. It is for this reason that log of per capita GDP has been used.

Should the orders of integration allow, the actual estimation procedure will follow the vector error correction (VECM) modeling of the form;

Short run regression model

VECM technique based on VAR by Johansen (1991) which applies maximum likelihood estimation to a vector error correction model to simultaneously determine the long run and short run determinants of the dependent variable in a model. This procedure avoids the problem of normalising the cointegrating vector on one of the variables or of imposing a unique cointegrating vector as in a single equation residual based 2-step cointegration test of Engle-Granger (1987) since all the variables in the VAR system are assumed to be endogenous. Second, it is capable of identifying multiple cointegration relationship when there are more than two variables involved in the test unlike the single equation residual based Engle-Granger test which only finds one cointegrating relationship despite the number of variables involved. This second advantage of the Johansen test is especially important to this study given that there are six variables involved in our analysis. In addition, the Johansen procedure provides the speed of adjustment coefficient which measures the speed at which the dependent variable reverts to its equilibrium following a short-term shock to the system. The method also corrects for autocorrelation and endogeneity parametrically through the use of vector error correction mechanism specification.

In general, the Johansen technique is based on the VAR representation given by equation below:

$$\Delta Z_t = A_1 Z_{t-1} + A_2 Z_{t-2} + \dots + A_k Z_{t-k} + \mu_t \quad (1.3)$$

where Z_t is a vector of non-stationary I(1) variables which can be endogenous in the model, $Z_t = [GDP_capita_t, Gross_Inv_t, DE_t, RE_t, INF_t, BD_t]$

$$(1.4)$$

with k number of lags for each variable, A_i is a n x n matrix of coefficients and μ_t is an error term with zero means, constant variance and individually serially uncorrelated. The equation above is an unrestricted VAR model which can be reformulated in a VECM in order to apply the Johansen procedure by subtracting Z_{t-1} from both sides as follows:

$$\Delta Z_t = \Gamma_1 Z_{t-1} + \Gamma_2 Z_{t-2} + \dots + \Gamma_k Z_{t-k} + \Pi Z_{t-1} + \mu_t \quad (1.5)$$

where $\Gamma_i = (1 - A_1 - A_2 - \dots - A_k)$, $i=1, 2, 3, \dots, k-1$, $\Pi_i = -(1 - A_1 - A_2 - \dots - A_k)$ and δ is the first difference operator and μ is a vector of white noise residuals. If Π is of rank $1 \leq r < 9$, then it can be decomposed into $\Pi = \alpha\beta'$. Note that Π is a 6x6 matrix (due to our 6 endogenous variables in the system) and lead us to further reformulation of equation as follows:

$$\Delta Z_t = \Gamma_1 \Delta Z_{t-1} + \Gamma_2 \Delta Z_{t-2} + \dots + \Gamma_{k-1} \Delta Z_{t-k+1} + \alpha(\beta' Z_{t-1}) + \mu_t \quad (1.6)$$

where the rows of β are interpreted as distinct co-integration vectors and α are the adjustment coefficients (loading factors) indicating the adjustment to long-run equilibrium. The linear combination $\beta' Z_{t-1}$ are stationary processes, therefore all the variables in equation (1.6) are stationary. Thus, the system of equations specified in (4) contains information on both the short-run and the long-run adjustment to changes in Z_{t-1} due to the presence of the Π matrix. Equation (1.6) therefore decomposes Π into

α and β' where α will include the speed of adjustment to equilibrium coefficients while β' will be the long run equilibrium matrix coefficients and contains the cointegration vectors. Therefore, $\beta'Z_{t-1}$ is equivalent to the error-correction term that contains up to (n-1) vectors of a multivariate framework. Therefore, the VECM model can be expressed for each endogenous variable in the system by putting the other variables as dependent variables (in the left-hand sides) each in one equation, six VECM equations can be obtained from the empirical model given by equation (1.1) above.

The first step in the Johansen approach is to test for the order of integration of the variables under examination. The aim is to have non-stationary variables in order to detect among them a stationary cointegrating relationship(s) and avoid the problem of spurious regressions. The second step involves setting the appropriate lag length of the model. For this purpose, Information criterion such as the Akaike Information Criteria (AIC), Schwarz Information Criteria (SIC), Hannan-Quinn criterion (HIQ), Final Prediction Error (FPE) as well as Likelihood Ratio Test (LRT) criteria will be used and the model that gives the lowest values of these criteria will be chosen. However, since these information criteria usually produce conflicting VAR order selections, the decision about the lag structure of a VAR model could be based on the fact that a given criteria produces a white noise residual and conserves degrees of freedom.

Cointegration tests are very sensitive to the assumptions made about the deterministic components (i.e., the intercept and the trend) of the model (Asteriou & Hall, 2007). To select the most appropriate model, the Pantula principle will be applied which involves the estimation of all the three plausible models and the presentation of the results from

the most restrictive model through the least restrictive one, at each stage comparing the trace or maximum test statistic to its critical value, stopping only when a conclusion is made for the first time that the null hypothesis of no cointegration is not rejected. Then the number of cointegrating vectors will be determined using either the maximum eigenvalue or the trace statistics in which the null hypothesis of no cointegration is rejected if the test statistic is greater than the critical value. In case where the trace and maximum eigenvalue statistics yield conflicting results, Johansen and Juselius will be used to guide the examination of the estimated cointegrating vector and basing one's choice on the interpretability of the cointegrating relations.

Once the number of cointegrating vectors has been determined, normalising the model will be done on the true cointegrating relation(s). Once estimation is complete, the residuals from the VECM will be checked for normality, heteroskedastic and autocorrelation or serial correlation. These tests are carried out using the Jarque-Bera normality test, White heteroskedasticity test, and Lagrange Multiplier (LGM) test respectively. These diagnostic tests are very important in that they validate the parameter estimation outcomes achieved by the estimated model. The stability test is also performed by computing the inverse roots of the characteristic roots of the models. The estimated VECM is said to be stable if the moduli of the characteristic roots are at most unity (Lütkepohl, 1991).

4.3 Data Collection: Sources and Techniques

This study used secondary annual time series data collected for the period of 1974 to 2021 sourced from the Reserve Bank of Malawi and Ministry of Finance and Economic Planning. The table below shows the data sources and summary statistics:

Table 4: Data source and summary statistics

Variable	Data Source	Mean	Min	Max	S.D
GDP	MoFEPD ⁵	K 305 billion	K 400 Million	K 1.5 trillion	497 billion
Gross Private Investment (% of GDP)	WDI ⁶	16.187%	9.315%	30.86%	5.295
Budget Deficit (% of GDP)	MoFEPD	14.738%	-3.477%	105.114%	21.729
Development Expenditure (% of GDP)	MoFEPD	25.665%	5.588%	149.962%	29.117
Recurrent Expenditure (% of GDP)	MoFEPD	71.063%	12.040%	425.179%	80.582
Inflation	RBM ⁷	19.971%	7.412%	83.326%	14.152

Source: Author's computations using WDI (2020) data set

Table 4 provides some basic summary statistics for the data. Inflation averaged 19.971% during 1974-2021 hitting minimum value of 7.4% and maximum value of 83.3% while budget deficit averaged 14.738% of GDP hitting a minimum of -3.477% (budget surplus) and a maximum value 105.114%. Development expenditure ranged between 5.588% to 149.962% with an average of about 25.665% while recurrent expenditure averaged about 71.063% of GDP while ranging from 12.0403% to around 425.179% of GDP in the study period.

⁵ MoFEPD = Ministry of Finance, Economics Planning and Development

⁶ WDI=World Development Indicators

⁷ RBM = Reserve Bank of Malawi

Time Series Properties

Stationarity

The estimation and hypothesis testing using time series data is based on the assumption that the variables are stationary or independent of time. A series is said to be stationary if its mean and variance are constant over time and the value of the covariance between the two time periods depends only on the gap between the two time periods and not the actual time at which the covariance is computed (Gujarati, 2004). If they are not, the means, variances, and covariance of the time series will not be well defined. Therefore, the regression results will be spurious and the estimated coefficients will be biased.

Tests for stationarity

Augmented Dickey Fuller and Philip-Peron unit-root tests were used to determine the stationarity of the data used in the analysis. The Philip-Perron unit-root test was chosen to Augment the ADF test since it is the best in face of structural breaks, which we assume are present within the sample period. As the theoretical framework presented in the previous chapter will be examined and tested using co-integration techniques, it is essential that the time series properties of the data are considered. Considering the stationarity of the data is important, since if the economic time series are characterised by non-stationarity, then the classical t-test and F-test are inappropriate since the limiting distribution of the asymptotic variance of the parameter estimates becomes infinite (Perron, 1990). This often leads to spurious results in conventional regression analysis.

Augmented Dickey Fuller (ADF) Tests

The ADF corrects for high-order serial correlation by adding a lagged differenced term of the dependent variable for the residual to become a white noise process. The ADF procedure involves estimating the following regressions:

$$\Delta \ln Y_t = \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + \mu_t \quad (1.7)$$

$$\Delta \ln Y_t = \beta_1 + \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + \mu_t \quad (1.8)$$

$$\Delta \ln Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \sum_{i=1}^m \alpha_i \Delta Y_{t-i} + \mu_t \quad (1.9)$$

Where Y_t is the required time series, δ is the difference operator, t is the time trend and μ_t is the pure white noise error term which should satisfy the following assumptions: normality, constant variance and independent error terms and $\Delta Y_{t-1} = (Y_{t-1} - Y_{t-2})$, $\Delta Y_{t-2} = (Y_{t-2} - Y_{t-3})$, etc. Testing for unit roots using equation (1.7) assumes that the data generating process has no intercept term and time trend i.e., pure random walk. To account for the existence an intercept term, equation (1.8) is used while equation (1.9) suggests using an intercept drift (deterministic) term to test for a unit root.

One major problem in implementing the ADF test is that of choosing an appropriate lag-length as inclusion of too many lags reduces the power of the test. On the other hand, too few lags will not appropriately capture the actual error process, so that δ and its standard error will not be well estimated. According to Gujarati (2004) enough of the lagged differences should be included empirically so that the error term in the equations is serially uncorrelated. In this empirical analysis, we will use the information criteria approach to determine the lag length. However, in the event that the information criteria produce conflicting results, decisions about the lag structure of a VAR model

could be based on the fact that a given criterion produces a white noise residual and conserves the degrees of freedom. Thus, additional diagnostic checking is done to determine if residual terms reveal any evidence of structural breaks or serial correlation. Specifically, plots of the residuals as well as their correlograms are examined for potential structural breaks and serial correlation. Formally, Ljung-Box (1978) Q-statistic is used to test for serial correlation in the residuals.

In estimating the above equations, if the computed absolute value of the tau-statistic exceeds the critical values, we reject the hypothesis that $\delta = 0$, in which case the time series is stationary, otherwise we do not reject the null hypothesis. Therefore, if the series are stationary in their levels, then the variables are integrated of order zero, $I(0)$. If the series becomes stationary after the first differencing, then the variables are integrated of order one, $I(1)$ and so on. The most desirable case is when all the variables are integrated of the same order and then to proceed with cointegration test. However, even in cases where the mix of $I(0)$, $I(1)$ and $I(2)$ variables are present in the model, cointegrating relationships might still exist.

Phillip-Perron Test

While Dickey-Fuller tests assume that the residuals are statistically independent (white noise) with constant variance, Phillips-Perron (PP) tests consider less restriction on the distribution of the disturbance term (Enders, 2004) and Gujarati (2004) states that the Phillips-Perron use non-parametric statistical methods to take care of the serial correlation in the error terms without adding lagged difference terms. According to Brooks (2008), the tests are similar to ADF tests, but they incorporate an automatic correction to the Dickey- Fuller procedure to allow for auto correlated residuals. The

PP test and the ADF test have the same asymptotic distribution. Brooks (2008) explains that the PP tests often give the same conclusions, and suffer from most of the same important limitations as the ADF tests. Enders (2004) suggests that a safe choice is to use both types of unit root tests. If they reinforce each other, then we can have confidence in the results. Therefore, to test for series stationarity, this study employs both the ADF and PP tests.

Cointegration Test

Due to possible Endogeneity among our variables, Johansen Cointegration technique was employed to uncover the long-run and short-run behavior of economic growth models. To understand this test, the basic Vector Error Correction Model (VECM) is generally given as:

$$\Delta y_t = \alpha \beta' y_{t-1} + \sum_{j=1}^m \Gamma_j \Delta y_{t-j} + \eta_t \quad (2.0)$$

where y_t is a $(K \times 1)$ vector of $I(1)$ variables, α and β are $(K \times r)$ parameter matrices with rank $r < K$. Johansen (1995) derived an ML estimator for the parameters and two likelihood-ratio (LR) tests for inference on r : the trace statistic, and the maximum-eigenvalue statistic. The null hypothesis of the trace statistic is that there are no more than r cointegrating relations. Johansen (1995) derived the distribution of the trace statistic to be: $-T \sum_{i=r+1}^K \ln(1 - \hat{\lambda}_i)$. An alternative hypothesis of the trace statistic is that the number of cointegrating equations is strictly larger than r . The distribution of the Maximum statistic is given as $-T \ln(1 - \hat{\lambda}_{r+1})$

CHAPTER FIVE

ECONOMETRIC ESTIMATION AND INTERPRETATION

5.1 Introduction

This chapter estimates the analytical model that was discussed in Chapter 4. The model will be estimated using the vector error correction model (VECM). The VECM procedure will provide estimates of the short-run dynamics and the long-run relationship between economic growth and budget deficit.

5.2 Stationarity tests

The Augmented Dickey Fuller and Philip-Perron unit-root tests were used to determine the stationarity of the data used in the analysis. As the theoretical framework presented in the previous chapter will be examined and tested using cointegration techniques, it is essential that the time series properties of the data are considered. Considering the stationarity of the data is important, since if the economic time series are characterised by non-stationarity, then the classical t-test and F-test are inappropriate since the limiting distribution of the asymptotic variance of the parameter estimates becomes infinite (Perron, 1990). This often leads to spurious results in conventional regression analysis. The stationarity tests showed that all the variables were $I(1)$. Capital and per capita GDP were found to be $I(1)$. The fact that we have $I(1)$ variables justifies the use of VECM.

Table 5: Unit Root Test Results

VARIABLES	Augmented Dickey Fuller unit-root Test		Phillip-Peron unit- root test		Order of Integration
	LEVELS	1 st Difference	LEVELS	1 st Difference	
lnGDP_capita	-3.452	-3.553*	-3.247	-3.534*	I(1)
BD	-3.246	-7.266*	-3.128	-8.009*	I(1)
DE	-3.219	-7.182*	-2.678	-6.119*	I(1)
RE	-2.123	-6.889*	-3.013	-5.678*	I(1)
Gross_Inv	-2.292	-3.781*	-3.260	-3.784*	I(1)
INF	-3.546	-7.221*	-2.458	-7.552*	I(1)

Source: Author's computations using data from MoFED

With regard to cointegration, the number of cointegrating vectors will be determined using either the maximum eigenvalue or the trace statistics in which the null hypothesis of no cointegration is rejected if the test statistic is greater than the critical value. The results of the cointegration results are presented in the tables 6 and 7 below;

Table 6: Cointegration Test Results for Model 1

Trace Statistic			
Null Hypothesis	Alternative Hypothesis	Test Statistic	Critical Value
$r \leq 0$	$r > 0$	150.4815	94.15
$r \leq 1$	$r > 1$	94.1508	68.52
$r \leq 2$	$r > 2$	57.4468	47.21
$r \leq 3$	$r > 3$	25.3204*	29.68
$r \leq 4$	$r > 4$	8.7318	15.41
Maximal Statistic			
$r = 0$	$r = 1$	56.3308	39.37
$r = 1$	$r = 2$	36.7040	33.46
$r = 2$	$r = 3$	32.1263	27.07
$r = 3$	$r = 4$	16.5887*	20.97
$r = 4$	$r = 5$	8.3617	14.07

Source: Author's computations using WDI (2020) data set

Table 7: Cointegration Test Results for Model 2

Trace Statistic			
Null Hypothesis	Alternative Hypothesis	Test Statistic	Critical Value
$r \leq 0$	$r > 0$	148.7259	94.15
$r \leq 1$	$r > 1$	95.5281	68.52
$r \leq 2$	$r > 2$	56.0995	47.21
$r \leq 3$	$r > 3$	25.2738*	29.68
$r \leq 4$	$r > 4$	10.0848	15.41
Maximal Statistic			
$r = 0$	$r = 1$	53.1979	39.37
$r = 1$	$r = 2$	39.4286	33.46
$r = 2$	$r = 3$	32.1263	27.07
$r = 3$	$r = 4$	30.8257	20.97
$r = 4$	$r = 5$	15.1889	14.07

Source: Author's computations using WDI (2020) data set

From the results, it is clear that there are at least three cointegrating equations in both equations. In other words, the results confirm the existence of cointegration among the variables. Having found cointegration, we then went ahead to estimate the VECM the results of which are presented in the tables below. First of all, results of the long run equation in Table 8 below will be presented and interpreted then results of short-run economic growth model in table 9 will follow:

Table 8: Normalised Cointegrating equations

Variable	Model 1	Model 2
$L.lGDP_t$	1	1
$Inflation_t$	-0.270***	-0.568
GPI_t	-1.683***	-0.783***
RE_t	-----	-0.041***
DE_t	-----	0.478***
BD_t	-0.539***	---
_Cons	30.215	0.186

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Author's computations using WDI (2020) data set

It can be noticed here that other than inflation, all the variables are significant in explaining per capita GDP in the long run. Specifically, with respect to budget deficit, one notices that there is a significantly negative relationship between budget deficit and GDP per capita growth in the long run. This confirms our earlier expectation that there is a negative relationship between budget deficit and economic growth. In other words, the results point to the fact that the neoclassical theory holds true in Malawi as opposed to the Ricardian and Keynesian models, at least in the long run. With respect to the type of expenditure, we notice that, as expected, it is development expenditure that is pro-growth as opposed to recurrent expenditure. The results of the short run economic growth model are presented in Table 9.

Table 9: Parsimonious Error Correction Model Results

Variable	Model 1	Model 2
$\Delta lGDP_{t-1}$	0.045***	1.719***
$\Delta Inflation_{t-1}$	-0.042	0.003
ΔGPI_{t-1}	-0.133	-0.042
ΔRE_{t-1}	-----	-0.030
ΔDE_{t-1}	-----	0.013***
ΔBD_{t-1}	0.016	0.009
ΔECT_t	-0.024***	-0.064***
_cons	0.0196***	0.124***

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Source: Author's computations using WBDI (2020) data set

Here one notices that budget deficit is not statistically significant. This entails that, running a budget deficit in Malawi does not have immediate impact on economic growth. In other words, the REH and Neoclassical model hold in Malawi in the short run. Similarly, recurrent expenditure is not statistically significant in the short run. However, it is development expenditure that has a positive impact on economic growth in Malawi in the short run. The results also confirm the presence of cointegration that

we have already established in the sections above. Specifically, the speed of adjustment is about 2.5% implying that the gap between the long run equilibrium and the short run disequilibrium is reduced by about 2.5% each year as we are moving from the short run to the long run.

CHAPTER SIX

CONCLUSIONS AND POLICY IMPLICATIONS

6.1 Summary

The study investigated the effects of fiscal deficit on economic growth in Malawi for the period 1974 to 2021. Theoretical models that explain the link between fiscal deficit and economic growth were explored. The study found out that budget deficit has a negative relationship with per capita GDP in the long run which is significant and has an insignificant relationship with per capita GDP in the short run. These results indicate that the Neoclassical model holds for Malawi. The significantly negative relationship in the long run indicates that an increase in the budget deficit reduces economic growth and the insignificant relationship between FD and per capita GDP in the short run means that budget deficit has no impact on EG in the short run.

The results of the study agree with the findings of Zuze (2016), Nkalu (2015), Kurantin (2017), among others whose works I have reviewed in the empirical literature. All these studies concluded that there is a negative relationship between fiscal deficits and economic growth.

Components of government expenditure were also investigated to establish their impact on the country's EG. It was found that DE has a significantly positive relationship with per capita GDP both in the long run and short run. This agrees with the findings of Zuze (2016), Nkalu (2015), Onifade, et al (2020), among others whose study results

concluded a positive relationship between the two variables. This shows that an increase in DE increases economic growth both in the long run and short run.

RE was found to have a negative relationship with per capita GDP in the long run and an insignificant relationship with per capita GDP in the short run indicating that in the long run an increase in RE reduces growth and that in the short run it has no impact on the economic growth.

Other economic variables were also used to investigate their impact on growth for comparison. These are gross private investment and inflation. The results showed that gross private investment has a positive relationship with per capita GDP in the long run which is significant and both gross private investment and inflation have insignificant relationships in the short run meaning they do not have any impact on economic growth in the short run.

From the results, it is clear that the objectives of the study have been met and all issues raised in the hypotheses have been resolved.

6.2 Policy Implications

Budget deficit does not cause economic growth in Malawi, rather, it is the composition of government expenditure that matters as far as economic growth is concerned. It has been shown in the study that the government budget is run on deficit every year. This shows that the country's tax base is not large enough to cover all government spending, as such, government needs to prioritise other areas like mining and agriculture by coming up with better policies so as to increase its revenues. The policies could include

closing leakages and loopholes in the case of mining and putting in place strategies for the rural masses to practice improved agricultural practices, for example, irrigation.

The government should also strive to spend within its means for the country to experience growth and avoid FDs as they lead to negative growth in the long run and have no immediate impact at all. However, for accelerated growth, government budget should have a big percentage of its resources allocated to development expenditure as compared to recurrent expenditure as DE is pro-growth.

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APPENDICES

Appendix 1: Data Set

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YEAR	BD	RE	DE	RGDP	GDP PER CAPITA	GCF	INFLATION	
1974	-3.50	48.1	30.2	399.5	356.5546512	27.32394366		18.29678037
1975	-9.40	53.8	26.5	421.0	367.740211	33.71719841		8.192416396
1976	-16.80	65.2	47.9	443.2	374.9191945	26.25816993		10.03770758
1977	-16.10	78.7	39.1	481.3	381.5045853	24.68406593		13.37826951
1978	-46.20	101.9	76.6	481.3	405.9795614	38.44136381		0.219778176
1979	-73.40	134.5	113.5	777.5	411.3658031	30.23713129		3.421461526
1980	-84.20	156.6	127.9	764.4	401.4783748	24.74380659		15.79275339
1981	-116.10	183.7	174.9	724.3	370.6367817	17.62476311	11.81469755	16.40573891
1982	-52.00	245.6	124.2	744.2	371.0279705	21.40333976	9.821162444	9.663258357

1983	-34.00	251.9	123.5	770.7	375.0054087	22.79749637	13.50251052	11.22976911
1984	-27.50	279.6	142.9	805.2	382.2469599	12.87923233	20.0263032	12.77205599
1985	-63.50	376.1	138.4	838.7	383.019575	18.58707389	10.51897599	8.930836088
1986	-77.20	468.6	160.2	878.4	362.3489428	12.46992601	14.04686796	13.50928432
1987	-165.20	593.1	189.8	900.2	346.7639979	17.27067468	25.15509543	16.72386678
1988	-56.00	604.6	250.9	926.3	337.2533988	21.41806247	33.91216494	31.09180596
1989	-32.30	753.8	341.3	968.3	325.2599999	24.55676643	12.44636205	22.50948307
1990	-92.70	962.8	295.3	1,016.2	331.7510297	23.04046567	11.82353805	10.66083429
1991	-215.30	1,060.3	311.6	1,095.0	353.3548134	20.23570517	12.61531538	10.69237006
1992	-144.20	1,219.3	314.8	1,012.3	324.5489856	19.93461213	23.75135302	13.27642115
1993	-784.98	1,701.8	468.3	1,127.4	355.1107329	15.17122562	22.77271023	28.17466666
1994	-752.60	2,005.4	511.3	9,149.0	317.5902817	29.09818147	34.64963615	26.17187901
1995	-987.30	3,081.9	958.9	10,411.0	367.0016106	17.39213919	83.32577475	77.21958346
1996	-2416.10	6,266.3	1,465.4	11,498.0	386.8445928	12.32708608	37.60204502	52.34560851

1997	-1379.80	7,095.7	1,741.5	12,303.0	392.0448705	11.59881201	9.13735243	20.83484034
1998	-2659.00	11,404.9	1,808.1	12,568.0	396.2212527	13.46502229	29.74865128	19.54848477
1999	-1480.80	11,083.0	5,323.4	13,023.0	396.9165528	14.65000729	44.80416429	39.69077832
2000	-1618.61	13,950.1	9,238.8	13,116.7	392.5245847	13.56469858	29.58148846	30.53395149
2001	-4618.40	21,856.4	6,868.4	12,581.7	363.7551737	14.89652953	22.7	25.62246729
2002	-5787.55	32,199.1	13,675.8	12,858.6	361.0435456	12.30359638	14.74463461	112.693648
2003	-11454.28	39,754.6	13,132.0	13,385.5	372.5312494	12.92234037	9.576797869	10.34609429
2004	-14719.01	59,537.0	20,999.0	14,002.8	383.0941888	13.75468618	11.42980608	14.84662752
2005	-9816.00	68,379.0	23,459.0	326,475.5	385.4608301	17.09475377	15.41034466	10.74123602
2006	-6740.00	95,626.0	32,734.0	347,816.7	392.7599989	20.01404169	13.97429435	19.96725933
2007	7296.00	99,419.0	53,101.0	373,768.1	418.5882186	23.06912807	7.952209909	4.099721432
2008	14274.00	121,284.0	64,089.0	410,438.3	437.8954761	23.22912054	8.712601866	11.96466714
2009	-21454.00	172,308.0	57,217.0	524,551.0	460.9246827	24.46288532	8.422044277	7.899822531
2010	-12542.00	188,247.0	66,588.0	642,816.0	478.6685897	22.82318609	7.411590929	12.12717946

2011	-13087.00	222,643.0	85,052.0	667,413.0	487.7306819	12.42477403	7.622822628	14.07576137
2012	-81017.00	260,530.0	77,565.0	1,004,184.0	482.9237812	12.04940544	21.271265	17.65610124
2013	-28774.00	397,201.0	103,963.0	1,157,601.0	493.8183695	12.70245804	27.28333333	27.30039651
2014	-127340.01	544,851.8	100,224.8	1,229,714.0	507.537975	11.9855601	23.79206495	20.88370338
2015	-163043.00	620,237.9	151,619.0	1,269,966.0	507.548405	12.22162442	21.86734755	20.53465854
2016	-128788.00	726,168.0	166,664.0	1,306,937.0	506.2496613	10.78027979	21.71111321	19.54413214
2017	-139924.80	847,351.0	273,831.0	1,372,731.0	512.6456123	13.19204948	11.54339392	13.46150517
2018	-109953.00	1,061,267.0	227,315.0	1,430,023.0	515.1064496	10.86511119	12.42017811	6.669240741
2019	-131030.57	1,214,212.1	273,667.3	1,499,565.0	523.6034516	12.30797693	9.370836056	8.165981151
2020	-303294.61	1,461,111.4	368,142.3	7,218,476.9	525.1064496	11.86511119	13.988654	6.669240741
2021	-284151.00	1,709,962.0	637,146.0	7,498,844.5	524.6034516	13.30797693	16.5	8.165981151