# The Macroeconomic Determinants of Economic Growth in Zambia: Do Copper prices matter?

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# THE MACROECONOMIC DETERMINANTS OF ECONOMIC GROWTH IN ZAMBIA: DO COPPER PRICES MATTER?

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**M.A. (Economics) Dissertation**

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# THE MACROECONOMIC DETERMINANTS OF ECONOMIC GROWTH IN ZAMBIA: DO COPPER PRICES MATTER?

**By**

**Bright Chizonde**

**A Dissertation Submitted in Partial Fulfillment of the Requirements for the award of the Degree of Master of Arts (Economics) of the University of Dar es Salaam.**

**University of Dar es Salaam**

**November, 2016**

## CERTIFICATION

The undersigned certify that they have thoroughly read and hereby recommend for acceptance by the University of Dar es Salaam, a Master of Arts (Economics) dissertation titled: "***The Macroeconomic Determinants of Economic Growth in Zambia: Do Copper Prices Matter?"***

……

**Prof. Nehemiah E. Osoro**

(Supervisor)

Date …….

……

**Dr. Godfrey E. Luvanda**

(Supervisor)

Date ……....

## DECLARATION AND COPYRIGHT

I, **Bright Chizonde**, do declare that this dissertation is my own original work and that it has not been and will not be presented to any other university for a similar or any other degree award.

**Signature …….**

## ACKNOWLEDGMENTS

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## DEDICATION

I dedicate this research to my family and friends for their immeasurable and consistent encouragement throughout my studies.

## LIST OF ABBREVIATIONS

| | |
|---|---|
| AfDB: | African Development Bank |
| ADF: | Augmented Dickey Fuller |
| AERC: | African Economics Research Consortium |
| AfDB: | African Development Bank |
| ARDL: | Autoregressive Distributed Lags |
| BoZ: | Bank of Zambia |
| CLS: | Conditional Least Squares |
| CPI: | Consumer Price Index |
| CSO: | Central Statistical Office |
| EU8: | Eight Central and Eastern European Union Member States |
| GDP: | Gross Domestic Product |
| GMM: | Generalized Method of Moments |
| IMF: | International Monetary Fund |
| MNFP: | Ministry of Finance and National Planning |
| OECD: | Organization for Economic Cooperation and Development |
| OLG: | Overlapping Generations Model |
| OLS: | Ordinary Least Squares |
| SADC: | Southern African Development Community |
| SAPs: | Structural Adjustment Programmes |
| SIC: | Schwarz Information Criteria |
| TAR: | Threshold Autoregressive |
| US: | United States |
| VAR: | Vector Autoregressive |
| WB: | World Bank |
| ZA: | Zivot Andrews |
| ZDA: | Zambia Development Agency |
| ZRA: | Zambia Revenue Authority |

## ABSTRACT

This research investigates the determinants of economic growth in Zambia using the Bounds Approach to Cointegration developed by Persaran and Shin (1999). Since Zambia's economy is said to be dependent on copper mining, economic analysts postulate that economic growth in Zambia is dependent on international copper prices and thus externally determined. This is somewhat problematic because it absorbs policy makers and government of the responsibility to generate sustainable growth. In order to test the validity of this postulation, the study estimates an Autoregressive Distributed Lags (ARDL) Model with copper prices as one of the variables of interest. Estimation results indicate that, in the long-run, economic growth is determined by physical capital, exchange rate, inflation, crude oil price, government spending and agricultural productivity; international copper prices only influence growth in the short-run. Therefore, with proper planning and strategic policy interventions, Zambia can still achieve higher sustainable economic growth even when international copper prices are falling.

**TABLE OF CONTENTS**

## LIST OF TABLES

## LIST OF FIGURES

# CHAPTER ONE

# INTRODUCTION

## 1.1 Background Information

The quest for economic development has always been at the center of human civilization. Even in our contemporary globalized world, economic growth dominates the main stream media debate and remains at the center of human concern. Nations which record exceptionally high growth rates are hailed as wonders and have been termed 'growth miracles'. This chapter contains six sections: section 1.2 presents background information on global and regional economic growth before highlighting Zambia's economic growth situation. Based on the background, section 1.3 documents the problem statement and the objectives of the study are highlighted in section 1.4. This introductory Chapter also states the significance of the study in section 1.5 and its organization in section 1.6 before making a conclusion

### 1.1.1 Theoretical background

Macroeconomic theory has a lot to say about economic growth. The most renowned economic growth model, popularly known as the Solow Model, postulates that economic growth is attributed to advancement in physical capital and not the stock of capital or labor (Romer :1996). Other mainstream economic growth theories also conclude that economic growth is enhanced by technological progress but they also make additional conclusions which are not in conformity with other models. For example, The Ramsey Model argues that capital accumulation embodies technological progress and hence

enhances economic growth-a conclusion which contradicts the Solow model (Groth: 2011).

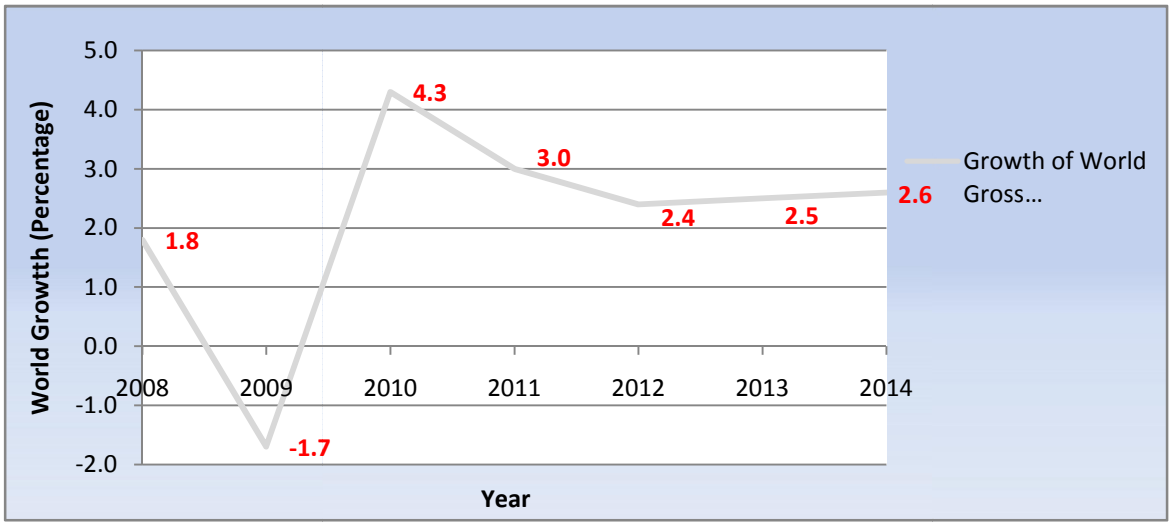
The so called Endogenous growth theories, such as Barro's and Lucas' models, conclude that economic growth is generated by human capital accumulation, physical capital accumulation and government action among others. Therefore, in such an environment of varying postulations, there is need to turn to empirical investigations in order to ascertain which factors determine the economic growth of specific nations or regions. Another added advantage of empirical investigations is that they can go beyond exiting theories in identifying nation specific factors which enhance economic growth.

### 1.1.2 Global economic growth

Growth proponents and development analysts believe that sustained economic growth at national, regional and global level is the key to eradicating social vices such as poverty. This is why multilateral organizations such as the World Bank and the United Nations have increasingly focused on economic growth oriented interventions. According to the United Nations Global Economic Outlook for 2015, the world economy was expected to grow by 3.1 percent in the year 2015 and 3.3 percent in the year 2016. Achieving this kind of growth is not easy; particularly because world economic growth depends on national and regional growth on one hand and on international factors on the other hand. The world economy only registers positive economic growth when the positive growth in some regions or nations is greater than the negative growth experienced in other regions or nations.

Figure 1.1 presents economic growth trend for the world economy and illustrates how complex it is to generate sustained growth at global level.

**Figure 1. 1: Growth of world gross product, 2008-2014**




*Source: United Nations, Global Economic Outlook, 2015*

Due to the Global Financial and Economic Crisis of 2008-2009, the world economy contracted and registered a growth rate of -1.7 percent. **Figure 1.1** shows that despite the unprecedented explosive, world economic growth of 4.3 percent in 2010 followed by 3.0 percent in 2011, the world economy is still recovering from the global financial and economic crisis. This is indicated by lower growth rates of 2.4 percent in 2012, 2.5% percent in 2013 and 2.6 percent in 2014. Generally speaking, however, the world economy has a positive economic growth trend. It is clear that even in the presence of the past financial crisis, economic growth has increased from 1.8 percent in 2008 to way above 2 percent for all the subsequent years after the crisis.

### 1.1.3 Regional economic growth

The positive trend in world economic growth in the very recent past can be attributed to differential growth across the world. Some regions of the world have been growing rapidly while others have experienced poor growth. Table 1.1 summarizes regional economic growth and shows which regions have been growing faster than others.

**Table 1. 1: World regional economic growth: 2012-2015**

| **Region** | **2013** | **2014** | **2015 (forecast)** |
|---|---|---|---|
| Europe and Central Asia | 3.7 % | 2.4 % | 1.8 % |
| Latin America and the Caribbean | 2.7 % | 0.9 % | 0.4 % |
| Middle East and North Africa | 0.5 % | 2.2 % | 2.2 % |
| South Asia | 6.3 % | 6.9 % | 7.1 % |
| Sub-Saharan Africa | 4.2 % | 4.6 % | 4.2 % |

*Source: World Bank, Global Economic Prospects, 2015*

According to Table 1.1, it is clear that most of the current world economic growth is derived from growth in South Asia and sub-Saharan Africa. Sizemore (2015) argues that African growth is real because per capita GDP has more than doubled in the past decade due the fact that 7 of the 10 fastest-growing economies in the world are in Africa. This is why investment analysts have turned their hopes of world growth to the sub-Saharan region. Many have even gone as far as stating that Africa is now the new China-implying that Africa is the most promising investment destination of the next 20 years (Sizemore, 2015).

### 1.1.4 Zambia's economic growth

The Republic of Zambia is one of the countries in the emerging sub-Saharan African region. Despite Africa's growth prospects, the region is still one of the global hubs of poverty. Thus it is no surprise that poverty is the major socio-economic pandemic that Zambia is currently grappling with. However, Zambia's case is somewhat ironic because the nation is greatly endowed with natural resources and has been politically stable for the past 50 years. One would expect an African nation, which has great mineral endowments such as copper and has experienced five democratic changes of government, to be among the most economically developed nations in the region. In contrast, Zambia has had a poor economic growth track record since its independence and its poor economic performance is the major factor contributing to high poverty rates.

Zambia's economic growth has historically been one of many swings. Figure 1.2 graphically illustrates the economic growth instability the nation has undergone.

**Figure 1. 2: Swings in Zambia's economic growth rates 1964-2014**

Upon independence in 1964, The Zambian government adopted a socialist economic model within an African context and initially generated considerable economic growth. According to the World Bank (2015), Zambia increased annual GDP growth from 12.2 percent in 1964 to 16.6 percent in 1965, a remarkable increase indeed. Unfortunately, these periods of prosperity were short-lived. Due to a fall in the world copper prices and the increased costs of importation generated by the rise in oil prices, Zambia experienced a growth disaster! The level of real GDP per capita declined by almost 30 percent and the country registered negative economic growth rates of –5.6 percent in 1966, -0.4 percent in 1969, -0.1 percent in 1971, -1.0 percent in 1973, -2.3 percent in 1975, -4.6 percent in 1977 and -3.0 percent in 1979 (World Bank: 2015).

After the economic instability of the 1960s and 1970s, the Zambian government attempted to stabilize the economy through a number of strategies. The major one was the introduction of Structural Adjustment Programmes (SAPs) in the 1980 and 1990s. Consequently, after the last negative growth rate in 1998, the nation's economy stabilized and experienced positive growth rates of 6.34 percent in 2011, followed by 6.73 percent in 2012, 6.71 percent growth in 2013, and 6.0 percent in 2014 (World Bank: 2015). It is hoped that the country will register higher sustained growth rates in the coming years. This is fundamental if the nation is to meet its goal of eradication extreme poverty.

## 1.2 Statement of the problem

The aforementioned background is indicative of the efforts that the nation has made to stabilize the economy. It is certain that if policy makers clearly understood the factors which determine growth, the picture would have been different. As demonstrated above, there is great need for knowledge on the macroeconomic factors that determine economic growth. Looking at the economic growth swings, one gets the picture that policy makers have historically been at loss in trying to foster progress in the nation. This research seeks to investigate Zambia's economic growth with special focus on the macroeconomic determinants of economic growth. Once the factors influencing growth are discovered, it would be easier to formulate policies which can build on the recent decade's progress and avoid going back to the era of negative growth.

Furthermore, it has always been believed that Zambia's economic growth is directly influenced by the international copper prices because of its high dependency on copper mining. At almost all points of negative or slacking economic growth, politicians, investors and even economists have traditionally explained the prevailing situation as to be caused by external factors-particularly falling copper prices on the international market. If the nation's economic growth fluctuations were directly linked to fluctuations of copper prices then it would be very difficult to generate sustained growth in Zambia. Therefore, it will also be imperative to investigate this notion as well.

### 1.3 Objectives of the study

The broad objective of this research is to investigate the major macroeconomic determinants of economic growth in Zambia while the specific objectives are:

1. to identify the key macroeconomic factors influencing Zambia's Economic growth in the long-run; and
2. to establish the link between Zambia's economic Growth and fluctuations in International Copper prices.

### 1.4 Significance of the study

The case of Zambia's growth is particularly unique and generates a new order of academic curiosity. The major research question is: "Is Zambia's growth story different because of Copper dependency or is it ignorance which is getting the better of its policy makers?" This study will investigate whether mainstream growth theories can explain Zambia's Economic growth situation and will thus contribute significantly to the existing body of knowledge. If Zambia is to formulate policies which will foster economic stability and sustainable economic growth; ignorance on what actually influences growth must be eliminated.

### 1.5 Organization of the study

This research comprises six main chapters. Chapter two documents a detailed overview of the macroeconomic environment in Zambia with special reference to factors which have influenced growth since independence. An investigative review of critical literature

is done in chapter three: containing a section on empirical literature and another on theoretical literature review. Chapter four describes the methodology employed in the study while chapter five is dedicated to the analysis of empirical results and interpretations. Finally, a summary of the research findings with corresponding conclusions and policy implications is done in Chapter Six.

### 1.6 Conclusion

It has been observed that world economic growth is dependent on national and regional growth. While some regions such as Europe and Central Asia are experiencing declining growth, the story is remarkably different for sub-Saharan Africa. In the case of the Republic of Zambia, sustained economic growth has been a great challenge ever since independence in 1964. The nation only experienced sustained positive growth in the decade after the start of the 21$^{st}$ century. Based on the popular view that Zambia's Economic growth is directly linked to international Copper prices and other macroeconomic factors, a problem statement and a set of specific objectives have been formulated. Additionally, it has also been made very clear that this research is aimed at influencing policy decision in Zambia.

# CHAPTER TWO

# OVERVIEW OF THE ZAMBIAN ECONOMY

## 2.1 Introduction

This chapter presents an overview of Zambia's economic performance and highlights some key macroeconomic characteristics which are important to understanding its economy. The chapter is divided into four sections: section 2.2 presents Zambia's recent economic performance, section 2.3 highlights it economic prospects while section 2.4 documents some of the economic challenges the nation is currently facing. Finally, the macroeconomic status of Zambia is presented in section 2.5.

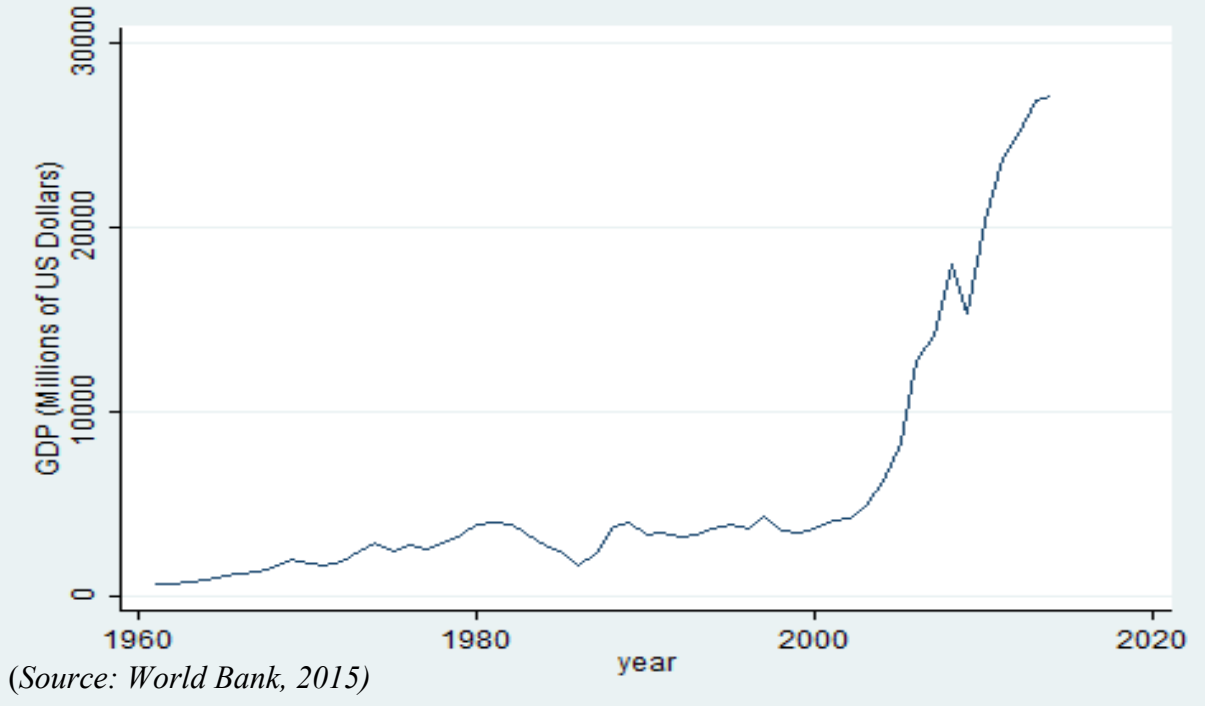
## 2.2 Economic performance

### 2.2.1 Gross domestic product

Zambia has historically faced a great deal of challenges in increasing it level of gross Domestic product. Even though the country has been exporting massive amounts of copper since before its independence in 1964, Gross Domestic product remained very low for the most part of the past 50 years. It is very disheartening to note that for almost 40 years, Zambia could not significantly increase its Gross Domestic Product. Since 1961, GDP only crossed the US $5 billion mark in 2004. However, from 2005 to date, Zambia has experienced sustained rapid economic growth. In only 10 years, Zambia increased it GDP from US $6.2 billion in 2004 to US$ 27.1 billion in 2014. This implies that GDP increased over four times as much in the last decade as compared to its

increase in the first four decades after independence. Figure 2.1 shows Zambia's Gross Domestic product from 1961 to 2014.

**Figure 2. 1: Zambia's gross domestic product, 1961-2014**



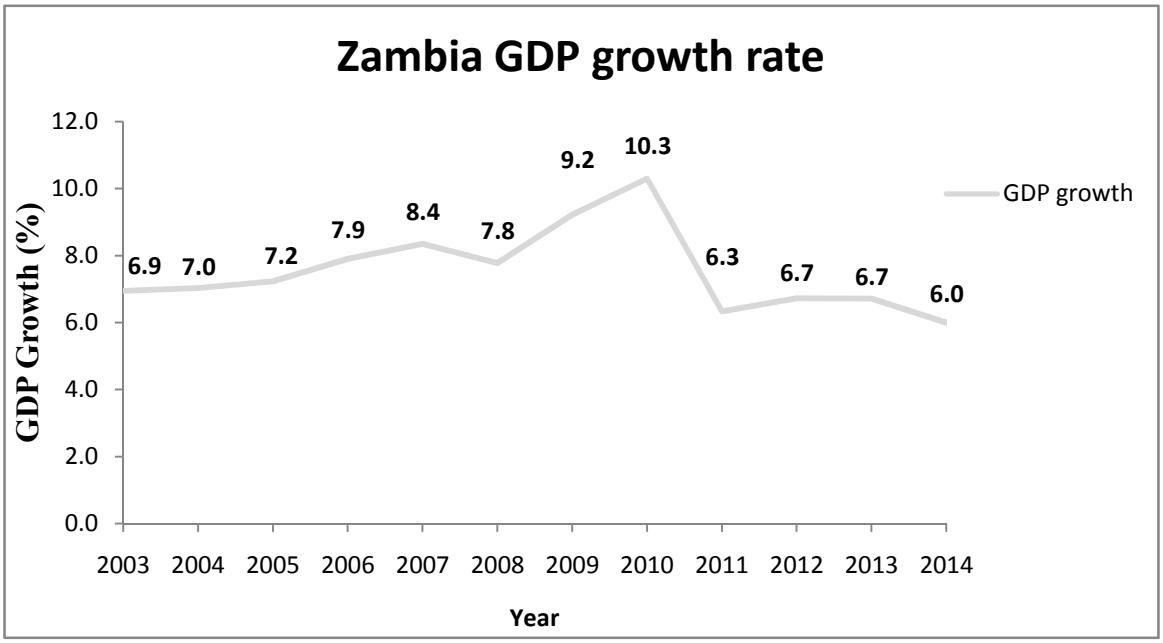

(*Source: World Bank, 2015)*

### 2.2.2 Economic growth

Zambia's growth rate has been one of many swings and periodic negative spirals. The nation has seen it all when it comes to economic growth rates: an outstanding positive growth rate of 16.65 percent in 1965, a devastating negative growth rate of -8.63 in 1994 and a remarkable positive growth rate of 10.3 percent in 2010. Over the past 54 years, Zambia has had an average growth rate of 3.4 percent-a situation attributed to too many negative spirals of growth. However, the average growth rate from 2003 to 2014 increased to over 7 percent. This period can rightly be termed the period of sustainable

economic growth in Zambia. Figure 2.2 shows Zambia's economic growth from 2003 to 2014.

**Figure 2. 2: Zambia's economic growth, 2003 to 2014**




(*Source: World Bank, 2015*)

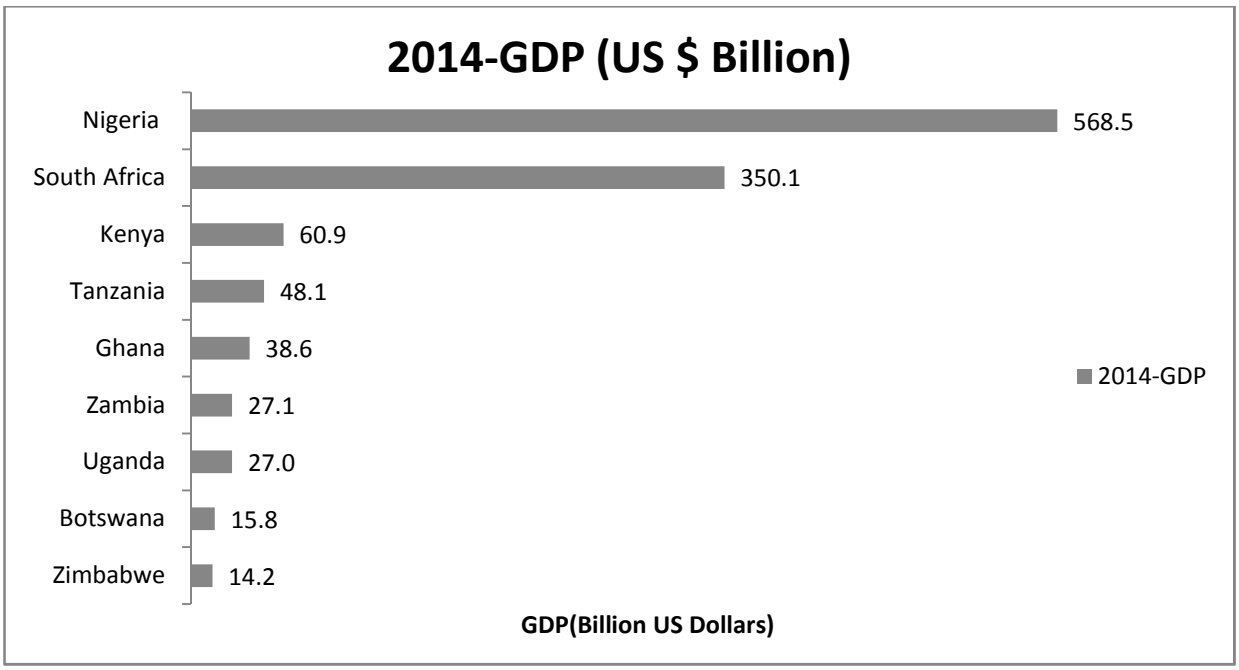
Figure 2.2 indicates that the country generated real GDP growth of 6.7 percent in 2013 but suffered a declined in 2014 believed to have been as a result of a fall in copper prices. Despite this external shock, Zambia's economy remains strong with growth expected to increase above 6% in 2016 .The African Development Bank (2015) predicts that Zambia is likely to record a growth rate of 6.6 percent in 2016. This prediction is, however, not likely to be accurate because it was made before the 2015 to 2016 electricity shortage the nation faced. In the year 2014, Zambia was the 7$^{th}$ fastest growing economy in sub-Saharan Africa and the 10$^{th}$ in the world (MFNP, 2014).

### 2.3 Cross-country economic comparatives

#### 2.3.1 Gross domestic product

Based on the 2014 World Bank gross domestic product (GDP) estimates, Nigeria was the largest economy in Africa with GDP of US$568.5 billion followed by South Africa with a GDP of US $ 350 billion. Zambia was the 17th largest economy in Africa with GDP of US $27.066 billon-ranking above Uganda, Botswana and many others. Figure 2.3 shows the levels of GDP for some selected African Countries.

**Figure 2. 3: 2014 Gross domestic products, selected African countries**




*(Source: World Bank, 2015)*

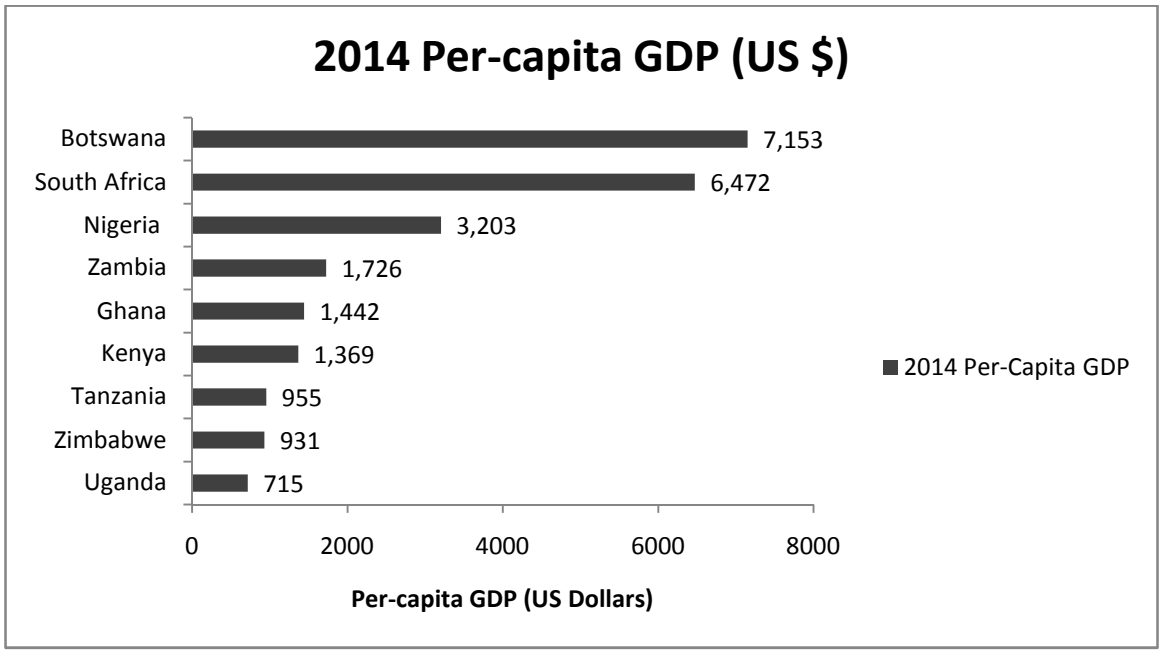
The two top economies in Africa, Nigeria and South Africa, have a considerable lead. Nigeria's economy is over 9 times as large as the Kenyan economy while the South African economy is over 5 times bigger than the Kenyan Economy. However, after these

two large economies, the gaps in GDP tend to be very small. For example, the Kenyan economy is only about twice as big as the Zambian economy even though there are 14 economies in between the two.

### 2.3.2 Per-capita gross domestic product

Due to huge variations in population size; from Nigeria's 173.6 million to Botswana's 2 million, the per capita GDP ranking of the above selected African countries is quite different from the GDP rankings above. According to the World Bank (2016), in 2014 South Africa and Botswana had per-capita GDP of US$ 6,472.1 and US$ 7,153.4 respectively. Figure 2.4 shows per capita GDP for selected African countries.

**Figure 2. 4: 2014 Per capita gross domestic product, selected African countries**




(Source: World Bank, 2016)

Zambia's 2014 per capita Gross Domestic product was estimated to be US $1,726.0. This is greater than the per capita GDP of Ghana, Kenya, Tanzania, Zimbabwe and Uganda. Assuming per capita GDP is a good measure of standards of living; Zambians are more than twice as better off in terms of standards of living as compared to Ugandans. Even though Ghana and Kenya have larger economies, Zambian standards of living are better because of a lower population of 15 million people as compared to 26 million in Ghana and 45 million in Kenya.

## 2.4 Structure of the Economy

### 2.4.1 Sector Contributions

The Zambian economy has undergone considerable structural transformation over the years. Based on the 2014 National Accounts estimates, the leading sector in terms of sector contribution to GDP is wholesale, retail and repairs of motor vehicles. The mining sector, though being the second largest contributor to GDP, experienced a contraction in the year 2014. Table 2.1 presents the contributions of Zambia's major sectors to the economy.

**Table 2. 1: 2014 Sector contributions to GDP**

| ***Sector*** | ***Share of GDP*** | ***Growth Rate*** | ***Share of Employment*** |
|---|---|---|---|
| ***Agriculture, forestry and Fishing*** | ***9.0*** | ***8.0*** | ***48.9*** |
| ***Construction*** | ***9.3*** | ***8.9*** | ***3.1*** |
| ***Education*** | ***7.6*** | ***10.9*** | ***2.7*** |
| ***Manufacturing*** | ***8.1*** | ***2.3*** | ***3.8*** |
| ***Mining and Quarrying*** | ***10.5*** | ***-2.2*** | ***1.4*** |
| ***Wholesale, Retail and Repairs of motor vehicles*** | ***23.3*** | ***3.5*** | ***11.8*** |

*Source: Central Statistical office of Zambia (2015)*

### 2.4.1 The Role of Copper Mining

Since Zambia is estimated to hold 10 percent of the world's copper deposits and happens to be the world's largest cobalt producer, its economy is greatly dependent on mining activities. The mining sector is said to contribute between 9 and 10 percent to GDP and accounts for between 60 and 70 percent of the country's exports. However, studies conducted by the International Monetary Fund (IMF) and World Bank suggest that the nation is not significantly benefiting from its mining sector (Reuters, 2012). The sector only accounted for 1.4 percent of the total employment in 2014.

Mining taxes accounted for less than 16 percent of total Government revenue before 2008. Ever since then, there has been considerable effort by the Zambian government to increase revenue generated from the mining sector. In 2012, the sector contributed over 30 percent of total tax revenue. Thus, the mining share of total revenue collected is currently higher than in other low and middle-income mineral-driven countries (Chamber of Mines of Zambia, 2014).

Copper mining has dominated the Zambian economy since the early 1920s when the first commercial mine was opened in the region called the Copperbelt Province. At the time, the British colonial government used Zambia's copper mineral wealth to develop industrial, social, educational and governmental infrastructure in Zimbabwe. This is because the two nations where merged to form the so called Rhodesia. It is thus accurate to infer that the vast infrastructural development that Zimbabwe received was at the indulgence of Zambian copper. Ever since then, Zambian copper wealth has traditionally

been used for developmental purposes. It is for this reason that international copper prices are said to influence the development prospects of Zambia (Meller, 2011).

### 2.4.2 The Role of Agriculture

Zambia has a total land endowment of approximately 42 million hectors and estimates suggest that only as low as 1.5 million hectors is used for agricultural production every year. Despite this great underutilization, the Agricultural sector has often been said to be the back-born of the Zambian economy. This is because the sector accounts for almost 50 percent of the total employment. "Agricultural output in Zambia increased from 18 percent of the GDP in 2008 to about 20 percent of GDP in 2009. The sector's contribution to GDP in 2014 was 9.0 percent. Primary agriculture accounts for about 10 percent of the total export earnings for the country" (Zambia Development Agency, 2015)

### 2.4.3 The Role of Manufacturing

The nation also has a dynamic and rapidly growing manufacturing sector. The growth of Zambia's manufacturing sector is largely driven by agro processing (food and beverages), textiles and leather subsectors, metal processing and material production (cement, fertilizer, chemicals, explosives, etc). According the Central Statistical office (CSO) (2015), the sector accounted for 8.1 percent of the country's GDP and grew at an annual growth rate of 2.3 percent. The Manufacturing sector accounted for only 3.8 percent of total employment.

It is no surprise that most of the country's locally produced commodities are not exported but rather consumed domestically. This is a common phenomenon among sub-Saharan countries. Thus the share of Zambia's manufacturing sector in total exports averaged 2.1 percent between 2006 and 2010 (Dinh, 2013). Though this has been increasing in the recent past, there is need to promote the exports of locally produced goods in order to diversify the economy and make it more robust to external shocks.

**2.5 Economic prospects**

The Republic of Zambia is one of the few African countries, which has experienced sustained peace for over 50 years after independence. The nation's peaceful political environment is arguably one of its most important characteristics. It has had 6 democratically elected presidents since 1964, two of which were peaceful elections of opposition political parties. Thus it is no wonder that Zambia is said to have one of the most advanced and stable democratic systems in Africa. This political stability has led to some significant economic gains for the nation. Many companies and organizations view Zambia as a stable investment destination. Consequently, Zambia's business environment has improved drastically on every major indicator since 2003 (World Bank, 2009).

This democratic standing of Zambia is well known by the international fraternity. The World Bank Group (2015) declared that "Zambia is a peaceful, democratic country with enormous economic potential, now grounded in its rich endowment of natural resources." In this optimistic statement lays another of Zambia's economic prospects:

natural resource endowment. The nation has more fresh water resources than any other nation is southern Africa. This allows Zambia to generate hydro power for local and regional consumption among other things. In terms of mineral endowments, Zambia has deposits of copper, cobalt, gold, zinc, emeralds and many other minerals - although mining has traditionally concentrated on copper and cobalt.

In order to harness and manage this national endowment, Zambia has been developing a growing human capital stock. The country has a growing labor force of over 6 million people out of the total population of 15 million. Current estimates indicate that Zambia's unemployment rate has been relatively stable at approximately 13.2 percent for the past four years (Trading Economics, 2015). This means the economy has been able to absorb almost all the net increase in the labor force. Once the economy is stimulated further, it is believed that the unemployment rate will fall.

In terms of infrastructure development, "More than 80 percent of Zambia's paved road networks are in good or fair condition, on par with the middle-income neighbors and well ahead of typical performance of resource-rich countries in Africa" (Foster & Dominguez, 2010). Since Zambia is one of the most urbanized countries in sub-Saharan Africa, most infrastructure developments such as the electricity grid and communication networks are concentrated in urban areas along the main lines of rail and roads. This offers great opportunity for economic activities in these urban centers. Furthermore, Zambian cities have adequate safe water supplied through tap-systems by provincial water utility companies.

## 2.5 Economic challenges

One of the major drawbacks of the Zambian economy is over dependence on mineral exports. The manufacturing sector accounts for only 2.1 percent of exports as compared to the mining sector's 70 percent. This situation makes Zambia very vulnerable to external shocks. "Zambia needs to diversify its exports into manufactures and services" (World Bank, 2009). In line with this advice, the nation has been striving to expand its manufacturing sector but the sector's growth has been limited by a rising cost of doing business relative to that in other countries.

Perhaps the most recent demonstration of Zambia's economic vulnerability was in the second half of 2015. According to the International Monetary Fund (IMF) (2015), The Zambian economy was under stress. Low copper prices and a severe electricity shortage were straining economic activities. The Zambian kwacha lost half of its value since the beginning of the year. It was the expert opinion of the IMF team which visited Zambia that the pressure on the economy reflected the impact of external shocks and waning confidence. Thus, if Zambia seeks to stabilize and grow its economy, diversification is imperative.

The IMF Team which assessed the 2015 Zambian economic challenges was also quick to point out that the economic hardships were partly due to poor fiscal management on the part of the government. Zambia has had sustained and increasing budget deficits for the past 8 years. In 2012, the nation recorded a deficit of 2.8 percent of GDP. This escalated to 6.7 percent in 2013 and 5.5 percent of GDP in 2014 (Trading Economics,

2015). “Zambia needs to lower its fiscal deficit and improve fiscal discipline if it is to restore market confidence” (IMF, 2015).

Rather than cut government spending in order to reduce its deficit, the government of Zambia has turned to the international bonds market for debt. In 2012, Zambia issued a US$750 million Eurobond and then issues two more Eurobonds; US$1 billion in 2014 and US $1.25 billion in 2015. Though the government claims that the funds were for infrastructure related projects in the area of road, energy, education, health, water and transport sectors in order to improve the lives of the people, it is publicly known that the country was securing the funds to plug a budget deficit that could swell to US2.64 billion in 2015-a deficit generated by gross misallocation of funds. The Nation’s debt to GDP ratio stood at 31 percent in 2014 (Trading Economics: 2015)

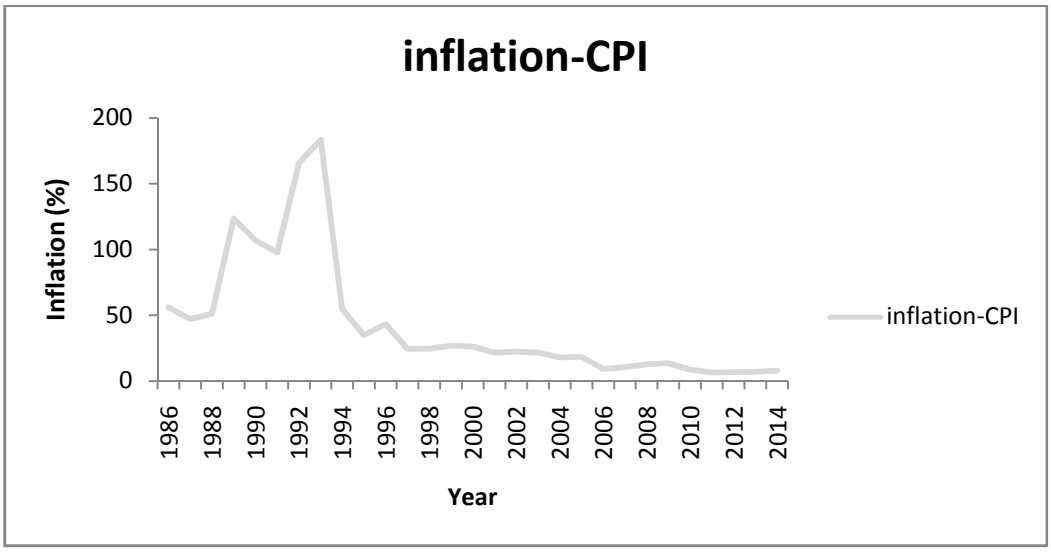
It is no wonder therefore that despite the political stability and resource endowment, the majority of Zambians are still living in poverty. According to the World Bank (2015), “60 percent of the Zambian population is below the poverty line and 42 percent are considered to be in extreme poverty. Moreover, the absolute number of the poor has increased from about 6 million in 1991 to 7.9 million in 2010, primarily due to population growth.” poverty rates are higher in rural areas as compared to urban areas such as Lusaka. The poverty levels in the capital, Lusaka, are estimated to be as low as 22 percent of the population compared to the rural 70 percent poverty rate. To eradicate poverty, there is need to develop pro-poor development goals and implement them in a cost effective manner.

## 2.6 Macroeconomic status

The Zambian central Bank is called the Bank of Zambia (BoZ) and is mandated by law to oversee the macroeconomic status of the nation. "The BoZ's mandate to take leading role in oversight and regulation of the payment system is derived from its governing legislation, in which the BoZ is given the responsibility to promote a stable and efficient payments mechanism as well as the liquidity, solvency and proper functioning of the financial system" (Johnson, 1998).

In line with this mandate, BoZ has been prioritizing inflation rate stability through money supply adjustment. Even though the central bank seeks to maintain exchange rate stability, it does so only in order to main low inflation rates. Figure 2.5 shows Zambia's inflation rate as measured by the Consumer Price Index (CPI).

**Figure 2. 5: Zambia's inflation rate, 1986-2014**




*(Source: World Bank, 2015)*

It is apparent that Zambia's inflation rate stabilized in the past decade and fell to single digit level. This reflects the central bank action in taking proactive measures to stabilize the economy. For instance; in the early part of 2015, the inflation rate projection was tending towards the 2015 target of 7% and hence the policy rate was maintained at 12.5%. However, towards the end of the first quarter, exchange rate volatility increased threatening to undermine the inflation objective and thus BoZ took action to stabilize the economy (BoZ, 2015).

Although the inflation rate is the first central bank priority, private sector expectations seem to be based on exchange rate stability. Zambia has an import dependent economy and thus exchange rate stability is key to maintaining domestic prices. Consequently, since these two goals are usually complementary, the BoZ has historically taken action to defend the exchange rate within a defined range. For the Kwacha-to-US Dollar exchange rate, the BoZ has traditionally sort to maintain a single digit rate of less than 10 Kwacha to 1 US dollar. Unfortunately, the Kwacha lost over half of its values in 2015 and the rate changed from 6.4 Kwacha to over 12 Kwacha to a dollar before the central bank took action to prevent further deprecation in the currency.

**2.7 Conclusion**

Zambia has generated positive sustained economic growth for the past decade. The nation has recorded average growth rate of 6 percent in the recent years and this level of growth in expected to continue. In cross-country comparisons, it was clear that although Zambia's GDP is considerably lower than the largest economies in Africa, standards of

living in Zambia are better than in most African Countries. However, it has been discovered that the economy is prone to external shocks due to its overdependence on the mining sector. Consequently, the nation has been advised to diversify its economy towards manufacturing and services sectors. Overall, Zambia is a nation of great economic potential anchored on its huge resource endowment and political stability. Though most of Zambian population is still grappling with poverty, the nation has been making considerable effort in bettering the lives of its people.

# CHAPTER THREE

# LITERATURE REVIEW

## 3.1 Introduction

Economic growth has always received overwhelming interest. Many scholars and researchers have investigated the determinants of economic growth in many countries and various theories of economic growth have been developed. This chapter contains two sections; section 3.2 presents some key theories of economic growth and section 3.3 proceeds to analyze the most relevant empirical research that has been conducted on economic growth. The former provides an important theoretical basis for analysis while the latter gives practical insight into how the subject matter can be investigated. Thereafter, a conclusion will be made.

## 3.2 Theoretical literature

### 3.2.1 The Solow-swan model

According to the Solow model, "the accumulation of physical capital cannot account for either the vast growth over time in output per person or the vast geographical differences in output per person" Romer (1996). This simply means that, capital and labor are not determinants of economic growth. The Solow model demonstrates convincingly that growth is not derived from capital or labor but from technological advances. However, the model fails to explain what generates technological progress. In other words, it identifies what can potentially cause growth, but since it treats technology as random or

exogenous, it essentially fails to model the very cause of the economic growth which it identifies. This is essentially why the model is only a starting point to analyzing determinants of economic growth. If one seeks to investigate what initiates and sustains long term growth-there is need to go beyond this model.

### 3.2.2 The Ramsey-cass-koopmans model

David Cass and Tjalling Koopmans formulated the final version of Frank Ramsey's model of society optimal saving by fusing it with the Solow model. The resultant model became known as The Romey-Cass-Koopmans model or simply the Ramsey model. (Groth, 2011)

This Model adopts a production function of the form

(1) $Y = AK^{\alpha}L^{1-\alpha}$,

where $Y$ is output, $A$ is technology, $K$ is capital, $L$ is Labor and $\alpha$ is a constant positive fraction. This production function can be written in intensive form as

(2) $y = A\mathrm{k}^{\alpha}$,

where $y = \frac{Y}{L}$ and $\mathrm{k} = \frac{\mathrm{K}}{\mathrm{L}}$ , taking natural logarithm gives us

(3) $\ln y = \ln A + \alpha ln\ k$ .

Differentiating each term with respect to the variables yields

(4) $\frac{\dot{y}}{y} = \frac{\dot{A}}{A} + \alpha \frac{\dot{k}}{k}$ .

This means that the growth in output is driven by exogenous technical change and capital accumulation. Though this model is similar to the Solow model in failing to model technological change, it attributes growth not only to technical change but also to capital accumulation. This model, therefore, does not downplay the importance of capital like the Solow model but elevates it to the same level as that of technological advancement.

### 3.2.3 The Diamond model

In both the Solow and the Ramsey model, savings are treated to be exogenous and are thus never modeled and according to these models; a change in the savings rate only results in a temporary change in output. The actual factors which influence savings were not indicated. It is the so-called Diamond overlapping generations model (OLG) which models savings as a function of the real interest rate.

According to the Diamond model, the savings rate is given by

(5) $$S(r) = \frac{(1+r)^{\frac{1-\theta}{\theta}}}{(1+\rho)^{\frac{1}{\theta}}+(1+r)^{\frac{1-\theta}{\theta}}},$$

where $r$ is the real interest rate, $\theta$ is a positive fraction and $\rho$ is the subjective inter-temporal discount factor.

This savings equation means that the savings rate is a function of the real interest rate ($r$) and by extension money supply. Since an increase in national savings is said to positively influence economic growth, economic growth can be influenced by altering the real interest rate and the money supply. Therefore, the central bank can use monetary policy to accelerate economic growth.

### 3.2.4 Endogenous growth theories

Unlike the above exogenous growth theories, endogenous growth theories attempt to model technological change and thereby identify potential factors which can influence economic growth through technology. According to the Arrow and Romer's endogenous growth and learning theory, the rate of growth of technology depends on the rate of growth of capital.

The mathematical formulation is

(6) $A = BK^{1-\alpha}$.

where $A$ is technology, $B$ is a constant learning factor, $K$ is capital and $\alpha$ is a constant positive fraction less than 1.

Taking the natural logarithm of the equation and then differentiating each term yields

(7) $\frac{\dot{A}}{A} = (1 - \alpha)\frac{\dot{K}}{K}$.

This means capital accumulation embodies technological progress and thus leads to economic growth. When a country accumulates more capital, there will be technological advancement and consequently economic growth. This finding is contrary to the Solow model which proposed that capital stock does not influence economic growth.

Robert Lucas' endogenous growth and human capital goes further by demonstrating that economic growth is a function of physical and human capital. Thus it is not only the physical capital accumulation, which is needed for growth, but also human capital accumulation. Under the endogenous growth and human capital model, technology was assumed to be synonymous with human capital. Thus the model concludes that just as technology is dependent on physical capital accumulation; it is also dependent on human capital accumulation because the two are equivalent.

Robert Barro's Model of endogenous growth presents yet another explanation to growth. According to this model, government spending and taxes can affect the marginal

productivity of capital and consequently influence output and growth. Increase in government spending has a positive impact on output while increase in taxes always negatively impact output and growth. Thus there is a need to balance these two effects in order to enhance economic growth.

### 3.3 Empirical literature

Economic growth is a well researched component of modern macroeconomics. Thus before making a new inquiry into this subject matter, it is imperative to make a comprehensive review of some of the most relevant empirical investigations, which have thus far been conducted. This review is aimed at providing first-hand information on some of the most important aspects and challenges that have been encountered in modeling economic growth.

#### 3.3.1 Cross-country studies

The broadest and most vigorous studies on the determinants of economic growth are those which simultaneously study economic growth in many countries. They seek to investigate the common factors which determine economic growth by studying panel data from many countries. Barro (1996) and Arratibel, et al., (2007) are typical examples of such rich enquiries that contain the most reliable and internationally accepted evidence on growth determination. This first section of empirical literature considers such studies in order to highlight the common macroeconomic factors which are believed to influence economic growth across countries.

Barro (1996) conducts a cross-country empirical study on the determinants of economic growth. He concludes that "for a given starting level of real per capita GDP, the growth rate is enhanced by higher initial schooling and life expectancy, lower fertility, lower government consumption, better maintenance of the rule of law, lower inflation, and improvements in terms of trade." This research offers insight into the potential determinants of growth: it seems prudent to test whether these factors influence Zambia's economic growth. Barro (1996) uses panel data on 100 countries for the period 1960 to 1990. He employs an Instrumental-Variable Technique for model estimation in order to deal with autocorrelations within the two growth-rate equations in which growth in per capita GDP was the dependent variable. Despite this rather sophisticated estimation technique, the cross-country panel data presents problems related to measurement and estimation which potentially influence the aforementioned findings.

Arratibel, et al., (2007) investigate the determinants of growth in the eight central and eastern European Union (EU8) member states: Czech Republic, Estonia, Latvia, Lithuania, Hungary, Poland, Slovenia and Slovakia. The research reveals that the prospects of convergence to European Union average per capita GDP is good and that growth in technology makes a significant contribution to GDP growth in all countries studied with the exception of Latvia. Others factors positively influencing growth in these EU8 countries include; employment rate, efficient labor allocation, labor productivity, capital accumulation, foreign direct investment, sound macroeconomic

policies and appropriate fiscal policies. Arratibel, et al., (2007) employ a Cobb-Douglas production function as a basis for analysis and extrapolation of relationships. However, due to data limitations the research is only qualitative and descriptive; no quantitative econometric model is estimated.

A number of cross-country economic growth investigations have been conducted in the African context. Ndambiri, et al., (2012) investigate the determinants of economic growth in sub-Saharan Africa using a panel data approach. The data used is on 19 sub-Saharan countries for the year 1982 to 2000 and the study employs the Generalized Method of Moments (GMM) method to overcome an endogeneity problem in the lagged dependent variable. The study results indicate that physical capital formation, a vibrant export sector and human capital formation significantly influence economic growth. However, government spending, nominal discount rate and foreign aid have been found to significantly influence negative economic growth. Herein is the first clue as to what may be behind Zambia's spiral of negative economic growth rate. Since the researchers find a negative relationship between foreign aid and economic growth, implying that foreign aid is not only unprofitable but leads to negative growth, they advocate the refusal of foreign aid.

Mbulawa (2015) analyzes the determinants of economic growth in Southern African Development Community (SADC) and concludes that good quality institutions have an indirect impact on growth through gross capital formation, savings ratio and financial

openness. The generic determinants of growth have been found to be necessary but yet not sufficient in explaining economic growth. Mbulawa (2015) uses panel data on the 15 SADC member states for the period 1996 to 2010 to estimate a dynamic linear regression model using Arellano and Bond (1991) Generalized Method of Moments estimator. The major limitation of this research is the fact that the number of observations in the panel seems to be insufficient and may have adversely affected the results.

Some growth experts postulate that there is a negative relationship between economic growth and natural resource endowment. This phenomenon has been termed 'resource curse' and is mainly attributed to the supposed negative effect of resource dependence on economic growth. Shwilima (2015) conducts an empirical study on the link between economic growth and nonrenewable resources. A panel of 145 countries, Zambia inclusive, is used to estimate the growth model using Ordinary Least squares (OLS). It has been found that economic growth is positively influenced by government effectiveness, nonrenewable resources exports, life expectancy and investment. For the period under study (1995-2010), there is no evidence of resource curse. Therefore, this research suggests that Zambia may not be suffering from a resource curse and as such its past economic swings my not necessarily be as a results of fluctuating copper prices.

### 3.3.2 Country studies

It is an irrefutable fact that cross-country empirical studies are highly reliable in determining common factors which influence economic growth. However, since the goal of economic growth is largely pursued at national level; it is imperative to investigate the nation-specific determinants of growth. A considerable amount of empirical work has been devoted to unveiling the macroeconomic factors which influence economic growth in many countries. This subsection presents some of these investigations and their findings.

Iqbal and Zahid (1998) examine the macroeconomic determinants of growth in Pakistan using time series data from 1949 to 1996. They conclude that Pakistan's economic growth is positively related to primary education, openness of the economy, foreign trade and physical capital. Foreign debt and budget deficits have been found to have an adverse impact on economic growth. In trying to establish links between growth and some key macroeconomic variables, the dual develop two behavioral growth models which they estimate using Ordinary Least Squares. One model has growth in real GDP while the other model has growth in real per capita income as the dependent variable. The two models have model forms which reveal a great deal of theoretical and empirical understanding as some of the independent variables enter the model as percentages of GDP.

Dritaskis, et al., (2006) undertake an empirical investigation using Granger Causality analysis for Greece to assertion not only the main determinants of economic growth but

also the directional relationship between GDP and some key macroeconomic variables. The research finds one significant Cointegrating vector which indicates that the logarithm of GDP is positively influenced by exports, foreign direct investment and gross fixed capital formation. Based on the causality test, it is established that gross fixed capital formation only influences GDP through exports. Dritaskis, et al., (2006) use annual time series data from 1960 to 2002 to estimate a Vector Autoregressive (VAR) Model which has an error correction mechanism. One unique characteristic of this model is the form in which the independent variables are admitted into it: all of them have been adjusted using the GDP deflator. This adjustment is similar to that which is performed by Iqbal and Zahid (1998).

Macroeconomic stability is believed to be one of the major determinants of economic growth. Since Inflation is a key indicator of economic stability, many scholars have sought to find the relationship between inflation and economic growth. Phiri (2013) employs a threshold autoregressive (TAR) econometric approach to study the relationship between economic growth and inflation in Zambia. It has been found that a rise in inflation is associated with improved economic growth as long as inflation is kept below 22.5 percent and if it exceeds this level, inflation is likely to have a negative impact on economic growth. This may explain the reason why Zambia had negative growth rates in the 1970s when the country had very high inflation rates. Phiri (2013) uses Conditional Least squares (CLS) to estimate the model and also concludes that economic growth is positively influenced by foreign direct investment.

Biswas and Saha (2014) use time series analysis to research on the determinants of economic growth in India. Annual time series data for the period 1980 to 2011 have been collected from the Reserve Bank of India. After testing for stationarity and making appropriate transformations of the variables so as to avoid spurious regression, the normalized gross domestic co-integration equation is estimated. It has been found that in the short-run, India's gross domestic product is positively influenced by gross domestic capital formation. Other macroeconomic factors which enhance growth include employment, exports, money supply and foreign direct investment while those which negatively influence growth are inflation and fiscal deficits. Based on their findings, the researchers conclude that India experienced stable economic growth during the period under study because of prudent and purposive management of macroeconomic determinants of growth.

Ismaila and Imoughele (2015) investigate the macroeconomic determinants of economic growth in Nigeria using a co-integration Approach. The study reveals that Nigeria's economic growth is positively influenced by gross fixed capital formation, total government expenditure and foreign direct investment. Inflation has been found to be negatively related to economic growth and hence macroeconomic stability; enhanced through sound monetary and fiscal policies is highly recommended. This research uses a rather simplistic but yet highly efficient methodology. Firstly, all the variables are tested for stationarity and then a test for co-integration between real gross domestic product and each potential determinant of growth is done. Thereafter, a dynamic model is run

using ordinary Least squares. The major shortcoming of this research is that it included a limited number of independent variable in the model.

### 3.4 Conclusion

It is evident that economic growth theory is one of multiple contradictions. The only consensus in growth theory is that technological progress is a major determinant of economic growth. Both exogenous and endogenous growth theories postulate that technology influences economic growth. The only difference is that while the exogenous theories fail to model how technology influences growth the endogenous theories identify factors such as human capital, physical capital accumulation, interest rate, government spending and taxes as determinants of growth through technology change.

In contrast, the review of empirical literature on economic growth reveals a rather different situation. Unlike the contradicting growth theories, empirical research seems to be in agreement for the most part. In line with theoretical postulations, technological progress, capital accumulation, human capital, and government spending are among the most widely accepted empirical determinants of economic growth. Even through growth theories do not fully explain how factors such as exports, inflation, fiscal deficit and foreign direct investment affect economic growth, empirical evidence has a general consensus that these factors are also significant determinants of growth both within country and across country. In addition to applying some techniques from the aforementioned inquiries into economic growth, this research identifies the potential

determinants of growth in the Zambian case and also deciphers the short-run and long-run influences of these macroeconomic variables on economic growth. The later is meant to clearly establish whether international copper prices and other notable macroeconomic variable influence growth in the short or long-run.

# CHAPTER FOUR

# METHODOLOGY

## 4.1 Introduction

This chapter presents the methodology that has been used to investigate the macroeconomic determinants of economic growth in Zambia. For simplicity and clarity, the chapter has been subdivided into four sections: Section 4.2 presents the theoretical framework and highlights the main theoretical underpinnings for analysis while section 4.3 states the data sources and operational definitions of the variables. The estimation technique and models are presented in section 4.4 and followed by the research hypotheses in section 4.5.

## 4.2 Theoretical framework

Economic growth and GDP are influenced by many factors in an economy. According to the extended neoclassical growth model, the growth rate in per capita output $D_y$ is influenced by the current level of per capita output **y** and the long-run steady state level of output y* (Barro, 1996). The model is given by

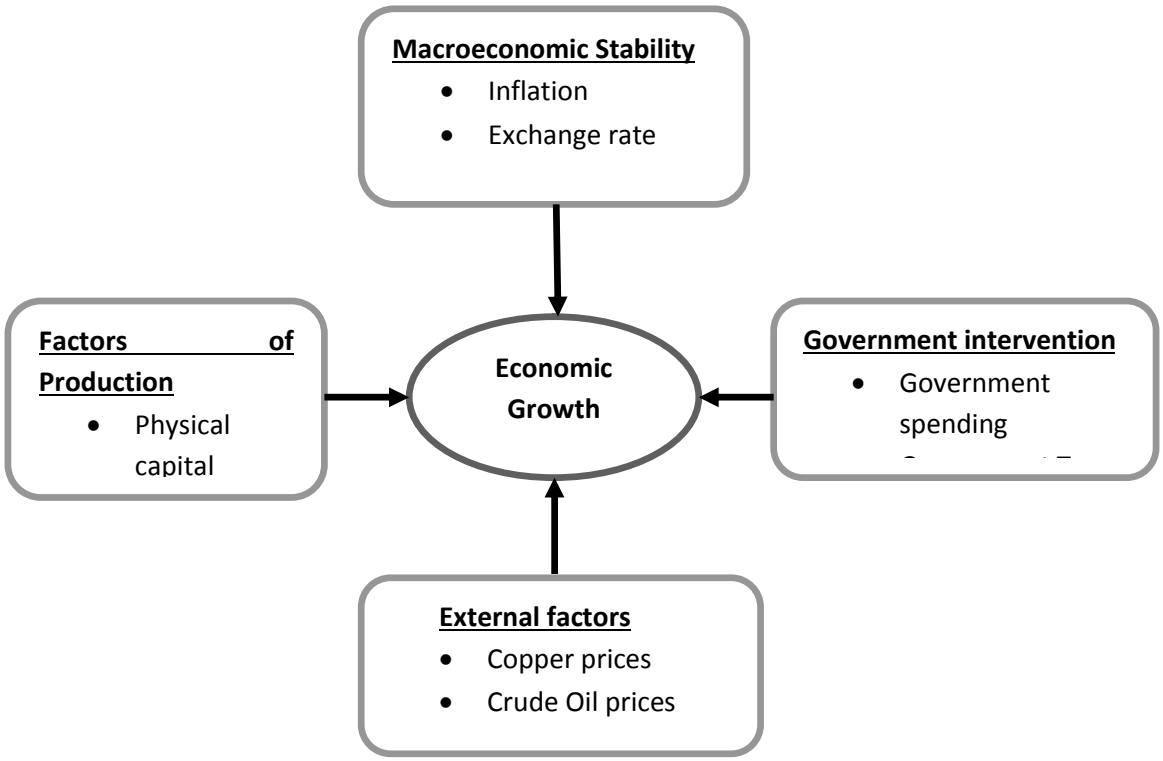
$$Dy = f(y, y^*), \tag{8}$$

$D_y$ is negatively related to $y$ for a given $y^*$ but positively related to $y^*$ for a given level of $y$. This is because any increase in output (**y**) when the steady state level of output ($y^*$) is constant would reduce the gap between the two and hence reduce the growth rate but an increase in $y^*$ at constant **y** would increase the gap and hence lead to higher growth rate.

The model is thus based on the notion that economies grow slower as the per capita output approaches its long run steady state. The key to generating higher growth is to influence this growth gap using variables which determine *y* and *y**. According to Barro (1996), y* depends on an array of choice and environmental variables while y depends on factors of production which directly determine output.

Choice variables include government spending and taxes, environmental variables include inflation and exchange rate while factors of production include employment and physical capital stock. These variables are therefore potential determinants of Zambia's economic growth. In addition to the aforementioned, copper prices and crude oil prices have been included as external environmental factors and agricultural sector contribution to GDP as a control variable.

**Figure 4. 1: Potential determinants of economic growth in Zambia**



### 4.1 Data

This research employs time series data for the period 1961 to 2015 obtained from the World Bank country Database and the Penn World tables. The variable definitions and sources of the data on each variable are given in Table 4.1

**Table 4. 1: Definitions and sources of variables**

| | *Variable and symbol* | *Definition* | *Source of data on variable* |
|---|---|---|---|
| *1.* | ***GDP Growth (yg)*** | Growth in Gross Domestic product measured in percentages. | World Bank |
| *2.* | ***Inflation Rate (inf)*** | Percentage change in general price level measured by GDP deflator | World Bank |
| *3.* | ***Employment (epp)*** | Percentage change in Number of people actively Engaged in labor | Penn World Tables |
| *4.* | ***Exchange rate (echp)*** | Percentage change in Kwacha equivalent to 1 US Dollar | World Bank |
| *5.* | ***Government Taxes (txp)*** | Percentage change US Dollar taxes on products. | World Bank |
| *6.* | ***Government Spending (gp)*** | Percentage change in US dollar General government final consumption expenditure. | World Bank |
| *7.* | ***Agricultural sector Growth rate (ag)*** | The annual percentage growth of Agricultural sector value added | World Bank |
| *8.* | ***Physical capital (pcp)*** | The percentage change in value of capital stock (US Dollars) | Penn World Tables |
| *9.* | ***Copper Price (cop)*** | The US dollar price of copper per metric tonnes | World Bank |
| *10.* | ***Crude Oil Price (op)*** | The US dollar price of crude oil per barrel | World Bank |

### 4.4 Estimation techniques and models

This time series research on the macroeconomic determinants of economic growth in Zambia employs the Bounds test approach to Cointegration developed by Persaran and Shin (1999) and later improved upon by Persaran, et al., (2001).

#### 4.4.1 Unit-root tests

The starting point to meticulously following the Bounds procedure is the testing for unit root. This is because the bounds approach is not applicable if any of the variables happens to be integrated of order 2. Therefore Augmented Dickey Fuller and a Zivot-Andrews Unit Root Tests have been conducted on each variable in order to test for both unit root and structural break.

The null hypotheses for both tests are rejected if the generated t-statistics are greater than the critical values. It seems prudent to conduct the ADF test without taking into account either the trend because doing so would reduce the strictness of the test and thus increase the chance of deeming I(2) Variables to be either I(1) or I(0). Furthermore, the tests are conducted with automatic lag selection using the Schwarz Information criteria (SIC) with maximum lag of 10.

#### 4.4.2 The Autoregressive distributive lags model (ARDL)

Once it is verified that none of the variables are I(2), The following ARDL Model of economic growth is estimated:

(9)

$$YG_t = \beta_{00} + \sum_{i=1}^{k} \emptyset_{0i} YG_{t-1} + \sum_{i=0}^{k} \beta_{1i} PCP_{t-i} + \sum_{i=0}^{k} \beta_{2i} EPP_{t-i} + \sum_{i=0}^{k} \beta_{3i} ECHP_{t-i} + \sum_{i=0}^{k} \beta_{4i} INF_{t-i} + \sum_{i=0}^{k} \beta_{5i} GP_{t-i} + \sum_{i=0}^{k} \beta_{6i} \Delta TXP_{t-i} + \sum_{i=0}^{k} \beta_{7i} COP_{t-i} + \sum_{i=0}^{k} \beta_{8i} OP_{t-i} + \sum_{i=0}^{k} \beta_{9i} AG_{t-i} + e_t$$

where

k is the maximum lag of a regressor in the model

The variables and symbols in the model are as defined in the section above. $\boldsymbol{\beta_0}$ is the intercept while $\boldsymbol{e_t}$ is a white noise error term

This model is estimated using EViews and the maximum lag of each regressor (*k*) is detained by minimizing the Akaike information Criteria.

### 4.4.3 Bounds test

According to Persaran and Shin (1999), the estimated ARDL model can then be used to test for Cointegration or the existence of a long-run relationship among the variables in the model.

*Null Hypothesis: No Long-run relationship exits*

The null hypothesis is rejected if the generated Wald-test (F-statistic) is greater than the upper bounds critical values given by Persaran, et al. (2001). If the F-Statistic is less than the lower bound critical values, the null is not rejected and if it is in between the

lower and upper bound critical values, the test becomes inconclusive. This approach has the following advantages over other approaches to Cointegration:

(a) Unlike multiple equation approaches like the Johansen approach, the Bounds test approach is a single equation approach and can thus be applied when there is limited degree of freedom.

(b) Bounds procedure is applicable even when time-series variables have ambiguous order of integration. This means the approach can be used when the variables are all I(0), all I(1) or a combination of both. Other approaches require the variables to be integrated of the same order.

(c) This approach to Cointegration is simple because it performs a simultaneous estimation of both the short-run and long-run coefficients.

### 4.4.4 Long-run and short-run coefficients

If the Bounds Test finds that there is a long-run relationship, the ARDL model is then used to estimate both the long-run and short-run coefficients. For the ARDL economic growth model above, the Cointegrating equation (containing long-run coefficients) and the error correction model (containing short-run coefficients) would take the following forms:

(10)

$$EC_t = YG_t - (\beta_0 + \beta_1 PCP_t + \beta_2 EPP_t + \beta_3 ECHP_t + \beta_4 INF_t + \beta_5 GP_t + \beta_6 TXP_t + \beta_7 COP_t + \beta_8 OP_t + \beta_9 AG_t),$$

where EC is the residual from the Cointegrating equation and the *β's* are long-run coefficients.

(11)

$$\Delta YG_t = \beta_{01} + \sum_{i=0}^{k} \emptyset_{1i}\Delta YG_{t-1} + \sum_{i=0}^{k} \beta_{1i}\,\Delta PCP_{t-i} + \sum_{i=0}^{k} \beta_{2i}\Delta EPP_{t-i} + \sum_{i=0}^{k} \beta_{3i}\,\Delta ECHP_{t-i} + \sum_{i=0}^{k} \beta_{4i}\Delta INF_{t-i} + \sum_{i=0}^{k} \beta_{5i}\Delta GP_{t-i} + \sum_{i=0}^{k} \beta_{6i}\,\Delta TXP_{t-i} + \sum_{i=0}^{k} \beta_{7i}\,\Delta COP_{t-i} + \sum_{i=0}^{k} \beta_{8i}\,\Delta OP_{t-i} + \sum_{i=0}^{k} \beta_{9i}\Delta AG_{t-i} + \delta EC_{t-1} + U_t,$$

where

Δ denotes the first difference operator.

$\boldsymbol{\beta_0}$ is the drift component, $\boldsymbol{U_t}$ is the white noise error term and $\boldsymbol{EC_{t-1}}$ is the lagged residual obtained from the Cointegrating equation.

**4.5 Research hypotheses**

**H1:** ***Physical capital positively influences economic growth.***

The growth in stock of physical capital is said to positively influence both output and economic growth. Since capital is an input in production, when a nation has an increase in physical capital growth its productive captivity would also increase. This would make it produce more output and accelerate economic growth. The positive impact of capital on growth is a major proposition in economic growth theories like the Ramsey Model. Research on economic growth conducted by Ndambiri, et al., (2012), Ismaila and

Imoughele (2015) and Mbulawa (2015) all found that Physical capital positively influences economic growth.

**H2:** ***Employment positively influences economic growth***

Arratibel at el. (2007) found that the level of employment positively influences a nation's economic growth. The employment level is a good measure of the general level of labor in the national production function. Thus since the marginal product of labor is positive, an increase in the employment rate translates into higher output and growth. It is thus postulated here that Zambia's employment rate will positively influence its economic growth.

**H3:** ***Exchange rate positively influences economic growth***

Rodrik and Kennedy (2007) conducted a comprehensive study on the influence of the exchange rate on economic growth. The paper concludes that undervaluation stimulates economic growth due to some institutional and market based factors in developing countries particularly. This implies that when a nation's currency depreciates in value, its tradable goods become cheaper and hence leading to higher exports, output and growth. There is a positive relationship between the level of devaluation and growth- when the currency equivalence to other currencies increases, economic growth would also increase.

**H4:** ***The inflation rate negatively influences Zambia's economic growth.***

Ismaila and Imoughele (2015) and Biswas and Saha (2014) conclude that the inflation rate negatively impacts economic growth. However, it is certainly not that straightforward because the inflation rate is one of the most complex macroeconomic variables. Economic theory suggests that a moderate amount of inflation is good for the economy while hyperinflation is detrimental to economic activity and growth. For this reason, new research on the impact of inflation on growth employ threshold regression so has to estimate which level of inflation is counterproductive to economic growth. Phiri (2013) concludes that inflation only negatively influences growth when it goes above 22.5 percent. Since Zambia's inflation has historically been high, it seems logical to expect a negative impact of inflation on economic growth.

**H5:** ***Copper prices positively affect Zambia's economic growth.***

There is limited research and theoretical work on the impact of commodity prices on economic growth. Shwilima (2015) investigated the impact of exporting non-renewable resources on economic growth and found that increased exploitation of a county's non-renewable resources is associated with higher economic growth. In the case of Zambia, copper prices have traditionally determined the amount and level of copper mining activities in the country. This is because when copper prices become relatively higher, mining companies increase production in order to make higher profits. Therefore, there exists a positive relationship between copper prices on the international market and the level of exports and eventually the level of economic growth in Zambia.

**H6:** ***Crude oil prices negatively affect Zambia's economic growth.***

Crude oil importing nations take an increase in the price of crude oil per barrel as a negative external shock. This is because it translates into higher local prices of fuel and consequently leads to increased transportation costs. The higher cost of transportation adds to the production costs of all firms and hence results in lower output and economic growth. Jain and Patil (2015) found that crude oil prices negatively impact India's economic growth. It has thus been assumed that this phenomenon also applies to Zambia due the fact that it is also an oil importing nation.

**H7:** ***Government spending positively impacts economic growth in Zambia.***

Robert Barro's Endogenous Growth theory postulates that government spending positively impacts economic growth (Groth: 2011). The basic economic premise is that increased government spending increases aggregate demand and this leads to higher GDP and economic growth. This supposed link is precisely what economists seek to employ when conducting fiscal policy measures through government spending. Ismaila and Imoughele (2015) conclude that this postulation is empirically valid because there is a positive relationship between government spending and economic growth.

**H8:** ***Government taxes negatively impact economic growth in Zambia***

An increase in any form of government taxes is said to negatively impact economic growth because it reduced disposable income and consequently consumption and aggregate demand also reduce (Johansson, et al., : 2008). Barro's Endogenous growth theory advocated for a balanced mix between government spending and taxation because the two have opposite impacts on economic growth. Since government spending is derived from taxes, very low taxes would reduce revenue and not fully take advantage of the gains from high government spending while too high taxes would lead to recession. According to this theory, there is need to find the optimal tax level which minimizes the negative impact of taxes and maximizes economic growth (Groth: 2011).

**H9:** ***The agricultural sector productivity positively influences Zambia's economic growth***

The republic of Zambia, just like many developing countries in Sub-Saharan Africa, is heavily dependent on agricultural productivity. The sector contributes about 20 percent to Gross Domestic product and is thus the largest productive sector. According to Oyakhilomen and Zibah (2014), the agricultural sector productivity positively influences economic growth. When the sector is growth, it contributes more to GDP and thus has the potential to accelerate economic growth.

**Table 4. 2: Summary of Research Hypotheses**

| **Research hypothesis** | **Theory/ Empirical research** |
|---|---|
| H1: *Physical capital positively influences economic growth.* | *The Ramsey Model,* Groth (2011), Ndambiri at el. (2012) Ismaila and Imoughele (2015) Mbulawa (2015) |
| H2: *Employment positively influences economic growth* | Arratibel, et al., (2007) |
| H3: *Exchange rate positively influences economic growth* | Rodrik and Kennedy (2007) |
| H4: *The inflation rate negatively influences Zambia's economic growth.* | Ismaila and Imoughele (2015) Biswas and Saha (2014) |
| H5: *Copper prices positively affect Zambia's economic growth.* | Shwilima (2015) |
| H6: *Crude oil prices negatively affect Zambia's economic growth.* | Jain and Patil (2015) |
| H7: *Government spending positively impacts economic growth in Zambia.* | *Barro's Endogenous Growth Model***,** Groth (2011) Ismaila and Imoughele (2015) |
| H8: *Government taxes negatively impact economic growth in Zambia* | *Barro's Endogenous Growth Model***,** Groth (2011) Johansson, et al., (2008) |
| H9: *The agricultural sector positively influences Zambia's economic growth* | Oyakhilomen and Zibah (2014) |

## 4.6 Conclusion

It is apparent from the above that this research follows a time series econometric methodology. In attempting to concretize the basic understanding of how economic growth is generated, the extended neoclassical growth model is used to provide the theoretical basis for analysis and helps to identify the potential determinants of economic growth. Thereafter, the Bounds Approach to Cointegration is employed by first estimating an ARDL model and then testing for Cointegration. Based on the finding of the bounds test, the long-run and short-run coefficients of the economic growth model are estimated.

# CHAPTER FIVE:

# ANALYSIS AND DISCUSSION OF RESULTS

## 5.1 Introduction

This chapter presents the major findings of this research and corresponding discussions. The descriptive section highlights some of the salient points concerning the statistical properties of the variables of interest and is followed by the analysis and results section. Once section 5.3 is completed a comprehensive discussion of the findings is undertake in section 5.4 before making a conclusion.

## 5.2 Descriptive statistics

The major variables of interest in this research are economic growth (*YG*) physical capital (*PCP*) employment (*EPP*), exchange rate (*ECHP*), inflation (*INF*), government taxes (*TX*), government spending (*GP*), Agricultural productivity growth (AG) and two external factors; namely copper prices (*COP*) and Crude oil prices (*OP*). Tables 5.1 and Table 5.2 present some key summary statistics on these variables.

**Table 5. 1: Summary statistics (A)**

| Variable | **YG** | **PCP** | **EPP** | **ECHP** | **INF** |
|---|---|---|---|---|---|
| Mean | 1.897244 | 0.642411 | 3.017840 | 29.91685 | 34.60460 |
| Median | 0.553764 | -0.706942 | 3.105675 | 1.385140 | 18.33123 |
| Maximum | 16.64746 | 5.508877 | 3.566461 | 166.4210 | 165.5340 |
| Minimum | -5.570310 | -2.116499 | 2.349083 | -99.90000 | -14.16990 |
| Std. Dev. | 4.824879 | 2.565071 | 0.350315 | 60.19850 | 45.28528 |
| Skewness | 1.005032 | 0.550351 | -0.033071 | 0.881372 | 1.500191 |
| Kurtosis | 4.130924 | 1.687971 | 1.775400 | 3.585257 | 4.418337 |
| Jarque-Bera | 0.002053 | 4.772776 | 3.465185 | 41.06812 | 9402925 |

| | | | | | |
|---|---|---|---|---|---|
| Jarque-B Prob* | 0.998974 | 0.091961 | 0.176825 | 0.00000 | 0.00000 |
| Observations | 54 | 50 | 50 | 53 | 54 |

**Table 5. 2: Summary statistics (B)**

| Variable | **TXP** | **GP** | **AG** | **COP** | **OP** |
|---|---|---|---|---|---|
| Mean | 2.279691 | 1.503780 | 2.181654 | 1688.048 | 15.07849 |
| Median | 5.186486 | 7.444475 | 0.818660 | 1480.442 | 14.35000 |
| Maximum | 44.80900 | 41.76760 | 68.11174 | 2848.410 | 36.86875 |
| Minimum | -66.27205 | -124.8934 | -33.07108 | 1057.675 | 1.210000 |
| Std. Dev. | 22.97717 | 29.76835 | 13.21126 | 495.5830 | 11.66749 |
| Skewness | -0.897100 | -2.827395 | 2.378311 | 0.841584 | 0.316245 |
| Kurtosis | 4.259886 | 12.80056 | 15.11497 | 2.677373 | 1.923616 |
| Jarque-Bera | 15.11871 | 216.6282 | 345.8542 | 23.74593 | 20.06453 |
| Jarque-B Prob* | 0.000521 | 0.000000 | 0.000000 | 0.000007 | 0.000044 |
| Observations | 48 | 32 | 49 | 55 | 55 |

The summary statistics above reveal some key characteristics of the variables. The variables with the highest number of observations are copper prices and oil prices. The dual have 55 observations while the variable with the least number of observations has only 32 observations. The discrepancy is owing to the fact that there was limited data on Government spending in Zambia. In terms of skewness, most of the variables are positively skewered but within an acceptable range.

Almost all the variables have non-zero standard deviations with a maximum from copper prices and the minimum from employment. This considerable variation in all the variables translates into more efficient estimates. However, the Jarque-Bera normality test indicated that only three out of the ten variables are normally distributed. It is hoped that taking the first-difference of the variables would improve their normality.

## 5.3 Analysis and results

### 5.3.1 Unit root test

Augmented Dickey Fuller (ADF) Tests with maximum lag of 10 has been employed to test whether the variables have a unit root at 1 percent level of significance while the Zivot Andrews (ZA) Unit root with structural break test has been used to test for structural break in the variables with unit root. The ZA test conclusions have been made at 5 percent level of significance. The summary results are presented in Tables 5.3 and Table 5.4.

**Table 5. 3: ADF unit root test results**

| *Variable* | *Level* | *First Difference* | *Significant lag Based on SIC* | *Order of Integration* |
|---|---|---|---|---|
| 1. yg | -2.2767** | -7.6205*** | 1 | I (1) |
| 2. cop | -0.0134 | -5.9758*** | 0 | I (1) |
| 3. op | -0.5782 | -5.9853*** | 0 | I (1) |
| 4. epp | -0.2987 | -8.4318*** | 1 | I (1) |
| 5. pcp | -0.8559 | -8.6240*** | 0 | I (1) |
| 6. inf | -1.7627* | -6.8981*** | 0 | I (1) |
| 7. echp | -2.8508*** | -8.4161*** | 0 | I (0) |
| 8. gp | -6.2372*** | -11.1598*** | 0 | I (0) |
| 9. txp | -6.8229*** | -12.6229*** | 0 | I (0) |
| 10. ag | -12.3641*** | -10.1311*** | 0 | I (0) |

P-values of Coefficients: ***p<0.01, ** p<0.05 and * p<0.1

**Table 5. 4: Zivot-andrews unit root and structural break test results**

| *Variable* | | *Chosen Break point* | *Conclusion* |
|---|---|---|---|
| 1. yg | -6.132*** | 1984 | No Structural Break |
| 2. cop | -3.647** | 2000 | No Structural Break |
| 3. op | -4.130*** | 2002 | No Structural Break |
| 4. epp | -2.978* | 1978 | Structural Break |
| 5. pcp | -3.805*** | 1988 | No Structural Break |
| 6. inf | -3.272** | 1991 | No Structural Break |

P-values of Coefficients: ***p<0.01, ** p<0.05 and * p<0.1

These results indicate that none of the variables are integrated of order 2 and that some variables are stationary at level or I(0) while others are stationary only after taking the first difference or I(1). Therefore, there is statistical evidence in favor of using the Autoregressive distributed lags model (ARDL) model as opposed to the Vector error correction model which requires the same order of integration. Furthermore, only one variable has been found to have a significant structural break at 5 percent level of significance. Table 5.5 presents the ARDL model results while Table 5.6 gives the model statistics.

### 5.3.2 ARDL model estimations

**Table 5. 5: ARDL model results**

| Variable | Coefficient | Std. Error | t –Statistic | Prob.* |
|---|---|---|---|---|
| **YG(-1)** | -0.42654** | 0.124474 | -3.42671 | 0.0187 |
| **YG(-2)** | 0.310581** | 0.107293 | 2.894696 | 0.0340 |
| **YG(-3)** | 0.071050 | 0.050039 | 1.419898 | 0.2149 |
| **PCP** | 2.719462*** | 0.309624 | 8.7831 | 0.0003 |
| **PCP(-1)** | -0.97952** | 0.368665 | -2.65693 | 0.0450 |
| **EPP** | 14.13375*** | 2.314181 | 6.107451 | 0.0017 |
| **EPP(-1)** | -11.0528*** | 2.376707 | -4.65048 | 0.0056 |
| **ECHP** | 0.005395 | 0.015646 | 0.344807 | 0.7443 |
| **ECHP(-1)** | 0.055091*** | 0.011364 | 4.847896 | 0.0047 |
| **INF** | 0.123008*** | 0.019894 | 6.183301 | 0.0016 |
| **GP** | 0.070887*** | 0.015244 | 4.649998 | 0.0056 |
| **GP(-1)** | 0.124012** | 0.033252 | 3.729422 | 0.0136 |
| **TXP** | 0.025643 | 0.015339 | 1.671688 | 0.1554 |
| **TXP(-1)** | -0.02263 | 0.015988 | -1.41538 | 0.2161 |
| **COP** | 0.005791** | 0.001876 | 3.086978 | 0.0273 |
| **COP(-1)** | -0.00854*** | 0.001425 | -5.98934 | 0.0019 |
| **OP** | 0.071652*** | 0.107042 | 0.669379 | 0.5329 |
| **OP(-1)** | 0.370976 | 0.116095 | 3.195455 | 0.0241 |
| **AG** | 0.30009** | 0.05236 | 5.731234 | 0.0023 |
| **AG(-1)** | 0.188185** | 0.065185 | 2.886943 | 0.0343 |
| **C** | -9.49242 | 7.270534 | -1.3056 | 0.2485 |
| **TREND** | -0.46476 | 0.159827 | -2.90791 | 0.0335 |

P-values of Coefficients: ***p<0.01 and ** p<0.05

**Table 5. 6: Model statistics**

| | | | |
|---|---|---|---|
| **R-squared** | **0.989578** | **Mean dependent var** | **1.627516** |
| **Adjusted R-squared** | 0.945803 | S.D. dependent variable | 3.805499 |
| **S.E. of regression** | 0.885928 | Akaike info criterion | 2.538868 |
| **Sum squared residual** | 3.924338 | Schwarz criterion | 3.594735 |
| **Log likelihood** | -12.2747 | Hannan-Quinn criteria. | 2.852832 |
| **F-statistic** | 22.60636 | Durbin-Watson stat | 2.09397 |
| **Prob(F-statistic)** | 0.001314 | | |

### 5.3.3 Diagnostic tests

Table 5.7 documents the major diagnostic Test results which have been performed on the ARDL model above.

**Table 5. 7: Summary of diagnostic tests**

| *Test for:* | *Diagnostic Test* | *Test statistic* | *p-value* | *Conclusion* |
|---|---|---|---|---|
| ***Model Significance*** | F-test of significance | F = 22.60636 | 0.001314 | Model is significant |
| ***Heteroskedasticity*** | Breusch-Pagan-Godfrey Test | F = 2.137587 | 0.2042 | No Heteroskedasticity |
| ***Autocorrelation*** | Breusch-Godfrey LM | F = 0.328832 | 0.7428 | No Autocorrelation |
| ***Omitted Variables*** | Ramsey Reset Test | F = 0.812564 | 0.4183 | No omitted Variables |
| ***Goodness of Fit*** | R-Square Test | R2 = 0.989578 | N/A | Model fits data well |
| ***Normality*** | Jarque-Bera Test | J-B = 0.699735 | 0.704781 | Residuals are normal |

Note: Conclusions are made at 1% percent level of significance.

These results indicate that the estimated ADRL Model has passed the major econometric diagnostic tests and thus the results are not being affected by heteroskedasticity or autocorrelation. The R-square of 0.9896 and the F-statistic of 22.61 for model significance implies that the regressors in the model are adequately able to explain economic growth. Consequently, the Ramsey RESET test and the normality test suggest that there is no model specification error.

### 5.3.4 Bounds test

Table 5.8 summarizes Bound test results.

**Table 5. 8: Bounds test results**

| **ARDL bounds test** | | |
|---|---|---|
| Sample: 7 33 | | |
| Included observations: 27 | | |
| Null Hypothesis: ***No long-run relationships exist*** | | |
| Test Statistic | Value | K |
| F-statistic | 24.81497 | 9 |
| Critical Value Bounds | | |
| Significance | I0 Bound | I1 Bound |
| 10% | 2.16 | 3.24 |
| 5% | 2.43 | 3.56 |
| 2.50% | 2.67 | 3.87 |
| 1% | 2.97 | 4.24 |

The test generated an F-statistic equal to 24.81497 which is greater than all the upper bound critical values and thus implies that the null hypothesis of no long-run relationship has been rejected at 1 percent level of significance. The variables in the model possess a long run relationship and thus there is need to estimate the Cointegration and long-run form of the ARDL model.

### 5.3.5 Cointegrating equation

The cointegration equation is expressed as

(12)

*Cointeq = YG - (1.6652*PCP + 2.9485*EPP + 0.0579*ECHP + 0.1177*INF + 0.1865*GP + 0.0029*TXP -0.0026*COP + 0.4236*OP + 0.4673*AG -9.0845 - 0.4448*@TREND )*

This equation has been generated based on the above ARDL model and the cointegrating term is then used as a variable in the cointegrating form of the model. The cointegrating form captures the short-run dynamics of the ARDL model and is thus an error correction model.

### 5.3.6 ARDL Cointegration and long-run form

Table 5.9 summarizes the results of the Error Correction Model.

**Table 5. 9: Cointegration form (error correction model)**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| | | | | |
| **D(YG(-1))** | -0.38163** | 0.116438 | -3.27756 | 0.0220 |
| **D(YG(-2))** | -0.07105 | 0.050039 | -1.4199 | 0.2149 |
| **D(PCP)** | 2.719462*** | 0.309624 | 8.7831 | 0.0003 |
| **D(EPP)** | 14.13375*** | 2.314181 | 6.107451 | 0.0017 |
| **D(ECHP)** | 0.005395 | 0.015646 | 0.344807 | 0.7443 |
| **D(INF)** | 0.123008*** | 0.019894 | 6.183301 | 0.0016 |
| **D(GP)** | 0.070887*** | 0.015244 | 4.649998 | 0.0056 |
| **D(TXP)** | 0.025643 | 0.015339 | 1.671688 | 0.1554 |
| **D(COP)** | 0.005791** | 0.001876 | 3.086978 | 0.0273 |
| **D(OP)** | 0.071652 | 0.107042 | 0.669379 | 0.5329 |
| **D(AG)** | 0.300090*** | 0.05236 | 5.731234 | 0.0023 |
| **D(TREND)** | -0.46476** | 0.159827 | -2.90791 | 0.0335 |
| **ECM(-1)** | -1.04490*** | 0.222498 | -4.69624 | 0.0054 |

**Table 5. 10: Long-run form**

| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
|---|---|---|---|---|
| | | | | |
| **PCP** | 1.665170*** | 0.374154 | 4.450489 | 0.0067 |
| **EPP** | 2.948517 | 1.845754 | 1.597459 | 0.1711 |
| **ECHP** | 0.057887** | 0.022449 | 2.578579 | 0.0495 |
| **INF** | 0.117722** | 0.030847 | 3.816242 | 0.0124 |
| **GP** | 0.186523** | 0.066957 | 2.785694 | 0.0386 |
| **TXP** | 0.002884** | 0.024824 | 0.116174 | 0.9120 |
| **COP** | -0.00263 | 0.002694 | -0.97544 | 0.3741 |
| **OP** | 0.423606*** | 0.103835 | 4.079627 | 0.0095 |
| **AG** | 0.467292** | 0.129150 | 3.61821 | 0.0152 |
| **C** | -9.08449 | 6.601282 | -1.37617 | 0.2272 |
| **TREND** | -0.44479** | 0.163751 | -2.71625 | 0.0420 |

P-values of Coefficients: ***p<0.01 and ** p<0.05

## 5.4 Discussion of results

### 5.4.1 Economic growth dynamics

The results from the error correction model imply that Zambia's economic growth is stable and has a long-run equilibrium. This is because the error correction term (ECM(-1)) is both statistically significant and negative. Furthermore, since the coefficient of the error correction term is -1.044, it can be inferred that; when economic growth deviates from its long-run equilibrium path, there exists a rapid correction mechanism which will correct the growth path back to equilibrium within 1 year. Thus its take less than 1 year for the Zambian economy to fully stabilize after a sudden disturbance attributed to either external or internal factors. However, it should also be noted that Zambia's economic growth is currently following a negative long-run trend to the extent that economic growth will continue to reduce by 0.44 percent each year if there is no intervention

taken. This reemphasizes the need to identify the macroeconomic factors of growth in order to quickly intervene in the economy.

### 5.4.2 Determinants of growth

This section considers the results of the ARDL model and corresponding long-run model to indentify the determinants of economic growth in Zambia.

***A: Economic growth and factors of production***

**H1:** *Physical capital positively influences economic growth*

***Short-run: ( t = 8.783, p < 0.05)*** ***Long-run: ( t = 4.451, p < 0.05)***

**H2:** *Employment positively influences economic growth*

***Short-run: ( t = 6.107, p < 0.05)*** ***Long-run: ( t = 1.597, p > 0.05)***

It has been found that both physical capital and employment positively influence economic growth in the short-run and that physical capital is also a long-run positive determinant of economic growth in Zambia. Holding all other factors constant, if Zambia increases its physical capital stock by 1 percent annually economic growth would increase by 1.67 percent. The fact that employment is not a long-run determinant of economic growth does not downplay its important for growth. Moreover, the results actually indicate that the marginal effectiveness of employment is greater than that of physical capital in the shut-run.

The finding that physical capital stock positively influences economic growth is consistent with exiting empirical work. Ndambiri, et al. (2012) found that physical capital formation positively influences economic growth in sub-Saharan countries and Mbulawa (2015) found that increased Gross Capital formation leads to higher economic growth in SADC countries. The established short-run positive impact of employment on growth is also not contradictory to exiting research. Biswas and Saha (2014) and Arratibel, et al., (2007), found employment to positively impact economic growth.

***B: Economic growth and macroeconomic stability***

**H3:** *Exchange rate positively influences economic growth*

***Short-run: ( t = 0.345, p >0.05 )*** ***Long-run: ( t = 2.579, p < 0.05)***

**H4:** *Inflation negatively influences Zambia's economic growth*

**Short-*run: ( t = 6.183, p >0.05)*** ***Long-run: ( t = 3.816, p > 0.05)***

The hypothesis test results indicate that H3 has been rejected only for the short-run while H4 has been rejected for both the short-run and long-run at 5 percent level of significance. This is because it has been found that the exchange rate is only a positive determinant of economic growth in the long-run while the inflation rate is a positive, and not a negative, determinant of growth in both the short and long run. A one percent decrease in the value of the kwacha against the US dollar will increase economic growth by 0.06 percent while a percentage increase in inflation will increase economic growth by 0.12 percent. Thus Zambia needs to maintain a moderate amount of inflation in order

to stimulate economic growth. There was no estimation of the actual limit of inflation upon which its effect may become negative.

Rodrik and Kennedy (2007) provide both theoretical and empirical evidence that devaluation leads to higher economic growth-a finding which is consist with the long-run effect of exchange rate on economic growth in Zambia. When it comes to the inflation rate, many studies have established that the inflation rate influences economic growth but there is no general consensus on whether its impact is positive or negative. Barro (1996), Biswas and Saha (2014) and others found a negative relationship between inflation and growth while Phiri (2013) actually found that inflation positively influences Zambia's economic growth when it is kept below 22.5 percent. Therefore, the findings by Phiri (2013) have been validated by this research.

### *C. Economic growth and external factors*

**H5:** *Copper prices positively affect Zambia's economic growth*

***Short-run: ( t = 3.087, p <0.05)*** ***Long-run: ( t = -0.975, p > 0.05)***

**H6:** *Crude oil prices negatively affect Zambia's economic growth.*

***Short-run: ( t = 0.669, p >0.05)*** ***Long-run: ( t = 4.080, p < 0.05)***

It has been established at 5 percent level of significance that among the two external factors investigated; copper prices only positively influence economic growth in the short-run while oil prices are only a long-run positive determinant of economic growth in Zambia. Ceteris paribus, a 1 US Dollar increase in oil price per barrel will lead to 0.42

percent increase in economic growth in the long-run. This means that increasing international crude oil prices do not adversely impact the Zambia economy. On the contrary, when crude oil becomes more expensive there is an increase in domestic aggregate spending and thus stimulating economic growth.

Shwilima (2015) found that the export of nonrenewable resources like copper positively impacts economic growth while Jain and Patil (2015) found that crude oil prices negatively impact India's economic growth. Therefore, the finding that copper prices positively impact economic growth in Zambia is empirically supported because quantity exported is directly related to price. In contrast, the finding that crude oil prices positively impact growth is not empirically substantiated. Contrary to the results in this research, it has widely been found that crude oil price negatively influence both GDP and growth. It seems logical to conclude that most investigations did not sufficiently lag the crude oil price variable and this made the negative contemporaneous effect significant and dominant.

### *D. Economic growth and government intervention*

**H7:** *Government spending positively impacts economic growth in Zambia*

***Short-run: ( t = 4.650, p <0.05)*** ***Long-run: ( t = 2.786, p <0.05)***

**H8:** *Government taxes negatively impact economic growth in Zambia*

***Short-run: ( t = 1.671, p >0.05)*** ***Long-run: ( t =0.116, p > 0.05)***

Government spending is a positive determinant of economic growth in both the short and long-run while government taxes do not impact economic growth. This is because H7 has not been rejected while H8 has been rejected at 5 percent level of significance for both the short and long-run. Holding all other factors constant, a 1 percent increase in governments spending will increase economic growth by 0.19 percent. On the other hand, moderate increase in government taxes will have no impact on economic growth in both the short and long-run.

Government spending and taxes have been found to be key determinants of growth in many countries. Ismaila and Imoughele (2015) found a positive relationship between government spending and economic growth in Nigeria while Johansson, et al., (2008) found that all types of taxes negatively impact economic growth in OCED Countries. Therefore, the positive impact of government spending on growth is consistent with both economic theory and empirical work. It is however surprising that government taxes do not impact economic growth in Zambia. This may be because, unlike the developed nations, governments in the developing world do not fully exploit the tax system to the level that it can negative influence growth.

### *E. Economic Growth and Agricultural Sector*

**H9:** *The agricultural sector positively influences Zambia's economic growth*

***Short-run: ( t = 5.731, p < 0.05)*** ***Long-run: ( t = 3.618, p <0.05)***

The agricultural growth has been found to be both a short-run and long-run determinant of economic growth in Zambia. At 5 percent level of significance, H9 could not be rejected. If Zambia experiences 1 percent increase in agricultural contribution, ceteris paribus, there will be 0.47 percent increase in economic growth. This finding implies that Zambia is still very dependent on agricultural production and thus there is need to further develop the sector.

The positive impact of agricultural productivity on economic growth is common in the developing world. This is because most developing economies are heavily dependent on the agricultural sector. Oyakhilomen and Zibah (2014) conclude that agricultural sector productivity positively impacts economic growth in the Nigerian economy. Thus Oyakhilomen and Zibah (2014) support the positive impact of the agricultural sector on growth in Zambia.

**5.5 Conclusion**

The search for the macroeconomic determinants of economic growth in Zambia has been very fruitful. It has been discovered that physical capital, employment, inflation, government spending, copper prices and agricultural productivity are all positive short-run determinants of economic growth in Zambia. This means that these factors are behind the swings in economic growth. The constant variations in economic growth can directly be attributed to changes in these macroeconomic variables. Furthermore, it has also been established that the major long-run determinants of economic growth in

Zambia are physical capital, exchange rate, inflation, government spending, crude oil prices and agricultural productively. Notably, factors such as physical capital, government spending and inflation fall in both categories and are thus the most important determinants of growth. The long-run determinants of economic growth significantly influence the trend of economic growth.

# CHAPTER SIX

# CONCLUSION, POLICY IMPLICATIONS AND RECOMMENDATIONS

## 6.1 Introduction

This chapter presents a summary of all the major findings and policy implications of the results. It has been organized into two sections: section 6.2 offers policy implications and section 6.3 is the conclusion section. In fostering economic growth in Zambia, there is need to both plan for economic growth and strategically respond to external factors so as to achieve that needed growth.

## 6.2 Policy implications

It has been established in this research that Zambia's Economic growth is following a negative trend in both the short and long-run. This means that without adequate policy action and strategic intervention, the nation will continue registering lower growth rate in the future. Policy makers are expected to plan for economic growth in the long-run and also take short-run interventions in order to remedy the situation.

### 6.2.1 Economic growth policies

**A: Infrastructure and agricultural development**

The starting point to propelling Zambia towards positive sustainable economic growth is the development of long term economic growth oriented policies. In light of the findings of this research, the long-term plan should focus on growing the nation's physical capital

stock and encouraging agricultural growth. The Government of Zambia has in the recent past done a commendable job in upgrading the Nation's physical capital and expanding agricultural productivity. These two developmental areas have traditionally been the focus of government action and thus there is need to continue infrastructural development projects and farmer input support programmes.

**B: Exchange rate policy**

The finding that the depreciation of the local currency is positively related to long-run economic growth adds credence to the fact that Zambia is dependent on export earnings primarily from copper. Contrary to popular opinion, the depreciation of the Kwacha does not harm Zambia's long-term growth prospects. There is therefore absolutely no need for the central Bank to intervene when the Kwacha is marginally depreciating against major convertible currencies because the loss of value encourages exports and growth of the mining sector. Furthermore, since most of Zambia's imports are consumer goods; devaluation of the kwacha would actually encourage the development of the local manufacturing sector and lead to economic growth in the long-run.

**C: Fiscal policy**

Government spending has been found to positively impact long-run economic growth in Zambia. If the government engages in public investment, there will be an increase in private investment and consequently higher GDP, growth and taxes. The increased taxes can then be used to finance further increased public investment. Government spending

needs not be increased by seeking increased government external debt. If the public spending is investment focused it will stimulate economic growth and generate its own capacity for increase. Since it has been found that government taxes do not negatively influence economic growth in the long and short-run, there is need to increase corporate taxes in order to maximize government taxes and reduce external debt. An increase in corporate taxes will not adversely affect Zambia's economic growth prospects and can thus help reduce government external borrowing.

**D: Monetary policy**

The positive relationship between inflation and economic growth in the long-run suggests that monetary policy can be employed to generate higher growth in the long-run. This research recommends a constant money growth policy in the long-run. The Bank of Zambia should make use of monetary policy to stimulate the economy through increased aggregate demand. However, there is need to properly optimize the money growth policy in order to avoid hyper-inflation. Since this research did not employ a threshold analysis on inflation and economic growth, the estimated positive relationship between the dual may only hold at lower levels of inflation.

### 6.2.2 Economic Growth Interventions

Planning for economic growth using long term economic growth oriented policies is not enough to achieve sustainable growth. There is need to establish short-term interventions. In other words; planning happens in the long-run but the realization of the

needed growth is a short-term phenomenon. Macroeconomic situations are such that there is great need to properly respond to prevailing circumstances so as to achieve long-term goals. When the Zambian economy experiences negative external shocks and economic growth falls below its long-run target; policy makers can respond by increasing Government spending, employment and money supply. Increased government spending and money supply will increase aggregate demand while increased employment in other sectors will lead to higher GDP. These will therefore counteract the influence of the external shock on the Zambian economy.

### 6.3 Do copper prices Matter?

Zambian governments and policy makers have traditionally theorized that changing copper prices are responsible for economic growth fluctuations. Whenever the nation's economic situation takes a negative turn, analysts often blame falling copper prices and thus been offering a perfect scapegoat for government economic mismanagement. This investigation into the determinants of economic growth in Zambia has established that international copper prices only influence economic growth in the short-run. This means copper prices do not have a long-run impact on economic growth. With proper policy action and strategy, Zambia can achieve higher economic growth in the long-run even in the presence of falling copper prices.

The fall in copper prices only causes a short-run shock which deviates economic growth from its long run target. Since economic growth is responsive to both fiscal and

monetary policies in the short run; the effect of falling copper prices on economic growth can be fully counteracted. Policy makers in Zambia can strategically respond to eliminate the negative influence of lower copper prices on the economy by implementing expansionary fiscal and monetary policy. It is apparent therefore, that blaming international copper prices for Zambia's economic mishaps cannot be empirically substantiated. It is poor planning and policies for economic growth and poor responsive action in the short-run which have historically generated low levels of growth in Zambia.

### 6.4 Conclusion

Zambia is a democratically stable and resource rich land locked nation located in Southern Africa. Due to the fact that the country is one of the world's leading exporters of copper, many analysts have theorized that Zambia's economic growth in directly influenced by international copper prices. This supposition has lead to government laxity as most of the economic problems of the country are blamed on external shocks which are beyond government intervention. It has however, been established in this research that the major determinants of economic growth in Zambia include government spending, inflation, exchange rate and agricultural development. Copper prices have been found to only influence economic growth fluctuations in the short-run.

The spotlight needs to turn away from international copper prices to proper economic management. If the nation is to achieve higher sustainable growth in the future, it should focus on increased public investment, agricultural development and currency devaluation. The unmerited focus on external factors is not the source of economic growth but a hindrance to proper goal oriented planning. With sound fiscal and monetary responsiveness, the influence of external shock generated by copper price fluctuations can be managed and Zambia can achieve higher sustainable economic growth.

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