

ANALYSIS OF THE IMPACT OF ECONOMIC GROWTH, EXTERNAL DEBT AND POPULATION GROWTH ON POVERTY LEVELS IN ZAMBIA:

AN AUTOREGRESSION DISTRIBUTED LAG (ARDL) ANALYSIS

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ABSTRACT

Poverty is both a social and economic phenomenon that has ravaged many countries around the globe. The impact of poverty cannot be underrated and its ugly face manifests in people's poor living standards, poor health, higher child mortality rates and high levels of illiteracy among others. In order to fight the woes of poverty, governments employ different policies including population control, positive economic growth and investment in social and economic sectors. Thus, this study sought to establish the significant impact of economic growth, external debt and population growth on poverty levels. Using time series data from 1980-2016, and employing the Auto Regression Distributed Lag (ARDL) model, the study found that there exist a significant long run relationship and that while individually economic growth was found to be insignificant, external debt and population growth were found to be negatively significant. In the short run however, only external debt significantly influences poverty. The study concluded that the insignificant impact of economic growth on poverty could be as a result of an influx of foreigners who after earning their profits and paying meagre wages to domestic employees externalise their profits leaving only working capital. On external debt, the study concluded that the significant negative impact of external debt on poverty is because the increase in external debt leverages domestic private borrowing and crowds-in private investment. And on population growth, the study concluded that growth in the population provides the economy with an increased supply of human capital and the expansion of markets for goods and services. The study recommended that a policy on external debt ceiling be put in place and that the government should ensure that the projects in which the contracted debt is injected produce results and pay back so that a certain level of debt is maintained and lastly that the government should also devise a system of quotas for the profits that foreign national and multinational companies externalise to their countries

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DEDICATION

This project is dedicated to my late parents, Dad and Mum, (Mr and Mrs Lusaya) who lived to believe in my abilities and always encouragement me to become better. I also dedicate this project to my Son Martin Hernandez Lusaya for whom I endeavour to work hard

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CHAPTER ONE:

INTRODUCTION

1.0 OVERVIEW

Poverty is both a social and economic phenomenon that has ravaged many countries around the globe. Poverty is synonymous with poor countries as it is very pronounced in underdeveloped countries such as Zambia. The impact of poverty cannot be underrated and its ugly face can be seen on people's poor living standards, poor health, higher child mortality rates and high levels of illiteracy mostly from the third world countries. In Africa, political instability, higher levels of inequality, low levels national output and others, if not the results of high levels of poverty can be said to exacerbate high levels of poverty. Higher incidences of poverty are very common to Africa, Asia and the Latin America as observed by Vijayakumar (2013) who adds that of the about seven billion population on earth, more than 1.3 billion earn less than US \$1 per day. According to World (1997), the incidence of poverty is manifestly tremendous, suggesting that on the average 45% to 50% of sub-Saharan Africans live below the poverty line in terms of \$1.25. Many argue that the key to poverty alleviation is expansion in the per capita GNP. Some countries and regions that have recorded positive economic growth rates have recorded improvement in the levels of poverty.

This chapter highlights the background, problem statement, research objectives and significance of the study among others that bring to light the magnitude of this study.

1.1 BACKGROUND

According to Nindi & Odhiambo (2015), the slow improvement in the living standards of the poor comes in the wake of the region experiencing positive growth rates in recent years, with an average annual GDP growth rate of approximately 4.9% since 2000. The level of national income is the major determinant of the classification of the country as low, middle and higher income countries. The classification of countries by income levels is synonymous with the classification of countries in terms of poverty levels. According to Todaro (2009), a country whose per capita gross income in 2005 is \$875 or less, it is classified as the low-income country. Those countries whose per capita gross national income is between \$876 and \$3,465 are classified as lower-middle income countries. The upper-middle-income countries have per capita national incomes between \$3,466 and \$10,725 while high-income countries have per capita national incomes above \$10,725. Majority of countries in sub-Sahara Africa are classified as lower income countries as their per capita income is around \$750. Not surprising, classification of income by regions puts Africa, Asia and Latin America in a class of low-income countries thus called developing countries. These regions however classified as low-income countries, tend to have a higher incidence of absolute poverty as measured by the

number of people living on less than \$1.25/day as more than 60% of the world's poor population from these regions. Such statistics formed the cornerstone for the establishment of the Millennium development goals and placed eradication of extreme poverty on the apex of the goals. Efforts to eradicate poverty entail the right path to achieving the millennium development goals.

Notwithstanding the efforts by various governments to eradicate poverty, sub-Saharan Africa is faced with high stocks of external debt which in most cases remain unsustainable thereby retarding growth. Zambia, in particular, has gone through high stocks of public debt standing at \$7BN as at 2017 (Ministry of Finance, 2017). The incidences of public debt cannot be overemphasised. High levels of public debt take a toll on the future generation on which the taxes to liquidate the debt are charged. This means that, with a high stock of public debt, the future incomes will be levied higher taxes in order to pay off the loans accrued by the present generation. This will reduce the amount of income available to the citizens which is likely to affect their standards of living and setting them in a vicious cycle of poverty.

Buoyant with the independence frenzy in the mid-1960 and early 1970's, Zambia became one of the prosperous countries in Africa. With increased prices of the major export commodity copper, the country recorded positive growth in the per capita averaging \$1200 Perkins et al, (2006) and with a sense of nationalism, the government switched to a more protective system by the state owning much of the critical industries, introduction of price controls and high import tariffs resulting in an average growth rate of 2.4% in the first Ten years (SARPN, 2008). Despite the economic boom of the immediate post-colonial era, Zambia's poverty levels were still extremely high which was attributed to the colonial-indigenous higher inequality averaging a Gini coefficient of 0.4 (McCulloch et al, 2000). The mid-1970 saw a slump in the prices of copper. This situation which was seen to be temporal but coupled with the oil shocks plunged the country into the balance of payment problems. In overcoming the BoP problems, the government resorted to heavy external borrowing. The over borrowing plunged the country into slowed economic growth and per capita output resulting in food shortages and scarcity of major commodities. Ng'andwe (1990) adds that the international agencies such as the IMF started negotiating with the government to introduce the Structural Adjustment Programmes which were aimed at instilling a sense of fiscal discipline and restore the economy. The SAPs were briefly introduced which included removal of subsidy, this, however, did not go well as there were skyrocketing food prices. The poverty levels started to soar and Zambia according to Chisala, et al., (2006) which was ranked best of twelfth from the bottom between 1965 and 1969 was now ranked a worst of third from the bottom between 1975 and 1979.

The 1980's were marked by turbulence in the economic and political atmosphere in Zambia. This was a period of declining economic growth, food shortages and high stocks of public debt resulting

from stringed SAPs which were re-introduced. The public discontent with the SAP's resulted in the government abandoning the programmes and introducing the imposition of 1970's price controls. However, the economy according to (SARPN, 2008) continued declining, poverty levels rising and debt swelling to US\$7.1 billion by 1991. According to Chisala, et al., (2006), the government's capacity to deal with the problem of Poverty in Zambia is undermined by the country's debt burden. They furthered that; fundamentally a legacy of the 1970s and 1980s, the debt burden arises directly from the decline in revenue from copper that resulted from the combined effects of supporting liberation struggles in the region and the decline in the copper price (Chisala, et al., 2006, p. 10).

The 1990's saw the birth of a free market economy common called market liberalisation brought about by the new Movement for Multi-Party Democracy (MMD). McCulloch, et al, (2000) observed that by early 1990, consumption per person had fallen by two-thirds over the past 15 years. The continued decline in economic performance saw a decline in most social indicators such as school enrolment, infant and under-five mortality and number of child malnourishment. The problem of the 1990's was exacerbated by declining mining and quarrying sector and the 1992 drought which resulted in the collapse of agricultural value-added by one-third (McCulloch, et al, 2000). The compounding problems resulted in high poverty levels since 1991. According to Chibuye (2014), the incidence of overall poverty was very high in the early 1990s and added that this is not surprising, as at the time the government was implementing austerity measures through the Structural Adjustment Programme in order to reduce the fiscal deficit. The privatisation programmes which gained momentum in 1996 resulted in massive job losses which was not compensated for by an increase in private sector employment through privatisation. There was, however, a positive impact of reduced formal sector employment on the wages of those who remained in the sector although, on the large scale, it impacted negatively on the incidences of poverty as summarised in the table below.

Figure 1: ZAMBIA'S POVERTY LEVELS (1991-1998)

Year	Zambia		Rural		Urban	
	Overall poverty	Extreme poverty	Overall poverty	Extreme poverty	Overall poverty	Extreme poverty
1991	69.7	58.2	88.0	80.6	48.6	32.3
1993	73.8	60.6	92.2	83.5	44.9	24.4
1996	69.2	53.2	82.8	68.4	46.0	27.3
1998	72.9	57.9	83.1	70.9	56.0	36.2

Source: (CSO, 1998)

Much of 2000's era was marked by macroeconomic stability. The Living Condition Monitoring Survey of 2002/03 in Chibuye, (p. 239, 2014) showed an overall poverty rate of 67 per cent, with 46 per cent of the population being extremely poor and unable to afford even the minimum basic food

requirements. Poverty was highest in the fourth quarter, considered to be the lean (peak hunger) period due to low seasonal agricultural production. CSO (2004) showed in the Living Condition Monitoring, that sixty-seven per cent of the population fell below an adult equivalent poverty line of K 92,185 per month. With respect to this consumption line, poverty in rural areas affected seventy-four per cent of the population and fifty-two per cent were below the extreme poverty line. Thus, in 2003, more than half the rural population of Zambia was living at levels below the basic food basket (Chisala, et al., 2006). With a boom in copper output, debt relief and a stable macroeconomic environment, the poverty incidence in the 2000's improved as other social indicators. The country started to record positive per capita growth rates averaging 5%. GRZ (2004) observed that the poverty trend for both extreme and overall poverty rates assumed a downward trend as summarised in the table below

Figure 2: Incidences of Overall and Extreme Poverty in Zambia (1991-2010)

Residence	1991	1993	1996	1998	2002/03	2004	2006	2010
Incidence of overall poverty (%)								
All Zambia	70	74	69	73	67	68	62.8	60.5
Rural	88	92	82	83	74	78	80.3	77.9
Urban	49	45	46	56	52	53	29.7	27.5
Incidence of extreme poverty (%)								
All Zambia	58	61	53	58	46	53	42.7	42.3
Rural	81	84	68	71	52	65	58.5	57.7
Urban	32	24	27	36	32	34	13	13.1

Source: (GRZ, 2004)

Among the many causes of poverty, income inequality, public debt, diseases, population growth and lower levels of economic growth rates have been cited as the major factors influencing poverty in Zambia. Poverty theories strongly link government's policies to poverty levels as Stark (2009) observed that poverty is as a result of the failure to organize legal and economic institutions in a sensible way. In support of this view, SARPN (2008) observes that huge external debt and disease have exacerbated poverty in Zambia. While GDP per capita has steadily been growing at an average of 5% per annum in the last decade, Zambia's external debt stock has been slowly growing and stood at US\$6.3 billion in 2000. Under the SAP arrangement according to SARPN (2008) debt service seems to be given priority over social sector payments as such huge debt servicing has meant draining away the much-needed resources for the social sector and general development. To elaborate on this factor, SARPN (2003) adds that poverty levels are driven by the stock of public debt as heavy debt burden, has exerted a significant crowding out effect on social expenditures. Over the years, debt service has on average accounted for 10 per cent of the GDP, while all the social sectors together have accounted for only 5 per cent. The inadequate expenditures on economic and social services have contributed to the debilitation of the country's stock of human and economic capital and this, in turn, has constrained growth (SARPN, 2003).

Lack of economic growth is believed to have a negative effect of the poverty levels. It has been observed by SARPN (p. 26, 2003) that the foremost barrier to moving out of poverty in Zambia is the lack of sustained levels of positive growth. This has been exacerbated by increased income inequality, the persistence of discrimination against women and the girl child, insufficient investment in economic and social infrastructure to keep pace with requirements for rapid growth, and the HIV/AIDS pandemic.

1.2. PROBLEM STATEMENT

Poverty still remains problematic in many countries including Zambia. In Zambia, there have been various efforts by the government to eradicate poverty that include the development of the Poverty Reduction Strategic Paper (PRSP), the introduction of the Farmer Input Support Programme (FISP), the introduction of the social cash transfer scheme among others. On the other hand, the country has continued to record high levels of public debt compounded by increased demand for public goods and service due to population expansion. The increased investment in such programmes and other socio-economic sectors is believed to result in high economic growth as postulated by various theories. With public external debt standing at \$10.79BN currently and the economy growing at around 3.5% p.a, poverty in Zambia is still rife as over 60% of the population is ravaged by the scourge. This situation necessitates an empirical investigation to establish the impact of economic growth, population growth and debt on poverty levels in Zambia.

1.3 RESEARCH OBJECTIVES

1.3.1. MAIN OBJECTIVE

The main objective of this study was to ascertain if there is significant impact of economic growth, population growth and public external debt on poverty levels in Zambia.

1.3.2. SPECIFIC OBJECTIVES

The specific objectives set forth include;

- a) To ascertain if economic growth does reduce poverty
- b) To find out whether public debt has significant impact on poverty levels
- c) To ascertain whether population growth does cause poverty
- d) To establish the overall trend in poverty, debt and economic growth

1.4 RESEARCH HYPOTHESES

The expected hypotheses are that there is a negative impact of economic growth on the levels of poverty, there is a positive impact of public debt on levels of poverty in Zambia and that there is a

negative impact of population growth on poverty levels. The three hypotheses can be stated as below;

1.4.1. ECONOMIC GROWTH HYPOTHESIS

H₀: There is a negative impact of economic growth on levels of poverty in Zambia

H₁: There is no impact of economic growth on levels of poverty in Zambia

1.4.2. PUBLIC DEBT HYPOTHESIS

H₀: there is a positive impact of public debt on poverty levels in Zambia

H₁: there is no impact of public debt on poverty levels in Zambia

1.4.3 POPULATION GROWTH HYPOTHESIS

H₀: There is a positive impact of population growth on poverty levels

H₁: There is no impact of population growth on poverty levels

1.5 SIGNIFICANCE OF THE STUDY

The social and economic impact of high poverty levels cannot be underestimated. Poverty can lower individual productivity thereby impacting negatively on the national output. Poverty can also cause social vices such as crime, drugs abuse and spread of HIV. This could be one of the reasons for the development of the Millennium Development Goals which set out eradication of extreme poverty as goal number one. In Zambia, various attempts have been put in place to alleviate poverty. However, it seems these efforts have not yielded the much-expected results even when the country has continued to record high levels of public debt and in some cases improved economic growth, especially in the last twenty-five years. Various theories and studies point to different reason as to the cause of poverty in most developing countries with some citing population growth. The studies that include Nindi & Odhiambo (2015), Ngerebo (2014) and Makinde (2015) among others have investigated the relationship between economic Growth, Public debt and Poverty in which some found no significant impact of one variable on the other and others found the opposite. As the same theory can produce different results in different countries and by use of different methods of data analysis, replicating such a study to the case of Zambia is significant to understanding and predicting the relationship between the dependent and the independent variables as there has been no study in Zambia that has been published to shade light on the impact of these variables on another.

By undertaking this empirical research, the findings will contribute information significant to policy formulation on poverty. This information will provide a basis for policy information on which policymakers can base their policy arguments. Also, the study will help in assessing how far the country is in achieving MDG number one which will help in re-aligning various policies of poverty alleviation. Further, the study is significant in contributing to a body of knowledge in the field of development economics as it will open another chapter on the factors affecting poverty. It is therefore important that this study is undertaken.

1.6 SCOPE AND DELIMITATION OF THE STUDY

The study covered the annual time series data of all variables from 1980-2016 and made use of the time series econometric data analysis using Eviews. The choice of this period was based on the premise of covering the three administrations namely UNIP, MMD and the PF.

1.7 RESEARCH ASSUMPTIONS

This study assumed that;

Positive GDP growth will reduce the overall poverty levels in Zambia. This is based on the theory that a positive growth in the GDP entails an overall improvement in the economic well-being of the masses.

High levels of public debt will result in high levels of poverty. This is so because a rise in the stock of public debt today especially if not matched by investment in capital projects will entail higher taxes in the future thereby reducing the funds available per capita.

Poverty has not reduced to relatively lower levels despite high stocks of public debt and positive growth in per capita income.

CHAPTER TWO: LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.0 OVERVIEW

This chapter undertakes to review the various literature relating to poverty levels, growth in per capita income and public debt. In order to thoroughly understanding why poverty levels in developing countries continue to ravage the masses, both theoretical and empirical studies are reviewed within the context of this study. The closing section of this chapter will summarize the literature by means of identification of the research gap and further development of the conceptual framework hereto.

2.1 THEORETICAL LITERATURE REVIEW

2.1.1 DEFINITION AND MEASUREMENT OF POVERTY

Economists have not universally agreed on the definition of poverty. However way poverty may be defined, is within the context of the poverty theories that classify poverty in a cultural and structural sense. In the light of the cultural perspective of poverty, poverty is seen in the traits of the poor themselves wherein the valuational, attitudinal, and behavioural patterns of the poor which prevent them from being socially mobile. In the structural perspective, however, poverty is explained in terms of the conditions under which the poor live that include unemployment, underemployment, poor education, and poor health (Elesh, 1970). Thus, poverty goes beyond the known common meaning, it is more subjective to persons experiencing it. Within the framework of such poverty theories, poverty has been defined in various ways. According to the World Bank (2013) poverty is defined as the condition of having little or no wealth or few material possessions or whether households or individuals have enough resources or abilities today to meet their needs. In its multidimensional context which includes low income and the inability to acquire the basic goods and services necessary for the survival, poverty according to Sabir and Tahir (2010) is viewed as pronounced deprivation in well-being, and comprises many dimensions. It also encompasses the low level of health and education, poor access to clean water and sanitation, inadequate physical security, lack of voice and insufficient capacity and opportunity to better one's life. From the above definition, it can be seen that poverty is both monetary and non-monetary poverty. Monetary or income poverty refers to the proportion of people living below the poverty datum line of \$1.25 per day adjusted for purchasing power parity (World Bank, 2005). The poverty line is thus the minimum level of income deemed necessary to achieve an adequate standard of living in a given country. Non-monetary or non-income poverty is defined in light of Sen's capabilities approach which asserts that poverty is simply deprivation of human capabilities. The human capabilities

entail the freedom of an individual to choose and consume what they may wish. It entails freedom to participate in social and economic activities of a country. These capabilities overcome economic insecurity, poverty and inequality.

Poverty is classified as absolute and relative poverty. Absolute poverty refers to the lack of basic needs, education health, clothing shelter. Relative poverty according to Sabir and Tahir (2010) refers to the lack of socially acceptable level of income or other resources as compared to other countries or societies. Thus, while absolute poverty measures poverty as the sum of money needed to meet the basic needs, relative poverty is the failure in living up to the economic status that is standardised in a certain social context, so that poverty leads to social exclusion (Dahlquist, 2013).

Poverty is measured in terms of headcount (the Head Count index, (HCI)), poverty gap index (PGI) and the squared poverty gap index also called the Foster-Greer Thorbecke (FGT) index (Makinde, 2015). The Headcount Index or ratio is the proportion of poor people within the entire population. The HCI measures the prevalence or incidence of poverty. This measurement of poverty can further be broken down to measure the prevalence of poverty within some demographics such as age, sex and education levels. The poverty gap index measures the intensity of poverty in the country. According to Dahlquist (2013), this measures the average income or consumption shortfall from the poverty line and it measures the distance of individual poor people from the poverty threshold. The poverty gap can be broken down into income gap and the relative poverty gap. The income gap is simply the ratio of poverty gap among the minimum income poor people would have to have in order to stop being poor. The relative poverty gap, on the other hand, is the ratio of the difference between the poverty gap and the number of people in the poverty threshold. The poverty gap represents the transfer of income to the poor that would be necessary to eliminate poverty, assuming an absolute poverty line. The poverty gap index is simply the average poverty gap across the entire population (Makinde, 2015). Lastly, the FGT index measures the severity of poverty. Dahlquist (2013) notes that The FGT also called the squared poverty gap measures the poverty severity by including the inequality among the poor by putting higher weight on the households whose distance to the poverty line is greater.

2.1.2. THEORIES OF POVERTY

Theories of poverty try to develop an understanding of what the cause of poverty in many societies has been and the underlying effect of the persistence of such factors on the levels of poverty. Many theories have been developed to elucidate on poverty phenomenon. These include the following;

2.1.2.1 THE TRICKLE-DOWN THEORY

While it is a common belief that when the economy booms, many people will have enhanced standards of living as their social and economic well-being improves, it is never always the case that the benefit of the improvement in the economy will benefit all the people as there is not always “the trickle down” benefit. Thus, the trickledown theory postulates that economic growth plays an essential role in poverty reduction in any given country provided that the distribution of income remains constant. Proponents of this view believe that the benefits of higher economic growth in a country trickle down to the poor Nindi and Odhiambo (2015). The trickle-down theory according to Kahsu and Nagaraja (2017) suggests that a time lag exists before the poor benefit from economic growth. To elaborate on this point, they pointed out an example that economic growth may initially generate greater profits for existing firm owners and current employees. Their higher incomes may generate greater demand for products which will result in firm expansion. Firm growth may generate demand for additional employees including the unskilled poor, who may then reap the benefits of economic growth.

In view of this theory, many proponents that include Todaro (1997), Ravallion and Chen (2003) and Aghion and Bolton (1997) contends that in order to alleviate poverty, poverty reduction policies should be aimed at boosting economic growth.

2.1.2.2 THE TRICKLE UP THEORY

According to Todaro (1997), the trickle-up theory asserts that economic growth does not improve the lives of the very poor; but rather, the ‘growth processes’ tend to trickle-up to the middle classes and the very rich. In light of this theory, economic growth tends to increasing inequality as growth tends to the middle class and the rich while increasing poverty. Nindi and Odhiambo (2015) adds that the trickle up theory asserts that there are reinforcing factors that maintain poverty amongst the poor population and impede them from contributing to economic growth. These factors put the poor in the vicious cycle of poverty and if the masses are poor, the country will experience slowed economic growth.

2.1.2.3 THE UTILITARIANISM THEORY OF POVERTY

Unarguably, human nature is utility maximising. All human beings seek to maximise utility in society. It is this lack of utility maximisation that renders some people in society as poor and as rich. According to this theory, poverty is a question of utility, a problem to be analyzed and solved (Stark, 2009). According to Mowafi (2006), utilitarianism is concerned with the identification of a person’s interests and its subsequent fulfilment with the two main claims to utilitarianism being the centrality of happiness and desire fulfilment as core indicators of well-being. The theory further

asserts that humans are governed by a simple calculus of maximizing pleasure and minimizing pain. The principle of utility approves or disapproves of every action according to its tendency to promote or to oppose happiness (Bentham in Mowafi (2006)). Thus poverty arises out of the state's failure to recognise the needy of society to reduce pain and maximise happiness. This can be achieved by ensuring the establishment of the whole range of institutions and bureaucracies necessary to assure a decent standard of living. Through a decent standard of living, utility is maximised by a group in any given society.

2.1.2.4 THE SOCIAL EXCLUSION THEORY OF POVERTY

Poverty is seen as a multidimensional, dynamic, relational, active, relative and contextual phenomenon whereby an individual is denied the opportunity to participate in the normal activities of citizens whether he desires to participate or not. The multidimensionality of social exclusion according to Lardechi et al., (2003) refers to an idea that the experience of exclusion exists in economic, social, and political forms. Sameti et al., (2012) noted that social exclusion occurs when a person or group is deprived of its social status. Usually, individuals or groups are denied all of their social existence within mainstream society and Bessis in Sameti et al., (2012) adds that when social exclusion occurs the individuals affected do not have an equal opportunity for jobs in the labour market. In its multidimensionality in the political arena, Sameti et al (2012) observes that social exclusion occurs when a certain group including women and racial and religious minorities are deprived of part or all of their political rights. According to Lardechi et al., (2003), the dynamic attributes of social exclusion focus on the process and outcomes of deprivation. The dynamic process of social exclusion explains that some exclusion can lead to other form of exclusion, which in turn can lead to more exclusion and permanent multiple disadvantages while the relational aspect of social exclusion recognizes that social exclusion entails social isolation, rejection, lack of support and denial of participation for certain people or groups (Sameti, et al., 2012).

2.1.2.5 THE THEORY OF INDIVIDUAL DEFICIENCIES

In the further understanding of poverty, some authors refer to the individual's inability as the cause of poverty. The individual deficiency theory according to Bradshaw (2005) posits that poverty individuals are responsible for poverty situation. In light of this theory, theoretical conservatives argue that with harder work and better choices the poor could have avoided (and now can remedy) their problems. This theory builds on the neoclassical economics which sees individuals as sources of poverty. In this sense, individuals seek to maximize their own well-being by making choices and investments, and that (assuming that they have perfect information) they seek to maximize their well-being. When some people choose short-term and low-payoff returns,

economic theory holds the individual largely responsible for their individual choices (Bradshaw, 2005). In support of this theory, Asen (2002) contends that any individual can succeed with skills and hard work and that motivation and persistence are all that is required to achieve success.

2.1.3 RELATIONSHIP BETWEEN POVERTY AND OTHER MACROECONOMIC VARIABLES

Poverty is both a social and economic phenomenon that is influenced by a number of other macroeconomic variables such as economic growth, indebtedness, exchange rate, inflation, inequality and population among others. For the sake of this study, only economic growth and public debt will be discussed.

2.1.3.1 POVERTY AND ECONOMIC GROWTH

Economic growth is believed to be the main answer to poverty though other scholars such as Kuznets have pointed out that economic growth results in inequality which leads higher poverty levels. Economic growth in this context refers to growth in the GDP per capita of the country. According to Vijayakumar (2013), economic growth is important or a pre-condition for development, but alone it does not necessarily reduce poverty. He further notes that the poor people can also obtain fruits full of economic growth when benefits of economic growth are distributed by proper institution or state. Sabir and Tahir (2010) observed that economic growth means the increasing capacity of the economy to satisfy the needs and wants of the society. Economic growth can be achieved by increasing the productivity of the economy. GDP growth means that economy is growing and developing, technically it means the increase or decrease in the GDP compared with previous years. If GDP is growing then the growth rate is positive and if it is decreasing then the growth rate is negative and the economy is in recession (Sabir & Tahir, 2010). Roemer and Gugerty (1997) argue that the extent to which a given rate of growth affects poverty depends upon many factors, but particularly on economic structure and economic policies and added that growth is more likely to lead directly to a reduction in poverty when the economic assets of a country are distributed relatively equally or when economic growth is based on the intensive employment of abundant factors of production, which for most countries is labour. In line with dual economy theory, Roemer and Gugerty (1997) assert that in largely rural economies based on small-scale farming, as in many African and Asian countries, most of the poor are engaged in agriculture. When such a country grows through agricultural exports, or when growth in manufacturing increases the demand for food and materials supplied by the rural sector, growth benefits both poor farmers and the even poorer labourers they employ (Roemer & Gugerty, 1997). This view is consistent with the trickle-down theory and it can be deciphered economic growth positively impact poverty when

there is a trickle-down. In the case of mineral-driven economies, when growth is as a result of increased export of the minerals Roemer and Gugerty (1997) observes that such gains can only benefit the poor if government redistributes the gains from minerals by investment in public services such as education and health as the country's wealth is concentrated in the few hands.

According to Lustig et al., (2002), the relationship between growth and poverty runs in both directions. They highlight multiple complementarities between growth and poverty reduction and point out that actions to reduce poverty can create virtuous cycles that raise economic growth, in turn reinforcing poverty reduction.

In many countries, the hallmark of poverty is rising levels of unemployment and cost of living. The high levels of unemployment signify the inability of the economy to absorb its labour force either due to reduced economic activities or to rising substitution of labour intensive processes for technologically driven processes. In the case of heightened cost of living, economic growth that increases the cost of living for many has its toll on high levels of poverty. Increasing economic growth amidst increasing food basket is likely to leave many people in abject poverty.

2.1.3.2 POVERTY AND PUBLIC DEBT

Public debt's influence on poverty may not be exhibited directly but is more pronounced indirect. Public debt influences poverty through its influence on economic growth. If public debt can lead to positive economic growth, then it is expected that it will play a role in reducing poverty. In developing countries such as Zambia, public debt has been instrumental in investment in public services such as education, health, infrastructure and water and sanitation. In some cases, however, public debt is believed to exacerbate poverty as there is no trickle-down of the benefits of such debt. The hallmark of the effect of public debt is higher taxes and its ugly face is seen on the masses through lack of access to many essential facilities.

According to Patillo et al., (2002) economic theory suggests that reasonable levels of borrowing by a developing country are likely to enhance its economic growth. Chowdhury, (2001) adds that according to traditional neoclassical models, in the initial stages of their economic development, countries have limited capital stocks and investment opportunities; therefore capital mobility increases the economic growth. This capital mobility is in the form of external debt. Akram (2016) urges that as long as these borrowed resources are used for productive investment, these countries do not face macroeconomic instability, and so economic growth increased. Thus public debt can stir economic growth and in turn, reduce poverty. As Al-Zeaud (2014) observes, "in order to encourage growth, countries at early stages of development borrow to augment what they have because of the dominance of small stocks of capital hence they are likely to have investment opportunities with

rates of return higher than that of their counterparts in developed economies. This becomes effective as long as borrowed funds and some internally ploughed back funds are properly utilized for productive investment” (Al-Zeaud, p. 148, 2014). He concluded that Growth is likely to increase and allow for timely debt repayments and that when this cycle is maintained for a period of time growth will affect per capita income positively.

Notwithstanding the benefits of debt in enhancing economic development, it cannot go without saying that debt can negatively affect economic growth and in turn affect poverty levels. That is, high levels of indebtedness can slow down economic growth and induce poverty. This is through the two theoretical perspectives of crowding out and the debt overhang hypotheses. There is an argument in the neoclassical settings that Growth models augmented with public agents issuing debt to finance consumption or capital goods tend to exhibit a negative relationship between public debt and economic growth. In refining the analysis on the impact of debt, Modigliani in Checherita and Rother (2010) argued that the national debt is a burden for next generations, which comes in the form of a reduced flow of income from a lower stock of private capital. Apart from a direct crowding-out effect, he also pointed out to the impact on long-term interest rates, possibly in a non-linear form “if the government operation is of sizable proportions it may significantly drive up long-term interest rates since the reduction of private capital will tend to increase its marginal product. According to Stiglitz (2000) government, borrowing can crowd out investment, which will reduce future output and wages. When output and wages are affected, the welfare of the citizens will be affected too. The debt overhang hypothesis, on the other hand, asserts that if there is a probability that a country's future debt will be more than its repayment ability, then anticipated costs of debt-servicing can depress the investment. Public debt can be contracted domestically or externally and the impact of domestically contracted debt may differ from the externally contracted debt. Ayres and Warr in Matiti (2013) contend that Domestic debt can have severe implications for the economy if not well utilized because its servicing absorbs a major part of government revenues thereby creating a persistent deficit meaning that the Government has fewer resources to spend on development projects. When debt is contracted domestically, the government use up a large proportion of the loanable funds thereby suffocating domestic private investment which in turn reduces capital formation, growth and welfare. The effect of external indebtedness according to Loko, et al (2003) is in three ways; the servicing of heavy debt may directly divert budgetary resources from investment necessary to stimulate economic growth; it discourages private sector-led investment and employment owing to uncertainty about government action in servicing the large external debt and lastly high indebtedness signals economic mismanagement and bad governance entailing risky investment and can lead to capital flight and Akram (2016) adds that if a

greater share of foreign capital is used to service the external debt, very little will remain available to finance investment and growth again leading to crowding-out effect.

Poverty as a result of public debt is due to the impact of borrowing on the economic agents in the country. If a large proportion of public resources is used to service public debt then economic agents remain with fewer resources to undertake their economic activities. This would hinder job creation and exacerbate welfare loss. Thus, the extent to which indebtedness affect growth plays a role in influencing poverty.

2.2 EMPIRICAL LITERATURE REVIEW

Many empirical studies have been undertaken to establish the linkages between poverty, growth and public debt. Below is a review of some of these studies.

In examining the impact of public debt on economic growth, Al-Zeaud (2014) conducted an empirical analysis on Jordan on the effect of public debt on growth using the per capita income approach. His study covered annual data from 1991 to 2010 and using logged variables, GDP per capita was made a function of public debt (as a percentage of GDP) and the Debt service payment. The results of the regression estimates from his study showed that the coefficients confirm a priori conditions (positive) for the expected effect of public debt on economic growth applying the per capita income approach in Jordan. He concluded that public debt has promoted economic growth. He further urged that if Jordan is hoping to attain sustained economic growth, the positive effect of public debt should be maintained while negative effect of population growth should be reduced. Al-Zeaud's findings are consistent with what was observed by Patillo, et al (2002) that economic theory suggests that reasonable levels of borrowing by a developing country are likely to enhance its economic growth.

In a related study, Patillo, et al (2002) conducted a cross-country assessment on the nonlinear impact of external debt on growth using a panel data of ninety-three 93 countries for data from 1969-98 employing econometric methodologies. Their findings suggested the average impact of debt becomes negative at about 160-170 per cent of exports or 35-40 per cent of GDP. They also found that the marginal impact of debt starts being negative at about half of these values. In their study, it was seen that for a country with an average indebtedness (in net present value) below 100 per cent of exports and above 300 per cent of exports seems to be in excess of 2 per cent per annum.

Another study by Checherita and Rother (2010) investigated the average impact of government debt on per-capita GDP growth in twelve euro area countries over a period of about 40 years starting in 1970 focusing on the direct impact of public debt on growth and channels for the impact of public

debt on growth. The study employed the empirical growth model is based on a conditional convergence equation that relates the GDP per capita growth rate to the initial level of income per capita, the investment/saving-to GDP rate and the population growth rate and the model was augmented to include the level of gross government debt (as a share of GDP). The results of the direct impact of public debt on growth across all models showed a highly statistically significant non-linear relationship between the government debt ratio and the per-capita GDP growth rate for the 12 euro area countries included in the sample. The debt-to-GDP turning point of this concave relationship (inverted U-shape) was found to be roughly between 90 and 100% on average for the sample, across all models. Checherita and Rother (2010) concluded that on average for the 12-euro area countries, government debt-to-GDP ratios above such threshold would have a negative effect on economic growth. On the channel for the impact of public debt on growth, they found some evidence for the channels of private saving, public investment, Total Factor Productivity (TFP) and interest rates. They further concluded that “the fact that the change in the debt ratio and the budget deficits are linearly and negatively associated with growth (and with the long-term interest rates) may point to a more detrimental impact of the public debt stock even below the threshold”.

Similarly, Matiti (2013) on the relationship between public debt and economic growth in Kenya using secondary data from 2002-2012 found that public debt greatly affects economic growth in Kenya up to 96.20%. The study established that a unit change in treasury bonds holding the other factors constant will lead to change the economic growth by 1.381; a unit change in treasury bills holding the other factors constant will change economic growth by 1.312. It was concluded that domestic borrowing consumed a significant proportion of government revenue which poses a risk to fiscal sustainability. Domestic debt is characterised by higher interest rates compared with those on external debt, which is contracted mainly on concessional terms, and it is therefore expensive to maintain.

In ascertain how public debt influence poverty, Akram (2016) undertook a study on public debt and pro-poor economic growth which aimed at examining the consequences of public debt for economic growth and poverty regarding selected South Asian countries, i.e., Bangladesh, India, Pakistan and Sri Lanka, for the period 1975–2010. This study developed two models one in which GDP growth rate was a function of public debt with other control variables and another one where the Gini coefficient was made a function of Debt and other control variables and a Two-Stage Least Square (2SLS) and the Generalised Method of Moments (GMM) estimation methodologies were applied to get robust results. The results of the first model found a negative relationship between external debt variables and economic growth. It was found that external debt as a percentage of GDP has a significant and negative relationship with GDP growth rate. The reason being according to Akram

(2016) that when domestic resources are mobilised to repay and service the external debt (if it is too large in relation to the GDP) not much resource remains available for investment. These findings were at resonance with the debt overhang hypothesis. In the second model, it was found that External debt as a percentage of GDP and debt servicing as a percentage of exports do not have a significant relationship with the GINI coefficient, which suggests that debt remained neutral with respect to its distributional effects, it was however found that Domestic debt has a negative and significant impact on the GINI coefficient, suggesting that domestic debt reduces income inequality. Therefore, it can also be inferred that domestic debt not only stimulates economic growth but it also reduces the income inequality. Overall, the results indicate that per capita GDP has a negative and significant impact on GINI coefficient.

In a related study by Ngerebo (2014), an empirical investigation was undertaken to account for the impact of public Domestic debt on poverty in Nigeria. Applying the OLS technique of Cointegration on the collected time series data from 1986-2012, it was found that there is a long-run relationship between poverty (measured by real gross domestic product (RGDP), per capita gross domestic product (GDPPC), and basic secondary school enrolment) and domestic debt in Nigeria. The study further revealed that the domestic debt coefficient has a positive impact on bank credit and this impact is highly significant. Such credit provides a place for rural development project so as to reverse the chaotic trend of urbanization, industrialization, and create lucrative market advancement in the country's manufacturing sector, thereby, improving the welfare of the citizen (Ngerebo, 2014). The study further concluded that with log magnitude of the coefficient, it obviously implies that the funds generated through domestic borrowing have been used partially to finance those expenditures of government, which contribute to the growth rate of GDP.

In investigating the linkages between economic growth and poverty reduction, Ikechukwu (2012) undertook a study on poverty and economic growth in Nigeria using a Poverty Equivalent Rate Model (PEGR) which took into account factors that contribute to poverty reduction. According to this model, poverty is a function of the magnitude of Economic Growth as well as the degree of inequality. The PEGR posits that if the magnitude of economic growth increases, poverty would reduce and that if inequality that accompanies growth reduces. His finding of the PEGR measure showed a trickle-down growth which is not necessarily pro-poor. The overall pro-poor growth result indicates that though the growth process in Nigeria was able to reduce the magnitude of poverty to some extent, this, however, did not translate to improvements in inequality (Ikechukwu, 2012). The study also found that the positive growth resulted in increased inequality which threatened the pro-poorness of the growth. These findings were consistent with the findings by Akram (2016) and Ngerebo (2014).

In another study by Sabir & Tahir (2010) whose objective was to investigate the impact of different macroeconomic variables on the welfare of the poor in Pakistan, found similar results from those found by Ikechukwu (2012) and others on GDP growth and poverty. Using annual time series data from 1981-2010 on Pakistan and making poverty (as measured by Headcount Index) as function of GDP growth rate, population growth rate, per capita income, inflation, Minor crop and Major crop, the study established that GDP growth rate per capita income, major crops, minor crops and livestock had negative impact while inflation and population growth rate had positive impact upon poverty. They, therefore, concluded that in the long run, the reduction in poverty in Pakistan is to be driven by the changes in the macroeconomic variables.

A related study by Tahir, et al (2014) on the impact of GDP growth Rate on poverty was undertaken on Pakistan for the data from 1980-2012. The negative relationship indicates the reverse effect of GDP growth rate on poverty of Pakistan. Using a simple linear regression technique, the results revealed that 1% increase in GDP growth rate has a significantly negative impact on 1.9% on poverty. The study concluded that while economic growth had a negative impact on poverty, Policy failure of the government, poverty eradication policy and Global recession were the main factors contributing to the underprivileged class which have created an alarming situation in the country.

Also, Nindi & Odhiambo (2015) conducted a study whose main objective was to examine the causal relationship between poverty reduction and economic growth in Swaziland during the period 1980–2011. To examine this linkage, the study employed ARDL-bounds testing approach to co-integration and the ECM based Granger causality method. The findings of this study showed that economic growth did not Granger cause poverty reduction in Swaziland both in the short run and in the long run. The study, however, found a causal flow from poverty reduction to economic growth in the short run. The conclusion from this study was that the findings were not surprising as it was expected that when the level of income inequality is too high, economic growth alone may not necessarily lead to poverty reduction. The results were not consistent with the findings of the earlier revealed studies and contradict the economic theory that postulates a causal relationship.

A study by Chani, et al (2011) which aimed at investigating the role of economic growth and inflation in explaining the prevalence of poverty in Pakistan was conducted using time series data from 1972-2008. Using the ARDL as a test of co-integration and Unrestricted Vector Error Correction Mechanism, the results showed that the coefficient of economic growth indicates that economic growth has a significant and negative effect on poverty. Their findings showed that *ceteris paribus*, in a long run, a 1000 Pakistani rupees increase in per capita income decrease the percentage of people living below the poverty line by 2.5%. On the other hand, the short run

findings reveal that economic growth has negative and inflation has a positive impact on poverty whereas the role of investment and trade openness in poverty reduction in the short run is not significant. The results of this study were not consistent with the findings by Nindi and Odhiambo (2015) despite that the same technique was employed to analyse data.

Further studies have been conducted to investigate the linkage between economic growth and poverty. In the other study, Agrawal (2008) wanted to empirically examine the relationship between economic growth and poverty alleviation in Kazakhstan using province-level data. Using regression analysis of Generalised Least Squares on panel data from 2000-2002 in which poverty was made a function of economic growth as measured by per capita growth rate, it was found that higher growth rates of GDP per capita were strongly associated with larger declines in poverty across the provinces. He noted that these results provide a strong confirmation for Kazakhstan of the result that a high GDP growth rate reduces poverty. Agrawal (2008) concluded that rapidly increasing oil revenues since 1998 have helped significantly raise both gross domestic product growth and government revenue in Kazakhstan. Part of the oil fund was used to fund a pension and social protection program that has helped reduce poverty. This means that for growth to alleviate poverty, there is need to invest part of gains from economic boom into social security programme.

The debate on economic growth and poverty has interested many researchers. In a related study by Le, et al (2014) analysed and evaluated the effect of growth on poverty in Vietnam by estimating growth elasticity of poverty using various methods. The main findings of their study were that the growth elasticity of poverty based on the national accounts was estimated to be 0.95 for the 1990s and 0.83 for the 2000s, however, the estimates based on the growth semi-elasticity of poverty were 0.55 and 0.24. Using the decomposition of growth elasticity of poverty, the study found that income growth has been pro-poor during the 1990s and the 2000s. They concluded that growth and trade have a positive role in poverty reduction.

2.3 CHAPTER SUMMARY AND IDENTIFICATION OF RESEARCH GAP

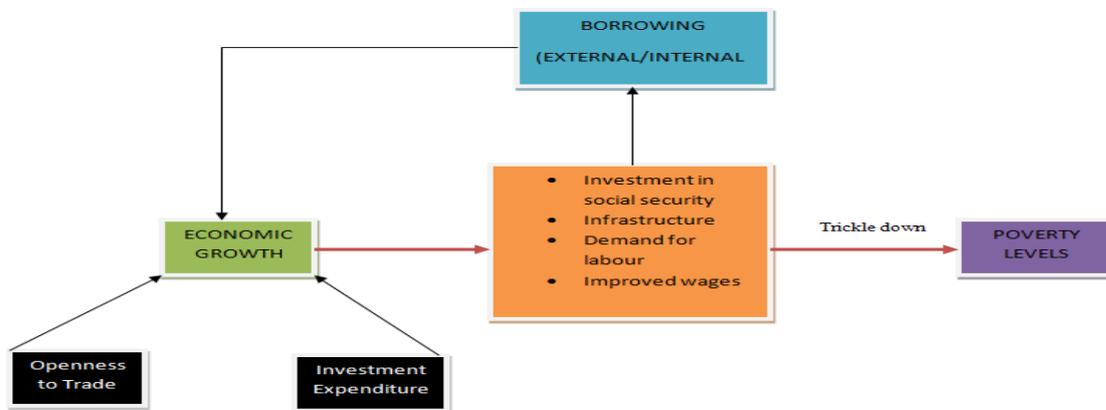
Many studies both theoretical and empirical have been reviewed. There is a strong contention between the two poverty theories of trickle-down and trickle up in terms of economic growth and its effect on poverty. The public debt hypothesis which posits that a reasonable level of public debt is necessary to stir growth was brought under scrutiny. While there theory does not specify the level of debt that can stir growth other than harm it, some empirical studies have shown that on average, public debt of above 30% of GDP can cause instability. In order to over the instability, other studies have argued that governments opt to domestic borrowing rather than external borrowing. In the study reviewed so, there is no one study that has addressed the impact of both sources of borrowing

in a single model. This could explain why reviewed studies have yielded inconsistent results. Thus, this study encompassed only external. The impact of economic growth on poverty is still inconclusive as other studies that include Nindi and Odhiambo (2015) have found no causal relationship while other still find either positive Matiti (2013) or negative Checherita and Rother (2010) relationship. The reason could range from methodologies to lack of generalisation of a single model. Above all, of these studies reviewed, none of them has focused on Zambia. This means that there exists a research gap not only in terms of methodology but also that there is no evidence of a similar study done on Zambia.

2. 4 CONCEPTUAL FRAMEWORK

The relationship of the variables under investigation can conceptually be organised as below. The conceptual framework presented below shows that economic growth can emanate from openness to trade, investment and public debt. When there is economic growth and the government invests in social security programmes, when firms hire more labour and improve wages of their labour force, there will be a trickle-down effect which would lead to alleviating of poverty. Thus, public debt can influence poverty through its influence on economic growth.

Figure 2: CONCEPTUAL FRAMEWORK ON POVERTY, ECONOMIC GROWTH AND PUBLIC DEBT



SOURCE: OWN CONCEPTUAL FRAMEWORK

**CHAPTER THREE:
RESEARCH DESIGN AND METHODOLOGY**

3.0 OVERVIEW

The main objective of this study was to investigate the impact of economic growth and public debt on poverty levels in Zambia. Time series data from 1980 to 2016 was used in this study. This chapter, therefore, highlights the research design and methodology used in this study. It also discusses the estimation procedure, data sample and source

3.1 RESEARCH DESIGN

Due to the nature of the time series data set, this research was purely quantitative in nature. This is so because the data to be collected was all quantitative and made use of time series econometrics. In time series econometrics, it is required that quantitative data is obtained that will be analysed and tested using time series econometrics procedure. The study modified many other models that include Akram (2016), Checherita and Rother (2010), Al-Zeaud (2014), Ikechukwu (2012), Nindi and Odhiambo (2015) and Tahir, et al (2014) among others. This was aimed at accounting for the other variables that might not have been captured in a single model of the above studies. In this study, poverty was made a function of economic growth, external debt and population growth. This relationship can be presented mathematically as below;

$$PHC = f(GDPG, EXDT, POPG).....(1)$$

Where;

POV is variable poverty incidence

GDPG is variable Gross Domestic Product growth rate

EXDT is variable External Debt and

POPG is variable population growth rate

3.2 MODEL SPECIFICATION

Arising from the mathematical model above, an econometric model can be specified. For analytical convenience, the variables are expressed in percentages. Because changes in the natural logarithm are (almost) equal to percentage changes in the original series, it follows that the slope of a trend line fitted to logged data is equal to the average percentage growth in the original series. Percentage changes in the variables and rates are not logged because of their negative nature and since

relationships between economic variables are generally inexact, this model included the disturbance term which takes into account other factors that may affect poverty other than economic growth and public debt. The above mathematical model then can be specified as follows:

$$\Delta PHC_t = \alpha_0 + \sum_{t=1}^k \alpha_{1i} \Delta PHC_{t-1} + \sum_{t=1}^k \alpha_{2i} \Delta GDPG_{t-1} + \sum_{t=1}^k \alpha_{3i} \Delta EXDT_{t-1} + \sum_{t=1}^k \alpha_{4i} \Delta POPG_{t-1} + \beta_1 PHC_{t-1} + \beta_2 GDPG_{t-1} + \beta_3 EXDT_{t-1} + \beta_4 POPG_{t-1} + \mu_t \dots \dots \dots (2)$$

Where; α_{1i} are elasticities of the short run model and β_j represents the slope coefficients of the long run model of k lags and measures the elasticities of the poverty to a unit change in the independent variables. μ_t is the error term that accounts for other variables not included in the model.

3.2.1 DEFINITION OF VARIABLES

The dependent variable Poverty (PHC) is defined as the proportion of people of a given population who cannot afford the basic basket. Poverty in this study was measured by Headcount which measures the incidence of poverty in a country. As it is a proportion of the population, it was presented as a rate equal to the log. Independent variable GDP growth rate (GDPG) is a measure of economic growth which is the rate of change in GDP per annum. In this study, GDP growth rate was used to measure the annual growth of the economy. Independent variable external debt (EXDT) is the total government monetary obligation owed to international creditors and independent variable Population Growth Rate (POPG) is the annual growth rate of the country's human population.

3.3 ESTIMATION PROCEDURE

The first step in our analysis was to test for stationarity of our variables. Gujarati (2012) suggests that a stationary stochastic process implies that the mean and variance are constant over time, and the covariance between two periods depends only on the lag between the two time periods and not the actual time at which the covariance is computed. This implies therefore that a non-stationary time series will have a varying mean or varying variance or both.

The statistical and time series properties of the data set were first carried out using the Augmented Dickey-Fuller (ADF) to test for unit root as regressing non-stationary variables does not depict any meaningful economic relationship between them as they lead to spurious results. It is for this reason that the use of non-stationary variables should be avoided. Stationarity test was used to determine the order of integration of the variables.

Having established the order of integration, the next step was to estimate the long run model. After the variables were found to be integrated of different orders i.e. some variables were found to be non-stationary at level but stationary at first difference, an Auto Regression Distributed lag method of Cointegration test was adopted in line with Pesaran, et al (2001).

In order to cure for any estimation problem, a diagnostic test was undertaken that aimed at checking for serial correlation, specification bias, normal distribution of the data sets and homoscedasticity among others.

3.4 DATA SAMPLE AND SOURCE

This study employed annual time series data from 1980 to 2016. This secondary data for the period under study was obtained from the IMF international financial statistics, World Bank, Index Mundi, Ministry of Finance, Central Statistics Office and the Bank of Zambia.

3.5 DATA ANALYSIS

The collected data was first entered into Microsoft Excel and then exported to Eviews 9.5 econometric package for analysis. The choice of this package was based on the nature of our data as time series set and that Eviews gives a better and simplified analysis of time series data set. The output was then presented and compiled as research findings.

3.6. DATA VALID AND RELIABILITY

The reliability was achieved by means of data collection sources. As this study was purely quantitative, the secondary data used was collected from reliable sources of the World Bank, Bank of Zambia, IMF international Statistics and Index Mundi. The data from each source was compared and only data that was consistent with at least two sources was inputted. Valid is very cardinal to any research undertaking as it is out of validity that research generalisation can be achieved, as a result, valid is definitely assured as there was no research biasness and that the collected data was collected with no any predetermined outcome.

3.7. ETHICAL CONSIDERATIONS

Ethics are very important in any research undertaking. In fact, ethics form the core value of research. In this study, research ethics were abided by through the use of reliable data set and that in the process of data analysis, the study endeavoured to avoid prejudice and result manipulation.

CHAPTER FOUR: DATA ANALYSIS AND INTERPRETATIONS

4.0 OVERVIEW

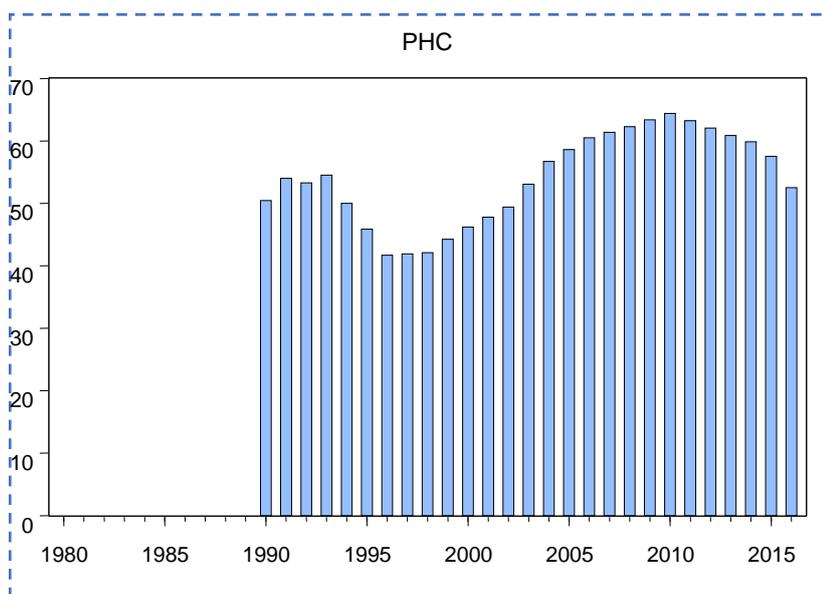
It is important that the data collected is processed, analysed and interpreted in order to add meaning to the data set. This chapter, therefore, presents the analysis of the collected time series data used in this study. In this analysis, both the descriptive and econometric approaches have been used.

4.1 DESCRIPTIVE STATISTICAL ANALYSIS

This section presents descriptive data presentation through the use of graphs, charts and figures to statistical data of the variables under investigation. According to Kazmier (2004), descriptive statistics is used in summarising and describing numerical data for easier interpretation. The charts, tables and graphs presented here are Eviews and Excel out of the variables.

4.1.1 DISTRIBUTION OF POVERTY BELOW POVERTY LINE

Figure 3: DISTRIBUTION OF POPULATION BELOW POVERTY LINE (1980-2016)

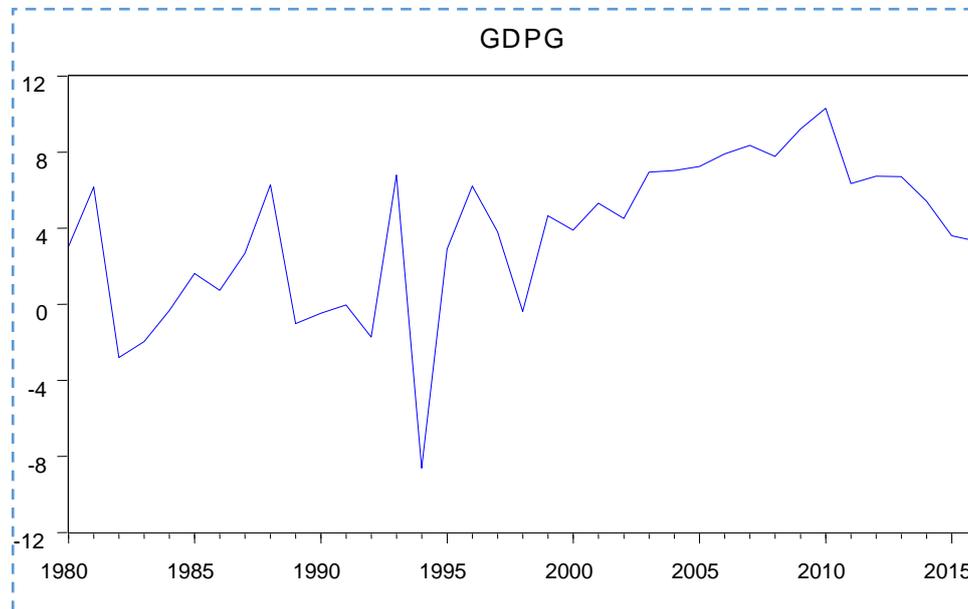


The figure above presents the distribution of the population below the \$1.90 poverty line at 2011 PPP. The gap obtained between 1980 to 1990 shows non-availability of data on poverty. However, poverty was highest in 2010 with 64.4% of the population said to be below the poverty line while the country recorded lowest poverty level in 1996 at 41.7% with an average poverty level of about 40%. Thus, it can be concluded that on average, over 40% of the population fall below the \$1.90 poverty line at 2011 prices which is slightly below the Sub Sahara average of 43%.

4.1.2 TREND IN GROSS DOMESTIC PRODUCT GROWTH RATE

GDP growth rate is a positive signal for economic growth. A growing economy is expected to impact positively on most macroeconomic indicators. Below is the trend in the GDP growth rate

Figure 4: TREND IN GDP GROWTH RATE (1980-2016)

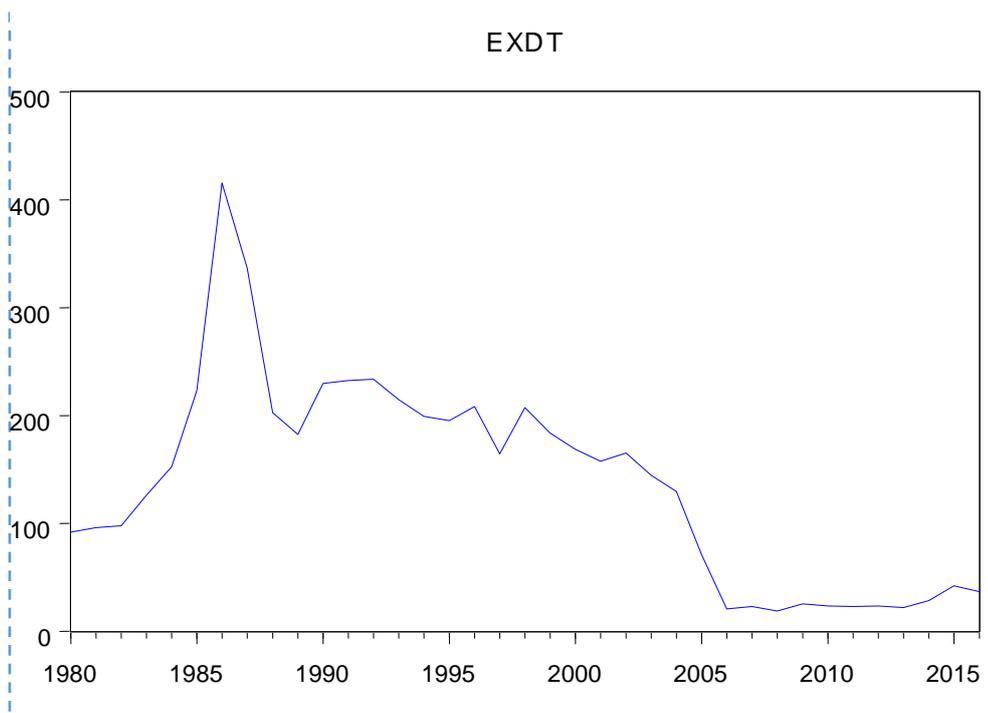


The GDP growth rate from 1980 to 2016 has assumed a sinusoidal trend with an average amplitude of 3.7%. The GDP growth rate was highest in 2010 at 10.3% which was the first ever double-digit economic growth rate and lowest in 1994 at -8.6%. The 2010 growth rate, however, coincides with a higher poverty level of about 64.4%. This means, there could be other factors directly influencing poverty rather than economic growth.

4.1.3 EXTERNAL PUBLIC DEBT

Governments world over tend to borrow domestically and internationally. The proportion of debt to GDP is cardinal to economic sustainability of the country. It is believed that cumulative higher proportion of external debt to GDP incapacitates economic growth. The figure below presents external debt to GDP ratio for Zambia from 1980 to 2016

Figure 5: TRENDS IN PUBLIC EXTERNAL DEBT (1980-2016)



External debt was highest in 1986 at 415.560% of GDP and was lowest in 2008 at 18.65% of GDP. The record low external debt in 2008 followed the HIPC completion point. From 1990, external debt assumes a relative downward trend.

4.1.4 SUMMARY STATISTICS

Table 1: SUMMARY STATISTICS

	EXDT	GDPG	PHC	POPG
Mean	138.2076	3.731351	39.39432	2.894126
Median	152.4600	4.506014	50.00000	2.881119
Maximum	415.5600	10.29821	64.40000	3.464681
Minimum	18.65000	-8.625442	0.000000	2.499392
Std. Dev.	96.16932	4.025246	25.08504	0.293224
Skewness	0.569760	-0.851512	-0.837246	0.439853
Kurtosis	3.236964	3.630145	1.951173	2.124051
Jarque-Bera	2.088430	5.083446	6.018602	2.375968
Probability	0.351968	0.078731	0.049326	0.304835
Sum	5113.680	138.0600	1457.590	107.0827
Sum Sq. Dev.	332947.4	583.2939	22653.34	3.095292
Observations	37	37	37	37

The summary statistics of the variables poverty, economic growth, external debt and population growth for 37 year period summarised above show that the means for external debt, economic growth rate, poverty levels and population growth are 138.20% of GDP, 3.73%, 39.4% of the population and 2.89% respectively. In terms of normality distribution, all the variables were found to be moderately skewed, i.e., the heights of these variables are close to the centre.

4.2 TIME SERIES ECONOMETRICS ANALYSIS

This section provides the results of the time series econometrics analysis. The results spelt out here followed the laid down procedures required in time series data analysis and are presented as below

4.2.1 STATIONARITY TEST (THE AUGMENTED DICKEY FULLER –ADF TEST)

It is important to verify the stationarity properties of variables in the model. This is vital because econometric analysis of non-stationary variables leads to spurious results and also affects the efficiency and consistency of the estimated results (Gujarati, 2012). To determine the order of integration, ADF unit root test was carried out on variables. The unit root test equation follows that;

$$Y_t = \rho Y_{t-1} + U_t \dots \dots \dots (3)$$

Where if $\rho = 1$, it is unit root and nonstationary and subtracting Y_{t-1} which is the lag of the variable from both sides yields the first difference of that variable whose equation is given by;

$$\Delta Y_t = (\rho - 1)Y_{t-1} + U_t \dots \dots \dots (4)$$

The null hypothesis underlying unit root testing is that the variable under investigation has a unit root ($\rho = 1$) against the alternative hypothesis that it does not have a unit root ($\rho \neq 1$) and thus stationary. The results of the unit root test for variables used in the analysis in their logged form are reported in Table below;

Table 2: ADF Unit Root Test at 5% with Trend and Intercept

VARIABLE	ADF t-stat At Level	CV @ 5% Level	ADF t-stat at 1 st Diff	CV (5%) 1 st Diff	Conclusion
PHC	-1.557	-3.540	-5.375	-3.544	I(1)
GDPG	-5.578	-3.544			I(0)
EXDT	-3.410	-3.548	-3.916	-3.558	I(1)
POPG	-0.974	-3.548	-5.989	-3.548	I(1)

The unit root test results above show that three of the variables namely poverty, external debt and population growth rate were integrated of order one I(1), meaning that they were not stationary at level but become stationary after the first difference. The other variable i.e. GDP growth was integrated of order Zero I(0), meaning that the variable was stationary at level and hence could not be differenced to bring it to stationarity. Since these variables were found to be integrated of different orders, the usual OLS regression could not be employed and neither could the Johansen

Cointegration be employed. According to Pesaran, et al (2001) when variables are integrated of different orders, the Auto Regression Distributed Lag (ARDL) should be used.

4.2.2 LAG SELECTION

Before the ARDL model for the long-run relationship can be estimated, it is required that an optimal lag is selected. This was done by the lag selection procedure. Under this procedure, a number of criteria are generated to which the optimal lag is that selected by a majority of the criterions. The results of lag selection criterion are shown in the table below.

Table 3: LAG SELECTION CRITERIA

VAR Lag Order Selection Criteria
 Endogenous variables: PHC GDPG EXDT POPG
 Exogenous variables: C
 Date: 04/15/18 Time: 16:54
 Sample: 1980 2016
 Included observations: 32

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-392.0301	NA	660301.3	24.75188	24.93510	24.81261
1	-296.6019	161.0351	4658.421	19.78762	20.70370	20.09127
2	-256.3514	57.85996	1077.899	18.27197	19.92092	18.81855
3	-222.7633	39.88596	411.6157	17.17270	19.55453	17.96221
4	-164.0725	55.02258*	38.01971*	14.50453	17.61922*	15.53696
5	-139.7470	16.72377	39.34104	13.98419*	17.83175	15.25955*

* indicates lag order selected by the criterion
 LR: sequential modified LR test statistic (each test at 5% level)
 FPE: Final prediction error
 AIC: Akaike information criterion
 SC: Schwarz information criterion
 HQ: Hannan-Quinn information criterion

As can be seen above, the optimal lag selected by most criterions is lag 4. Thus, the ARDL model estimate was based on three lags.

4.2.3 ESTIMATION OF ARDL MODEL

The long-run equilibrium relationship between the dependent variable Poverty levels and the independent variables economic growth, External Debt and Population growth was estimated using the ARDL equation given below.

$$\Delta PHC_t = \alpha_0 + \sum_{t=1}^k \alpha_{1i} \Delta PHC_{t-1} + \sum_{t=1}^k \alpha_{2i} \Delta GDPG_{t-1} + \sum_{t=1}^k \alpha_{3i} \Delta EXDT_{t-1} + \sum_{t=1}^k \alpha_{4i} \Delta POPG_{t-1} + \beta_1 PHC_{t-1} + \beta_2 GDPG_{t-1} + \beta_3 EXDT_{t-1} + \beta_4 POPG_{t-1} + \mu_t \dots \dots \dots (5)$$

Arising from the ARDL equation above were the results of the estimated ARDL model presented in the table given below

Table 4: ARDL ESTIMATION

Dependent Variable: D(PHC)
 Method: Least Squares
 Date: 04/15/18 Time: 17:09
 Sample (adjusted): 1985 2016
 Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-37.78351	89.19913	-0.423586	0.6800
D(PHC(-1))	-0.595333	0.346428	-1.718488	0.1137
D(PHC(-2))	-0.133194	0.245219	-0.543165	0.5979
D(PHC(-3))	0.069754	0.170552	0.408993	0.6904
D(PHC(-4))	-0.032255	0.187418	-0.172102	0.8665
D(GDPG(-1))	-2.942089	1.569788	-1.874195	0.0877
D(GDPG(-2))	-1.885889	1.393878	-1.352980	0.2032
D(GDPG(-3))	-1.027248	1.028909	-0.998386	0.3395
D(GDPG(-4))	-0.450808	0.590885	-0.762936	0.4615
D(EXDT(-1))	-0.084605	0.072361	-1.169200	0.2670
D(EXDT(-2))	-0.104224	0.077736	-1.340732	0.2070
D(EXDT(-3))	-0.171171	0.064074	-2.671448	0.0217
D(EXDT(-4))	-0.020417	0.065893	-0.309846	0.7625
D(POPG(-1))	-30.05133	169.4336	-0.177363	0.8624
D(POPG(-2))	-139.8925	384.5688	-0.363765	0.7229
D(POPG(-3))	195.8176	401.4140	0.487819	0.6353
D(POPG(-4))	-119.6724	197.0824	-0.607220	0.5560
PHC(-1)	-0.186044	0.229976	-0.808974	0.4357
EXDT(-1)	0.101625	0.083414	1.218320	0.2486
GDPG(-1)	3.376353	1.444770	2.336947	0.0394
POPG(-1)	6.870555	25.30925	0.271464	0.7911
R-squared	0.915691	Mean dependent var		1.640625
Adjusted R-squared	0.762403	S.D. dependent var		9.185442
S.E. of regression	4.477344	Akaike info criterion		6.080596
Sum squared resid	220.5127	Schwarz criterion		7.042486
Log likelihood	-76.28954	Hannan-Quinn criter.		6.399435
F-statistic	5.973654	Durbin-Watson stat		2.170004
Prob(F-statistic)	0.002047			

The above results give an ARDL model of the equations set above.

4.2.4 DIAGNOSTIC TESTS

Time series econometrics requires that a diagnostic test of the model is undertaken because the conclusion drawn may be very misleading if there is no cure to some of the problems exhibited by the model. In the case of the ARDL Model above, the first test was a test for serial correlation which was followed by the JB Normality, Cusum stability test and the heteroscedasticity test.

The diagnostic test showed that the first estimated model suffered from serial correlation and instability, however, it passed the white's heteroscedasticity and the JB normality test. To cure for serial correlation and model instability, the model was re-estimated after dropping some variables from the model and the results presented below

Table 5: RE-ESTIMATED ARDL MODEL

Dependent Variable: D(PHC)
 Method: Least Squares
 Date: 04/15/18 Time: 17:22
 Sample (adjusted): 1985 2016
 Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-17.51237	64.31862	-0.272275	0.7894
D(PHC(-1))	-0.466754	0.143515	-3.252304	0.0058
D(PHC(-2))	-0.039109	0.130885	-0.298807	0.7695
D(PHC(-3))	0.136472	0.148342	0.919984	0.3732
D(GDPG(-1))	-2.099783	0.636689	-3.297974	0.0053
D(GDPG(-2))	-1.033189	0.521665	-1.980561	0.0676
D(GDPG(-3))	-0.357163	0.294331	-1.213473	0.2450
D(EXDT(-1))	-0.064295	0.051196	-1.255865	0.2297
D(EXDT(-2))	-0.078191	0.054354	-1.438560	0.1723
D(EXDT(-3))	-0.157856	0.036694	-4.302000	0.0007
D(POPG(-1))	-44.65527	132.7007	-0.336511	0.7415
D(POPG(-2))	-106.5135	306.9410	-0.347016	0.7337
D(POPG(-3))	171.6058	342.7331	0.500698	0.6244
D(POPG(-4))	-107.8619	177.5130	-0.607628	0.5532
PHC(-1)	-0.220092	0.169976	-1.294843	0.2163
EXDT(-1)	0.058781	0.057847	1.016150	0.3268
GDPG(-1)	2.529509	0.676198	3.740783	0.0022
POPG(-1)	3.382379	18.08816	0.186994	0.8543
R-squared	0.904536	Mean dependent var		1.640625
Adjusted R-squared	0.788616	S.D. dependent var		9.185442
S.E. of regression	4.223146	Akaike info criterion		6.017359
Sum squared resid	249.6895	Schwarz criterion		6.841836
Log likelihood	-78.27775	Hannan-Quinn criter.		6.290650
F-statistic	7.803091	Durbin-Watson stat		2.099311
Prob(F-statistic)	0.000178			

The diagnostic test results for the re-estimated model is summarised in the table below

Table 6: DIAGNOSTIC TEST RESULTS

Test Type	Value	P-value
JB-Normality	0.3817	0.8262
White's Heteroscedasticity	11.16448	0.8479
Serial Correlation	7.8102	0.0988

With the JB value of 0.3817 and a probability of 0.8262, the probability was found to be significantly high. This meant that the null hypothesis of normally distributed residuals could not be rejected. The residuals, therefore, were normally distributed.

Under the null hypothesis that there is no heteroscedasticity (i.e. the errors are homoscedastic), it can be shown that sample size (n) times the R^2 obtained from the auxiliary regression asymptotically follows the chi-square distribution with df equal to the number of regressors (excluding the constant term) in the auxiliary regression. If the chi-square value obtained exceeds the critical chi-square value at the chosen level of significance, the conclusion is that there is heteroscedasticity. If it does not exceed the critical chi-square value, is insignificant and hence there is no heteroscedasticity. The P value for the chi-square value of 11.16448 is insignificant at the P value equal to 0.8479, as a result, the null hypothesis of no heteroscedasticity cannot be rejected.

Under autocorrelation, the usual OLS estimators, although linear, unbiased and asymptotically normally distributed, are no longer minimum variance among all linear unbiased estimators. In short, they are not efficient relative to other linear and unbiased estimators. That is to say, they may not be BLUE. As a result, the usual, t, F, and χ^2 may not be valid. The model was tested for autocorrelation using the LM serial correlation test. The results show that the null hypothesis of no serial correlation cannot be rejected based on an insignificant P value of 0.0988.

From the above diagnostic results, it has been found that residues are normally distributed, error variances are homoscedastic and there is no autocorrelation in the model, this implies that we can adopt the model and test it for Cointegration. According to Pesaran, et al (2001), the Bound test is used in the ARDL in testing for Cointegration.

4.2.5 BOUND TEST FOR LONG RUN RELATIONSHIP

Under this test, the Null hypothesis is that the coefficients of the long run model are simultaneously equal to zero. The test results are summarised below

Table 7: BOUND TEST FOR COINTEGRATION

Wald Test: Equation: Untitled			
Test Statistic	Value	df	Probability
F-statistic	8.335628	(4, 14)	0.0012
Chi-square	33.34251	4	0.0000
Null Hypothesis: C(15)=C(16)=C(17)=C(18)=0 Null Hypothesis Summary:			
Normalized Restriction (= 0)	Value	Std. Err.	
C(15)	-0.220092	0.169976	
C(16)	0.058781	0.057847	
C(17)	2.529509	0.676198	
C(18)	3.382379	18.08816	

Restrictions are linear in coefficients.

From the test results above, the H_0 of no long-run relationship has been rejected. Thus, there exists a Long Run relationship between the dependent variable poverty and the independent variables economic growth, external debt and population growth. The long-run poverty model was estimated and the results are presented below

Table 8: LONG RUN POVERTY MODEL

Dependent Variable: PHC
 Method: Least Squares
 Date: 04/15/18 Time: 19:56
 Sample: 1980 2016
 Included observations: 37

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	244.3391	22.89200	10.67356	0.0000
GDPG	0.449097	0.593838	0.756262	0.4549
EXDT	-0.158098	0.025344	-6.238171	0.0000
POPG	-63.84315	7.161612	-8.914634	0.0000
R-squared	0.791123	Mean dependent var		39.39432
Adjusted R-squared	0.772134	S.D. dependent var		25.08504
S.E. of regression	11.97443	Akaike info criterion		7.905229
Sum squared resid	4731.767	Schwarz criterion		8.079383
Log likelihood	-142.2467	Hannan-Quinn criter.		7.966627
F-statistic	41.66251	Durbin-Watson stat		1.040707
Prob(F-statistic)	0.000000			

4.2.6 ESTIMATING THE SHORT RUN POVERTY MODEL

Having established the long run model, the short run model is required to be established and determine the speed of adjustment of the short run to the Long Run Model. The speed of adjustment is determined by the Error Correction Term (ECT). This estimate of the short run model requires that another regressor, the (ECT) is introduced to take care of short-run disequilibrium. The results below summarises the results of the estimated short-run model.

Table 9: SHORT RUN MODEL ESTIMATION

Dependent Variable: D(PHC)
 Method: Least Squares
 Date: 04/15/18 Time: 20:13
 Sample (adjusted): 1985 2016
 Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.391305	1.354604	1.027093	0.3188
D(PHC(-1))	-0.253247	0.214035	-1.183204	0.2530
D(PHC(-2))	-0.064826	0.167672	-0.386625	0.7038
D(PHC(-3))	-0.024887	0.185998	-0.133805	0.8951
D(GDPG(-1))	-0.369479	0.450713	-0.819767	0.4237
D(GDPG(-2))	0.122506	0.579057	0.211561	0.8350
D(GDPG(-3))	0.236220	0.376686	0.627102	0.5389
D(EXDT(-1))	-0.008731	0.039857	-0.219053	0.8292
D(EXDT(-2))	-0.024442	0.036081	-0.677405	0.5073
D(EXDT(-3))	-0.094818	0.036759	-2.579470	0.0195
D(POPG(-1))	-75.40781	172.9244	-0.436074	0.6683
D(POPG(-2))	-104.4381	440.9715	-0.236837	0.8156
D(POPG(-3))	214.8907	443.8806	0.484118	0.6345
D(POPG(-4))	-118.1773	178.6154	-0.661630	0.5171
ECT(-1)	-0.316112	0.215250	-1.468576	0.1602
R-squared	0.713523	Mean dependent var		1.640625
Adjusted R-squared	0.477601	S.D. dependent var		9.185442
S.E. of regression	6.638978	Akaike info criterion		6.928770
Sum squared resid	749.2924	Schwarz criterion		7.615834
Log likelihood	-95.86033	Hannan-Quinn criter.		7.156513
F-statistic	3.024401	Durbin-Watson stat		1.362673
Prob(F-statistic)	0.016357			

As per estimation procedure, the short run model was subjected to diagnostic tests in terms of serial correlation and model stability. The initial model exhibited the following results on serial correlation while it was also found unstable.

Table 10: SERIAL CORRELATION TEST**Breusch-Godfrey Serial Correlation LM Test:**

F-statistic	1.790521	Prob. F(4,13)	0.1909
Obs*R-squared	11.36721	Prob. Chi-Square(4)	0.0227

Based on the above results, the H_0 of no serial correlation is rejected, thus, the Short Run has serial correlation. To cure for serial correlation, some variables in the Short Run model were dropped and the model re-estimated. The results obtained are presented below

Table 11: ESTIMATED ECM

Dependent Variable: D(PHC)
 Method: Least Squares
 Date: 04/15/18 Time: 21:02
 Sample (adjusted): 1985 2016
 Included observations: 32 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.737324	1.345193	1.291506	0.2120
D(PHC(-2))	0.000175	0.164288	0.001063	0.9992
D(PHC(-3))	0.026367	0.151521	0.174018	0.8637
D(PHC(-4))	-0.092377	0.174527	-0.529302	0.6027
D(GDPG(-1))	-0.388290	0.506812	-0.766142	0.4530
D(GDPG(-2))	0.090378	0.571376	0.158176	0.8760
D(GDPG(-3))	0.128338	0.386311	0.332214	0.7434
D(EXDT(-1))	0.010531	0.035457	0.296995	0.7697
D(EXDT(-2))	-0.021972	0.034537	-0.636175	0.5323
D(EXDT(-3))	-0.069736	0.029776	-2.342019	0.0302
D(POPG(-2))	-97.93639	49.87239	-1.963740	0.0644
D(POPG(-3))	64.77632	49.16809	1.317446	0.2034
ECT(-1)	-0.468054	0.197469	-2.370268	0.0285
R-squared	0.658404	Mean dependent var		1.640625
Adjusted R-squared	0.442660	S.D. dependent var		9.185442
S.E. of regression	6.857413	Akaike info criterion		6.979741
Sum squared resid	893.4581	Schwarz criterion		7.575196
Log likelihood	-98.67585	Hannan-Quinn criter.		7.177117
F-statistic	3.051776	Durbin-Watson stat		1.710821
Prob(F-statistic)	0.014632			

The follow up serial correlations test yielded the following results

Table 12: SERIAL CORRELATION TEST FOR ECM

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.544443	Prob. F(4,15)	0.7058
Obs*R-squared	4.056909	Prob. Chi-Square(4)	0.3984

Based on the above results, the H_0 of no serial correlation cannot be rejected, thus, the re-estimated Short Run has no serial correlation and meets the Classical assumption of no serial correlation.

4.2.7 TEST FOR SHORT RUN CAUSALITY

Having passed the serial correlation and the stability tests, the above short-run model was adopted as the short run model and further tested for short-run causality between the variables. This test is aimed at establishing if there is short-run causality running from the independent variable to the dependent variable. The null hypothesis for this test (H_0) is that there is no causality.

Short Run Causality of Economic Growth on Poverty

The test is to examine if economic growth does cause poverty in the Short Run. The Test results are presented below

Table 13: SHORT RUN CAUSALITY OF ECONOMIC GROWTH

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	0.732502	(3, 19)	0.5454
Chi-square	2.197505	3	0.5324

Null Hypothesis: $C(5)=C(6)=C(7)=0$
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(5)	-0.388290	0.506812
C(6)	0.090378	0.571376
C(7)	0.128338	0.386311

Restrictions are linear in coefficients.

As *P* value (0.54) is significantly higher than 5%, H_0 of no causality cannot be rejected. Thus, Economic growth does not cause poverty.

Short Run Causality of External Debt on Poverty

The test is to examine if External debt does cause poverty in the Short Run. The Test results are presented below

Table 14: SHORT RUN CAUSALITY OF EXTERNAL DEBT

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	2.827830	(3, 19)	0.0661
Chi-square	8.483491	3	0.0370

Null Hypothesis: $C(8)=C(9)=C(10)=0$
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(8)	0.010531	0.035457
C(9)	-0.021972	0.034537
C(10)	-0.069736	0.029776

Restrictions are linear in coefficients.

As *P* value (0.037) is significantly lower than 5%, H_0 of no causality is rejected. Thus, external debt does cause poverty.

Short Run Causality of Population Growth on Poverty

The test is to examine if Population growth does cause poverty in the Short Run. The Test results are presented below

Table 15: SHORT RUN CAUSALITY OF POPULATION GROWTH

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	2.141093	(2, 19)	0.1450
Chi-square	4.282187	2	0.1175

Null Hypothesis: $C(11)=C(12)=0$
Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(11)	-97.93639	49.87239
C(12)	64.77632	49.16809

Restrictions are linear in coefficients.

As *P* value (0.118) is significantly higher than 5%, H_0 of no causality cannot be rejected. Thus, Population growth does not cause poverty.

Short Run Causality of Economic Growth, External Debt and Population on Poverty

A test was carried out to find out if economic growth, external debt and population growth can simultaneously cause poverty. The test results are presented below

Table 16: SHORT RUN OVERALL CAUSALITY

Wald Test:
Equation: Untitled

Test Statistic	Value	df	Probability
F-statistic	2.411032	(8, 19)	0.0551
Chi-square	19.28826	8	0.0134

Null Hypothesis: $C(5)=C(6)=C(7)=C(8)=C(9)=C(10)=C(11)=C(12)=0$

As *P* value (0.0134) is significantly lower than 5%, H_0 of no causality was rejected. Thus, Economic growth, external debt and Population growth does simultaneously cause poverty

CHAPTER FIVE:

DISCUSSION OF THE FINDINGS

5.0 OVERVIEW

It is important that the analysed data and findings of the study are discussed in order to add meaning and elaborate on the findings of the study. This chapter, therefore, presents a discussion of the analysed.

5.1 UNIT ROOT TEST

The ADF test was conducted in order to ascertain the order of integration of the variable. The results found that only one variable (economic growth) was stationary at level. This meant that the Ordinary Least Square method for regression could not be carried out on these variables. The problem of using non-stationary variable is spuriousness of the results. In order to deal with this problem, Auto Regression Distributed Lag (ARDL) was employed and the findings of the model can now be adopted and interpreted with economic sense to it.

5.2 LONG RUN POVERTY MODEL

The long-run poverty model was estimated using the ARDL method. The estimated model is given by the following equation

$$PHC = 244.33 + 0.449GDPG - 0.158EXDT - 63.84POPG.....(6)$$

The poverty model above shows that ceteris paribus, Poverty incidence will significantly average 244%. The economic growth coefficient of 0.44 means that a percentage point increase in economic growth will increase incidences of poverty by 0.44 percentage point and a reduction in economic growth by a percentage point will reduce poverty incidences by 0.44 percentage point. The results of the economic growth coefficient are however not consistent with the priori expectation that economic growth does reduce poverty, in this case, economic growth leads to an increase in poverty levels. This can be attributed to the trickle up theory which postulates that economic growth leads to the increase in poverty. The impact of economic growth, however, is insignificant as can be seen from the p-value of 0.4549. This means that although there exists a relationship between poverty and economic growth, such a relationship is insignificant, thus, the influence of economic growth on poverty is insignificant.

The External debt coefficient of -0.158 means that, a percentage point increase in Stock of external debt will reduce incidences of poverty by 0.158 percentage point. That is to say, when the government borrows from the external sources, the borrowed funds may be invested in the socio-

economic factors that trickle down to the masses and as a result, reduce poverty. This is against the priori expectation that external debt stock will exacerbate poverty. The results of the external debt can be attributed to the fact that the government does not compete with the private sector for the same resources which case cause crowding out of private investment. The concern for debt overhang, however, remains as the increase in the stock of debt entails increased interest payments which reduce the resources available for other social and economic sectors. The influence of external debt was found to be significant with the P-value of less than 5%. Thus, the impact of external debt on poverty cannot be ignored.

The population growth coefficient of -63.84 means that, a percentage point increase in population growth will reduce poverty incidences by 63.84 percentage point. The results of the population coefficient are not consistent with the priori expectation that population growth will exacerbate poverty. This phenomenon is strongly argued by the Malthusian theory that population growth puts pressure on the available resources and therefore leads to high poverty levels. In this study, it was found that growth in population can reduce poverty. This is so, with increased population, there is increased human capital necessary to drive up output (GDP). The population growth coefficient was found to be statistically significant at 5%. This means that there significant impact of population growth on poverty levels.

The R^2 of 0.79 means that about 79% variations in Poverty levels, in the Long Run, are explained by variations in Economic growth, external debt and population growth. With the F p-value found to be significantly low implying that the Model is significant. Thus, the estimated model has been accepted as a long run model.

Although individually, some variables are insignificant, the Wald test of the long run model shows that all the variables are simultaneously significant. That is, economic growth, external debt and population growth simultaneously influence poverty levels.

5.3 SHORT-RUN POVERTY MODEL (ERROR CORRECTION MODEL)

In line with the requirement of econometrics time series data analysis, a short run model must be developed to account for short-run disequilibrium in the variables. Thus, the short run poverty model was estimated and the Error Correction Mechanism as the main factor for the short run model to account for the speedy of adjustment from the short run disequilibrium to long-run equilibrium. The equation below is the short run poverty model

$$\begin{aligned}
D(PHC) = & 1.73 + 0.026D(PHC(-3)) - 0.09D(PHC(-4)) - 0.388D(GDPG(-1)) + 0.09DGDPG(-2) \\
& + 0.128DGDPG(-3) + 0.011DEXDT(-1) - 0.022DEXDT(-2) - 0.069DEXDT(-3) \\
& - 97.936POPG(-2) + 64.776DPOPG(-3) \\
& - 0.468ECT(-1) \dots \dots \dots (7)
\end{aligned}$$

The Short-run model is the differenced variables of the long run poverty with the Error Correction Term (ECT). The Wald test of this model found that individually, economic growth and population growth does not cause poverty while external debt was found to cause poverty in the short run. However, the short run model showed that the null hypothesis of no causality of economic growth, external debt and population on poverty was rejected. Thus, economic growth, external debt and population growth simultaneously do cause poverty. As these other variables except external debt lag 3 are zeros, the discussion further focus on the short run external debt elasticity. The Short Run external debt coefficient of -0.069 means that when external debt increases by 1% point, poverty will on average reduce by 0.069 % point. The constant coefficient of 1.737 means that, ceteris paribus, poverty incidence in the Short Run will average 1.737%. The ECT coefficient of -0.468 implies that speedy at which the disequilibrium in the short run are corrected for in the long run and that disequilibrium in period one is corrected for in period two at the rate of 47%. As the ECT is highly significant, the short run model holds true as the short run poverty model.

The R² of 0.658 means that about 66% variations in Poverty levels are explained by variations in Economic growth, External Debt and population growth and the adjusted R² of 0.44 means about 44% variations in poverty are explained by variations in economic growth, external debt and population growth when these variables are adjusted for by the degree of freedom. The F p-value is significantly low meaning that the Short Run model is highly significant.

The diagnostic tests proved that both the long run and the short run model conform to the prerequisite of no serial correlation, no heteroscedasticity, normally distributed error term and stable models. Thus the two models can be accepted.

CHAPTER SIX:

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

6.0 OVERVIEW

This chapter forms the last part of this paper. It wraps up the discussion of this paper by means of a summary. It further draws conclusions from the available data and findings of the research and further makes recommendations for policy implication and further research.

6.1 SUMMARY

The study was undertaken to investigate the impact of economic growth, public external debt and population growth on poverty levels in Zambia. The study covered a period of 36 years from 1980 to 2016 with time series data from the World Bank, IMF, Index Mundi and Ministry of Finance. The Study was necessitated by the growing poverty trends, slowed economic growth and increased the stock of public debt. A review of the various literature revealed that poverty was exacerbated by the growth in public debt, population and lack of meaningful economic growth. It was theoretical discovered that where there is trickle down, economic growth was expected to reduce the levels of poverty and that the impact of public debt on poverty was dependent on the influence of poverty on economic growth while population growth's influence on poverty remained inconclusively. Empirically, various studies have found inconsistency and thus inconclusive results with other finding pro-poor, the impact of economic growth and public debt while others trickle up effects resulting from high levels of inequality.

After the stationarity test revealed that the variables were a mixture of $I(0)$ and $I(1)$, ARDL model was estimated in line with Pesaran et al, (2001). This study found that while there existed a long run relationship of economic growth, external debt and population growth on poverty, economic growth exhibited no significant impact on poverty while external debt and population growth were found to be highly significant. While economic growth was found to be insignificant, the independent variables simultaneously significantly influenced poverty levels.

The short run model found that the short run disequilibrium was being corrected for at the rate of 47% and because the ECT was highly significant, the short run model was accepted as the short run poverty model that tends to adjust to long-term equilibrium at the rate of 47%. The economic growth and population growth variables were found not to cause poverty in the short run while external debt was found to cause poverty in the short run. Simultaneously, the variables significantly influenced poverty in Zambia between 1980 and 2016.

6.2 CONCLUSIONS

The aim of this study was to ascertain if economic growth, external debt and population growth have a significant impact on poverty levels. The study found a long run relationship between variables. And from the findings, it was concluded that while theory expects that economic growth can reduce poverty, the result of economic growth rejected that null hypothesis of a positive impact as economic growth was insignificant in poverty reduction. That is to say, even when there is economic growth, there is negligible impact on poverty. This could be explained by the notion that economic growth is simply a measure of growth in national output and such growth can be triggered by an influx of foreigners who after earning their profits and paying meagre wages to domestic employees, externalise their profits leaving only working capital.

On the external debt, while the null hypothesis of a negative impact of external debt on poverty could not be rejected, the study concluded that the negative impact of external debt on poverty levels could be as a result of its effect on increased government expenditure which triggers increased demand for goods and services in the country. It was also concluded that the significant negative impact of external debt on poverty is because the increase in external debt leverages domestic private borrowing and crowds-in private investment.

On population growth where the study established non-rejection of the null hypothesis of a negative impact of population growth on poverty, it was concluded that growth in the population provides the economy with an increased supply of human capital and the expansion of markets for goods and services. Thus, the growth in population will trigger innovation due to expanded markets for goods and services.

It can further be concluded that while economic growth plays an insignificant role in poverty alleviation, external debt and population growth are other key drivers of poverty and further that poverty trends in Zambia continue to rise.

6.3 RECOMMENDATIONS

Having empirically investigated the impact of economic growth, external debt and population growth on poverty levels in Zambia, this study recommends as follows;

Policy Implication

While external debt has a negative impact on poverty levels, i.e. the higher the external debt, the lower the incidences of, the extent to which this debt can exacerbate poverty need to be established as high debt is expected to mop-up huge resources through high-interest payments. Thus, there should be a policy on external debt that is debt ceiling beyond which the country should not borrow.

The government should also ensure that the projects in which the contracted debt is injected produces results and pays back so that a certain level of debt is maintained.

It is further recommended that government reduces investment in birth control mechanisms and allow for steady population growth for increased human capital and expanded markets for goods and services and further that abolish any population policy aimed at limiting population growth.

The government should also devise a system of quotas for the profits that foreign national and multinational companies externalise to their countries. In this case, companies should only be allowed to externalise money to procure capital goods. This is because, if the companies externalise all their profits, little will remain for private sector investment which will trickle down to high unemployment and high poverty levels

Further Research

As this research could not investigate the leakage of economic growth, a further study should be undertaken to investigate the direction and leakages of economic growth so that economic growth can significantly trickle down and translate into poverty reduction.

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APPENDICES

A. UNIT ROOT TEST : POVERTY ADF UNIT ROOT TEST

Null Hypothesis: PHC has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.557029	0.7900
Test critical values: 1% level	-4.234972	
5% level	-3.540328	
10% level	-3.202445	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(PHC) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.375239	0.0005
Test critical values: 1% level	-4.243644	
5% level	-3.544284	
10% level	-3.204699	

*MacKinnon (1996) one-sided p-values.

GDP GROWTH ADF UNIT ROOT TEST

Null Hypothesis: GDPG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.577710	0.0003
Test critical values: 1% level	-4.243644	
5% level	-3.544284	
10% level	-3.204699	

*MacKinnon (1996) one-sided p-values.

EXTERNAL DEBT ADF UNIT ROOT TEST

Null Hypothesis: EXDT has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.410177	0.0667
Test critical values: 1% level	-4.252879	
5% level	-3.548490	
10% level	-3.207094	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(EXDT) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.916499	0.0229
Test critical values: 1% level	-4.273277	
5% level	-3.557759	
10% level	-3.212361	

*MacKinnon (1996) one-sided p-values.

POPULATION GROWTH ADF UNIT ROOT TEST

Null Hypothesis: POPG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-0.974166	0.9345
Test critical values: 1% level	-4.252879	
5% level	-3.548490	
10% level	-3.207094	

*MacKinnon (1996) one-sided p-values.

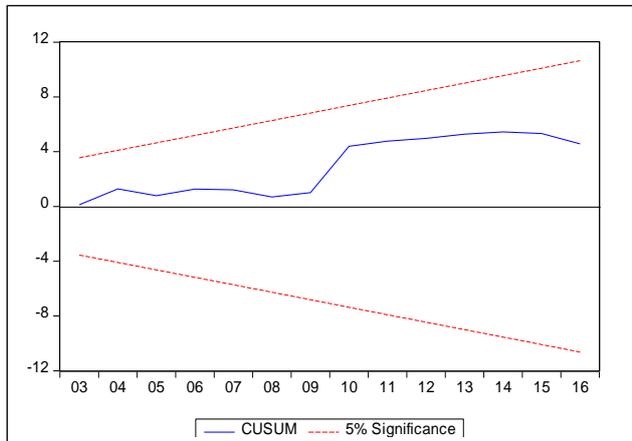
Null Hypothesis: D(POPG) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 1 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.989926	0.0001
Test critical values: 1% level	-4.252879	
5% level	-3.548490	
10% level	-3.207094	

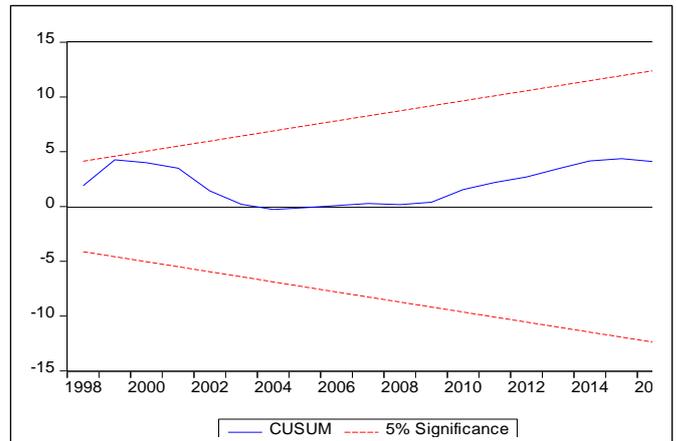
*MacKinnon (1996) one-sided p-values.

B. STABILITY TEST

LONG RUN MODEL CUSUM STABILITY TEST



SHORT RUN MODEL CUSUM TEST



C. NORMALITY TEST

VAR Residual Normality Tests
 Orthogonalization: Cholesky (Lutkepohl)
 Null Hypothesis: Residuals are multivariate normal
 Date: 06/18/18 Time: 20:11
 Sample: 1980 2016
 Included observations: 35

Component	Skewness	Chi-sq	df	Prob.*
1	1.980812	22.88775	1	0.0000
2	-1.531889	13.68899	1	0.0002
3	2.585070	38.98177	1	0.0000
4	-0.784499	3.590061	1	0.0581
Joint		79.14858	4	0.0000

Component	Kurtosis	Chi-sq	df	Prob.
1	10.35260	78.83852	1	0.0000
2	7.004398	23.38467	1	0.0000
3	12.27745	125.5204	1	0.0000
4	3.549581	0.440474	1	0.5069
Joint		228.1841	4	0.0000

Component	Jarque-Bera	df	Prob.
1	101.7263	2	0.0000
2	37.07366	2	0.0000
3	164.5022	2	0.0000
4	4.030535	2	0.1333
Joint	307.3327	8	0.0000

*Approximate p-values do not account for coefficient estimation

D. HETEROSCEDASTICITY TEST

VAR Residual Heteroskedasticity Tests (Levels and Squares)
 Date: 06/18/18 Time: 20:18
 Sample: 1980 2016
 Included observations: 35

Joint test:

Chi-sq	df	Prob.
195.3997	160	0.0297

E. POVERTY DATA SET

YEAR	PHC	GDPG	EXDT	POPG
1980	0	3.036	91.780	3.465
1981	0	6.168	95.910	3.457
1982	0	-2.813	97.640	3.435
1983	0	-1.967	125.950	3.391
1984	0	-0.337	152.460	3.323
1985	0	1.615	223.100	3.238
1986	0	0.724	415.560	3.159
1987	0	2.676	336.590	3.083
1988	0	6.281	202.570	2.991
1989	0	-1.024	182.480	2.881
1990	50.450	-0.481	229.760	2.766
1991	54.000	-0.036	232.360	2.645
1992	53.250	-1.731	233.730	2.546
1993	54.500	6.797	214.620	2.499
1994	50.000	-8.625	199.060	2.517
1995	45.850	2.898	195.170	2.576
1996	41.700	6.219	208.190	2.653
1997	41.900	3.814	164.340	2.714
1998	42.100	-0.386	207.250	2.734
1999	44.230	4.650	183.710	2.703
2000	46.200	3.897	168.710	2.641
2001	47.800	5.317	157.520	2.574
2002	49.400	4.506	165.080	2.534
2003	53.050	6.945	144.460	2.535
2004	56.700	7.032	129.500	2.589
2005	58.600	7.236	70.920	2.676
2006	60.500	7.904	20.500	2.767
2007	61.380	8.352	22.830	2.844
2008	62.250	7.774	18.650	2.908
2009	63.350	9.220	25.310	2.955
2010	64.400	10.298	23.190	2.987
2011	63.230	6.338	22.860	3.016
2012	62.050	6.731	23.270	3.042
2013	60.850	6.713	21.880	3.060
2014	59.850	5.418	28.250	3.070
2015	57.500	3.600	42.020	3.050
2016	52.50	3.300	36.500	3.060