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The Impact of External Debt on Zambia's Economic Growth: An ARDL Approach

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Abstract
This paper examines empirically the impact of External debt on the Economic growth in Zambia using annual time series data spanning 1980 to 2014 and the Autoregressive Distributed Lag Model (ARDL) or bounds testing approach to cointegration. External debt is found to have a positive relationship with economic growth in the short run and a negative relationship in the long run. The long run results indicated that external debt accumulation has a negative impact on economic growth. This confirms the existence of a debt overhang problem in Zambia. Debt servicing is also found to have a significant and negative impact on GDP growth in the short-run. As the debt servicing tends to increase, there will be less opportunities for economic growth. Debt servicing is found to have crowding out effects on economic growth in the short-run. In addition, the Granger causality test was used to check for the direction of causality among the variables. The findings established a unidirectional causality from external debt to economic growth. Consequently, the study recommends, that government should embark on prudent borrowing and encourage export-oriented growth.
Keywords: HIPC, external debt, debt overhang, ARDL, Economic growth, Granger causality

1. Introduction

External debt has been an important means by which governments finance their economic activities. This is especially true for most low income countries whose domestic sources of finance are not usually adequate to meet the required total finance levels. At the same time, developments such as the debt crisis that Highly Indebted Poor Countries (HIPCs) went through in the 1980s and 1990s where these countries reached unsustainable levels of external debt, whose negative effects (such as high levels of unemployment) continue to be felt up to today, have shown that external debt may not always desirable.

The traditional approach to analyzing debt before the HIPIC crisis had focused on debt stock. This implied that the flow or dynamic aspects that would show both potential short run effects and long run effects were underplayed with consequence that impending dangers might not be identified until it was too late. Against the above background, economist have in recent years resorted to using approaches that aim to capture the dynamics of external debt as an independent variable and economic growth as an important overall measure of economic performance. To this effect two theories have been prominently used in the studies namely, the debt overhang theory and dual gap theory? On the analytical part, the ARDL approach, also referred to the bounds testing approach to co-integration has emerged as an important analytical approach.

This paper was guided mainly by the debt overhang theory. This focus was chosen because this theory has proven to be appropriate in similar studies in low income countries. As for analytical approach, the paper employed the ADRL approach. The ADRL approach has proven to be appropriate in predicting both short run effects and long run effects of external debt under the dynamic conditions that are typical to low income countries.

This paper chose Zambia as the case study because Zambia it is one of the low income countries that suffered greatly from the debt crisis and also continue to experience a number of that crisis effects, such as high levels of unemployment. Furthermore, Zambia is one of the low income countries that have re-accumulated high levels of external debt, which by traditional analytical techniques has not yet reached dangerous or unsustainable but which soon reach such levels if caution in borrowing is not exercised. Given this state of affairs, employing the recent non-traditional analytical techniques to the Zambian external debt data might reveal results that would be critical for policy prescriptions not just for Zambia but for other low income countries.

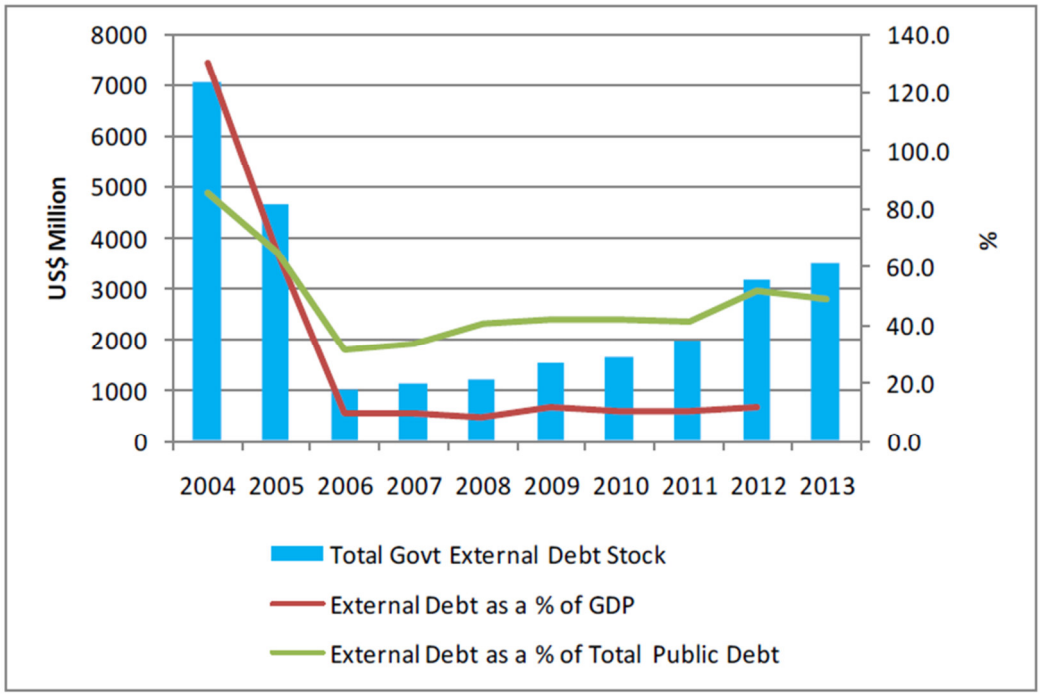
1.1 Zambia's External Debt Situation Since The HIPC Crisis Days

External debt in Zambia has evolved from a position of a huge external debt overhang in the 1980s (which limited citizens to benefit from their resources and also constrained the governments' abilities to effectively plan and implement national plans) to more sustainable levels in recent years, as indicated by the country's external debt indicators as of end 2013 (fig 1 below). It is estimated that in 1986, Zambia spent approximately 86% of its export earnings on debt service and was left with only 14%to distribute to other sectors of the economy. This trend continued even with the onset of Highly Indebted Poor Countries (HIPC) when in 1999 Zambia paid over three times of its combined budget for health, education and social security in debt service. As of end 2000, the country's external debt to exports and external debt to gross national income (GNI) stood at 652% and 188.6% respectively

With the attainment of the HIPC Completion Point (HIPC-CP) in April 2005, there was debt cancellation by both bilateral and multilateral creditors, resulting in a 36.2% reduction in the country's external debt from US$7,080million as of end 2004 to USS$4,519.3million as of end 2005. Consequently, the country's external debt to GDP ratio declined to 63% end 2005 from 130.2% as of end 2004 as shown in fig 1 below. Following a further qualification for debt relief under the Multilateral Debt Relief Initiative (MDRI) which began in 2006 following the July 2005 proposal by the G-8 that the International Monetary Fund (IMF), World Bank (WB) and the African Development Fund (AFDF) should cancel 100% of their debt claims on HIPC countries in order to free up additional resources for these countries to advance towards meeting the United Nations Millennium Development Goals (MDGs), the country received debt relief under the MDRI in 2006, which resulted in a 77.9% reduction in its total outstanding external debt between 2005 and 2006 as shown in fig 1 below. Consequently, external debt to GDP declined to 9.3% as of end 2006. As a proportion of total public debt, external debt also declined to approximately 31% as of end 2006 from 65.7% as of end 2005. Among others, debt relief included:

- The International Development Agency (IDA), AFDF who cancelled 100% of debts contracted prior to December 2003 and December 2004 amounting to US$1,813million and US$300.6million respectively;
- The International Fund for Agriculture Development (IFAD), the Arab Bank for Economic Development in Africa (BADEA), the European Investment Bank (EIB) and the Organization of the Petroleum Exporting Countries (OPEC) Fund for International Development who provided debt relief amounting to US$729.6million; and
- Non-Paris Club countries also provided debt reduction on Paris Club comparable terms with China providing partial cancellation of interest free loans that matured in 2005 amounting to US$11.3million

Fig 1: Evolution of Government of Zambia's Total Outstanding External Debt as of end December 2004 to 2013



Source: Ministry of Finance

However, in 2006 again, the government acquired six new loans on concessional terms, estimated at approximately US$79.7 miilion so as to finance its various activities such as public service management reforms, investment in the water sector, smallholder livestock investment and the TAZARA protocol. More loans were also acquired on concessional terms in 2007 to fund targeted priority areas identified in the country's Fifth National Development Plan (2006-2010) such as road rehabilitation, poverty reduction budget support, water supply & sanitation and the Copperbelt feeder road rehabilitation project among others. Export credits also increased by 80.8% mainly for the Mulungushi Textiles Limited Project debt that the government took over during the same year for the non-performing portfolio of the Development Bank of Zambia.

Even though the government continued with these external borrowings, it is notable that up to end 2011, the total external debt of the government remained below US$ 2 billion(% of GDP, % of exports) and

was mainly composed of concessionary sources. However, external debt increased by 61% between 2011 and 2012, to reach approximately US$3. 2 billion (% of GDP) as of end 2012 as also shown in fig 1 above. The major contributing factor to the rise in external debt stock during that year was the country's issuance of a debut 10 year US$750 million Eurobond on the international capital market in September 2012. Zambia's stock of external public and private debt has been rising since 2011. At the end of 2014 it stood at 24 percent of GDP compared to 15 percent in 2011. An increase in the stock of external public and publicly guaranteed debt (PPG) of the central government (10 percentage points between 2011 and 2014) to a large extent reflects issuance of Eurobonds in 2012 and 2014 (3.0 and 3.8 percent of GDP respectively).

The main objective of this paper is to examine the influence of a change in external debt on the economic growth of Zambia using time series data from 1970 to 2014.

2. Theoretical literature

There are several contributions by various economists and schools of thought as regards the subject matter of debt and economic growth. These concepts are relevant to this study as they serve as dependable framework upon which this study is built and as such some of them are discussed which includes: The dual gap theory, the debt overhang theory, Debt Laffer curve and crowding out hypothesis theory.

The Dual Gap Theory

The dual gap model propounded by Chenery and Strout (1966) underscores that indebtedness is associated with an imbalance, and depending on the case, it is the imbalance between savings and investment, and the budget deficit and the current account deficit. Thus, external borrowing becomes a necessity. The most important consideration in contracting external debt is a simple and direct one; signing up for debt from abroad only when the funds can generate higher returns than the cost of funds when invested. It therefore follows that borrowing nations would be enhancing their productivity and national output through the investment facilitated by borrowed funds. The dual-gap concept refers to the function of foreign capital in the economic development process. The role of foreign capital here is that it permits developing countries to invest more than they can save domestically; which is a necessity resulting from deficits in internal savings (McKinnon, 1964). Consequently, the model recommends that external savings should condition economic development if the savings-investment and import-export imbalances are to be corrected. These authors believe that domestically, it entails accumulating the savings needed to finance domestic investment and externally, finding the resources needed to finance the balance of payments deficit.

The Debt Overhang Theory

The literature field of economic growth *viz*., external borrowing is awash with the perceived negative relationship between foreign debt and investment which consequently results into lower capital formation. Krugman (1988) defines this negative relationship as "debt overhang" where the potentials of repayment of outstanding facilities fall lower than the signed value. The study gave a straight forward definition of the problem of debt overhang as being the anticipated current value of any potential resource allocation that is not up to its outstanding loan. Several scholars have supported the theoretical case for debt overhang. Some of the studies include Krugman (1988) and Sachs (1988). Others like Greene and Villanueva (1991), Elbadawi et al. (1997) and Chowdhury (2001) reaffirmed this by coming up with ample proof that backs the debt overhang phenomenon.

In those economies with heavy indebtedness "debt overhang" is considered a leading cause of distortion and slowing down of economic growth (Sachs, 1989; Bulow and Rogoff, 1990). Economic growth slows down because these countries lose their pull on private investors. Additionally, servicing of debts exhausts up so much of the indebted country's revenue to the extent that the potential of returning to growth paths is abridged (Levy-Livermore and Chowdhury, 1998). They suggested that even if structural adjustment programs are put in place by governments of these countries, adverse effects can still be felt on development of general economic performance. It should however be noted that debt overhang does not occur only when a country accumulates too much debt, it can also arise when country's circumstances change, making it difficult to manage and discharge its stocks of debts. Such conditions may emerge because of adverse economic shocks or poor economic policies (Arslanalp and Henry, 2004); and in these unfavorable circumstances, creditors loan portfolios will face heavier risks. The outcome would be panic among creditors who rush to cash their claims, and the withdrawal of interest from potential new credits.

The Crowding Out Effects Theory

Crowding out effects usually occurs due to excessive real interest charges while the terms of trade of an overly indebted country become worsen while foreign credit markets may no longer be available. Claessens et al. (1996) identified the decline in investment as being the effect of a decrease in a country's available assets for financing investment and macroeconomics activities. Reduction in nation's capability of maintaining its debt resulting from the crowding out effect; and therefore, as it strives to meet some of its obligations, leaving little capital for domestic investment (Patenio and Agustina, 2007).

The philosophy behind the crowding out effects concept assumes that government debts expends a greater part of the national savings meant for investment due to increase in demand for savings while supply remains constant, the cost of money therefore increases. Crowding out effects sets in at a point when only government and its agencies would be able to borrow due to excessive interest charges. Individual entrepreneurs and firms are thus unable to compete and hence crowded out of the market. Economic growth is thus affected via the economies inability to generate enough capital for investment.

The Debt Laffer curve

The Debt Laffer curve emphasizes the relationship between the amount of debt repayment and the size of the debt. It suggests that that there is a limit to which debt incurred can stimulate growth (Elbadawi et al, 1996). When the debt exceeds the threshold point, it becomes a burden as the cost of servicing the debt brings strain to the amount of resources available for productive investments, thereby crowding out investment which ultimately retards growth. This therefore implies that a reduction in the current debt service should lead to an increase in current investment for any given level of future indebtedness (Cohen 1993). Economic literature, posits that debt will impact positively on an economy up to a threshold point, beyond which any further increase in debt will bring about a negative impact on the economy (Kabadayi, 2012). In this paper, we test the debt overhang hypothesis for Zambia.

3. Empirical literature

Empirical studies relating to the impact of debt on economic growth have recently gained ground. There has been a growing number of studies devoted to this issue in developing countries, especially since the debt crisis in the 1980s.

All studies conducted on a sample of countries, such as the studies by B. Eichengreen and R. Portes (1986), Elbadawi *et al.* (1996), Patillo *et al.* (2004), and Clemens *et al.* (2003), also noted that excessive indebtedness has a negative effect on the growth rate. The works of Barry, E. and Portes, R. (1986) focused on the identification of determinants of the stock of debt of about thirty countries at a given moment of their economy. They came to the conclusion that excessive indebtedness and default tend to reduce the real growth rate and the credibility of the State.

Elbadawi *et al.* (1996) confirmed the effect of debt overhang on economic growth in 99 developing countries, and tried to identify the channel through which indebtedness impacts negatively on growth. In this connection, they identified three channels of transmission of the impacts of debt on growth. These are the effects of debt on growth, liquidity (as a result of the drawdown due on debt service), and indirectly on public sector expenditure and deficits. The study concluded that it was the accumulation of debt which had a negative impact on growth.

Clemens *et al.* (2003), for their part, considered a growth model by choosing the virtual debt burden hypothesis. They arrived at the conclusion that a six-point debt service reduction in percentage of GDP will increase the investment rate from 0.75 to one point and growth to two points. Furthermore, they believe that if half of debt service were cancelled without a rise in the budget deficit, growth will increase in some HIPCs by 0.5 point per annum.

Concerning specific studies conducted in countries, there is no consensus. For Borensztein (1990), debt service is an essential determinant which impacts negatively on external indebtedness in the Philippines. He concluded that the outstanding debt and the debt service-to-export ratio generally had the opposite effect on private capital formation and encouraged the country's indebtedness. In analysing the issue of indebtedness in Uganda, Barungi *et al.* (2000) identified the problems relating to indebtedness as well as its implications on the country's economy. Their major concern was to find out if the economy could attain a five percent growth rate while maintaining a suitable level of domestic investment, considering the country's heavy dependence on foreign capital. This concern was justified by the fact that a large portion of the country's debt was not eligible for rescheduling. For Uzochukwu (2005), the improvement of external debt indicators, in particular the debt service-to export and the outstanding debt-to-export ratios, is the main cause of the slow growth in Nigeria.

Conversely, Wejeweera *et al.* (2005) demonstrated the relationship between economic growth and indebtedness in Sri Lanka during the 1952- 2002 period, and arrived at contrary conclusions. They established that the country did not have a problem of debt overhang, and that indebtedness was not the major obstacle to growth, owing to the fact that the total debt stock was not too high. The study conducted by Desta (2005) also came to the conclusion that it was not debt service payment that curbed growth in Ethiopia, but rather the real effective exchange rate and inflation.

Jayaraman and Lau (2009) find that higher debt levels can promote higher economic growth. Their study involves six Pacific island countries between 1988 and 2004 and is based on regressing external debt stock, exports and the budget deficit against gross domestic product. Jayaraman and Lau (2009) estimates a regression model by the panel group mean fully modified ordinary least squares, and find that a 1 percent increase in the external debt stock leads to a 0.25 percent increase in national output. Jayaraman and Lau (2009) also test for

causality by a panel-based vector error correction model with a dynamic error correction term, and find that whilst there is no Granger causality relationship between real gross domestic product and external debt in the long-run, there is a significant causal relationship running from external debt to gross domestic product in the short-run.

Choong et al (2010) carried out the study on the effect of different types of debts on the economic growth in Malaysia during the sample period 1970 – 2006. The result of the cointegration test shows that, all components of debts have a negative effect on long-run economic growth. Furthermore, the granger causality test shows the existence of a short-run causal relationship between all debt measures and economic growth in the short run. It is concluded that an increase in foreign debt level negatively affects economic growth, while the reduction in the rate of economic growth reduces the ability of the country to pay back its debt.

Akram (2010) in the study of the impact of public debt on economic growth and investment in Pakistan developed a hybrid model that explicitly incorporates the role of public debt in growth equations. Using the ARDL technique, the results revealed that both domestic and external debt have negative relationship with per capita GDP and investment, confirming the existence of "Debt overhang effect" which crowds out private investment.

Safdari and Mehirizi (2011) investigated the effect of external debt on economic growth in Iran for the period of 1974-2007, by observing the balance and long term relation of five variables: GDP, Private investment, Public Investment, external debt and Imports. They employed the Vector autoregressive model (VAR) in their econometric analysis and the result of the research showed that external debt and imports had a negative effect on gross domestic product, but variables of private and public investment had positive effects on economic growth.

Sulaiman and Azeez (2012) investigated the impact of external debt on economic growth in Nigeria using GDP as the dependent variable while the ratio of external debt to export, inflation and exchange rate were used as the independent variables. Results from the study showed that external debt has a positive impact on the Nigerian economy in the long run. They therefore, recommended that external borrowing should be obtained for economic growth reasons rather than social and political motives.

From this literature review, which probes the relationship between external debt and economic growth, it can be deduced that, in most cases, external indebtedness has a negative effect on the economic growth of developing countries, particularly those of sub-Saharan Africa. The countries find themselves with very high levels of indebtedness. But then, empirical evidence reveal controversial results concerning the impact of the various debt ratios. Whereas for some countries it is debt service payment that is an obstacle to growth, for others, it is the accumulation of debt itself or both. Such contradictions might have stemmed either from the variability of the methods used by the specialized economists or from the particularities (economic situation, buoyant growth sectors, and availability of data) of the countries under study.

4. Methodology

4.1 Model Specification and Data

The current study used time series data from 1980 to 2014 obtained from the World Development Indicators (WDI), IMF and other sources. The argument of the study is that a macroeconomic framework linking the various sectors of the economy is needed to be able to fully analyze the effect of external debt on economic growth. As such, a national income identity model augmented with debt and monetary variables was employed. The model explores the linear relationship between output growth and debt burden indicators and is stated as follows:

$$GDPGR_t = \beta_0 + \beta_1 INVG + \beta_2 HK + \beta_3 OPEN + \beta_3 EDGDP + \beta_4 DRS + \beta_5 LBF + \beta_6 TOT + \beta_7 INF + \beta_8 RER \quad (1)$$

Where

$GDPGR_t$ = real GDP growth rate at time *t*;
$INVG$ = real gross domestic investment as a percentage of GDP (+);
HK = Human capital proxied by expenditure on education as a percentage of GDP (+);
$OPEN$ = Trade openness (+);
$EDGDP$ = stock of external debt to GDP ratio (-);
DSR = the debt service as a ratio of export earnings (reflects the 'crowding-out' effect) (-);
LBF = Labour force participation as a percentage of total population (+);
TOT = terms of trade (captures external shocks) (- or +);
INF = rate of inflation (reflects macro- economic stability) (- or +);
RER = movements in real exchange rate (reflects incredibility of policies) (-);

4.2 Estimation Procedure

In this study in order to test the occurrence of long run relationships among the dependent variable real GDP which is used to measure economic growth and the independent variables, we applied on Autoregressive Distributed Lag Model (ARDL) or bounds testing approach which was developed by Pesaran et al. (2001). In contrast to the previously stated approaches, bound testing has several advantages.

Firstly, autoregressive distributed lag model is a single equation method which can be applied on relatively small sample size whereas; the Engle–Granger approach and Johansen cointegration approach are fairly data intensive. This approach results in unbiased estimates in the long run (Pesaran, 1995) and also the estimates obtained are relatively more efficient for finite and small sample size which is similar to this study. This avoids the problems that come as a result of serial correlation and endogeneity (Pesaran et al, 2001).

Secondly, it is applicable irrespective of whether the regressors are purely I(0) or purely I(1) or mutually integrated. Consequently, it avoids the volatility linked with the pre-testing for the order of integration of the individual variables.

Thirdly, once the lag order of the model is obtained, it permits the cointegration relationship to be estimated by OLS and also bounds testing is helpful to make a distinction among dependent and independent variables which allows investigating the existence of the long run relationship between them. Moreover, the short-run and long-run coefficients of the model are estimated simultaneously (Pesaran and Shin, 1997).

The ARDL model approach starts with construction and estimation of the following unrestricted error correction model (UECM) using OLS to ensure for the occurrence of long run relationship between the variables under consideration.

$$\Delta Y_t = \alpha_0 + \sum_{i=1}^{k} B' \Delta Y_{t-i} + \sum_{i=0}^{k} \gamma' \Delta X_{t-i} + \theta_1' Y_{t-i} + \theta_2' X_{t-1} + \varepsilon_t$$

Where, Δ is first difference operator, Y_t is the vector of dependent variables, X_t is the vector of independent variables, K is the number of lags and ε_t is the error term which is assumed to be white noise. The augmented model used in this study is stated as follows:

$$\Delta GDPGR_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{1i} \Delta GDPGR_{t-i} + \sum_{i=0}^{k} \alpha_{2i} \Delta INV_{t-i} + \sum_{i=0}^{k} \alpha_{3i} \Delta HK_{t-i} + \sum_{i=0}^{k} \alpha_{4i} \Delta OPEN_{t-i} + \sum_{i=0}^{k} \alpha_{5i} \Delta EDGDP_{t-i} +$$
$$\sum_{i=0}^{k} \alpha_{6i} \Delta DSR_{t-i} + \sum_{i=0}^{k} \alpha_{7i} \Delta LBF_{t-i} + \sum_{i=0}^{k} \alpha_{8i} \Delta TOT_{t-i} + \sum_{i=0}^{k} \alpha_{9i} \Delta INF_{t-i} + \sum_{i=0}^{k} \alpha_{10i} \Delta RER_{t-i} + \delta_1 GDPGR_{t-1} + \delta_2 INV_{t-i}$$
$$+\delta_3 HK_{t-1} + \delta_4 OPEN_{t-1} + \delta_5 EDGDP_{t-1} + \delta_6 \Delta DSR_{t-1} + \delta_7 LBF_{t-1} + \delta_8 TOT_{t-1} + \delta_9 INF_{t-1} + \delta_{10} RER_{t-1} + \varepsilon_{1t} \quad (2)$$

Where, Δ is first difference operator, $\delta_i, i = 1.....10$ are long run coefficients and $\alpha_i, i = 1.....10$ are the short run dynamic coefficients of the ARDL model. The above model will be estimated using OLS for the purpose of testing for the long run relationship.

In order to check the significance of lagged labels of the variables an F-statistic is used for the determination of the existence of long run relationship, the null hypothesis that there is no cointegration among the variables is tested against the hypothesis that there is cointegration among the variables. That is, for equation 2:

$$H_0 : \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \delta_7 = \delta_8 = \delta_9 = \delta_{10} = 0$$
$$H_1 : \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq \delta_6 \neq \delta_7 \neq \delta_8 \neq \delta_9 \neq \delta_{10} \neq 0$$

If the computed F-statistics is larger than the upper bound critical value, then the null hypothesis of no long run relationship is rejected in favor of the alternative hypothesis that there exists a long run relationship. But, if the computed F-statistic is less than the lower bound critical values the null hypothesis is accepted showing that there is no long run relationship. If the computed F-statistic lies between the lower and the upper bound critical values, inference is inconclusive and we have to determine the order of integration of the regressors prior to making conclusive inference (Pesaran et al, 2001).

After identifying the existence of cointegration, then the cointegrating vector is derived using the following ARDL model:

$$GDPGR_t = \alpha_0 + \sum_{i=1}^{p} \alpha_{1i} GDPGR_{t-1} + \sum_{i=0}^{q} \alpha_{2i} INVG_{t-i} + \sum_{i=0}^{q} \alpha_{3i} HK_{t-i} + \sum_{i=0}^{q} \alpha_{4i} OPEN_{t-i} + \sum_{i=0}^{q} \alpha_{5i} EDGDP_{t-i} + \sum_{i=0}^{q} \alpha_{6i} DSR_{t-i} + \sum_{i=0}^{q} \alpha_{7i} LBF_{t-i} + \sum_{i=0}^{q} \alpha_{8i} TOT_{t-i} + \sum_{i=0}^{q} \alpha_{9i} INF_{t-i} + \sum_{i=0}^{q} \alpha_{10i} RER_{t-i} + \varepsilon_t \quad (3)$$

Then, the short run dynamics of the model can be obtained by the estimation of the error correction model linked with the long run estimates. It is stated as follow:

$$\Delta GDPGR_t = \theta_0 + \sum_{i=1}^{p} \theta_{1i} \Delta GDPGR_{t-i} + \sum_{i=0}^{q} \theta_{2i} \Delta INVG_{t-i} + \sum_{i-0}^{q} \theta_{3i} \Delta HK_{t-i} + \sum_{i=0}^{q} \alpha_{4i} \Delta OPEN_{t-i} + \sum_{i=0}^{q} \theta_{5i} \Delta EDGDP_{t-i} + \sum_{i=0}^{q} \theta_{6i} \Delta DSR_{t-i} + \sum_{i=0}^{q} \theta_{7i} \Delta LBF_{t-i} + \sum_{i=0}^{q} \theta_{8i} \Delta TOT_{t-i} + \sum_{i=0}^{q} \theta_{9i} \Delta INF_{t-i} + \sum_{i=0}^{q} \theta_{10i} \Delta RER_{t-i} + \gamma ecm_{t-1} + e_t \quad (4)$$

Where $\theta_{1i}, i = 1.....10$ are the short run dynamic coefficients of the variables in the model, ecm_{t-1} is the error correction term. This term captures the long-run relationship. It reflects attempts to correct deviations from the long-run equilibrium path and its coefficient can be interpreted as the speed of adjustment or the amount of disequilibrium transmitted each period to economic growth.

4.3 Unit Root Test

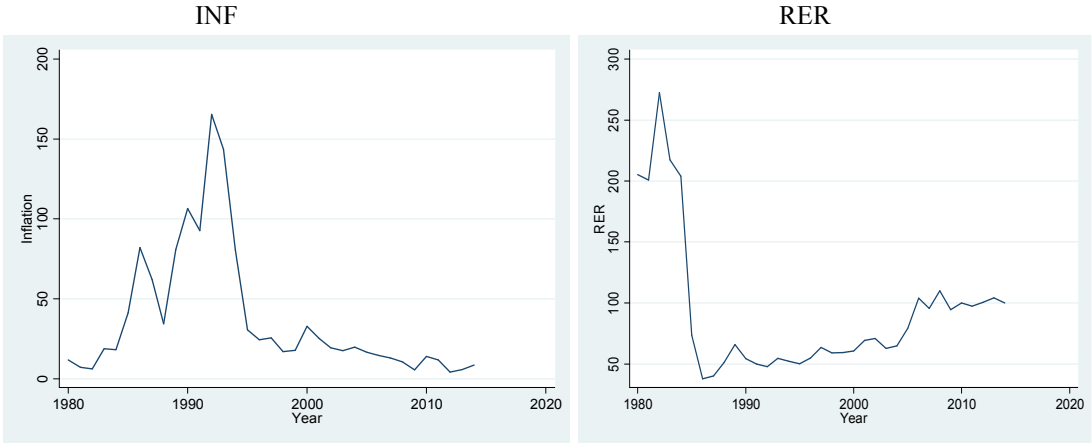
In order to determine the order of integration of the series, the Philips–Perron (PP) unit root tests are carried out. The PP test is preferred to the traditional Augmented Dickey-Fuller (ADF) test because of its use of non-parametric methods to adjust for serial correlation and endogeneity of regressors thereby preventing the loss of observations implied by the ADF test. The presence of unit root in the series indicates that the variable is non-stationary, hence the degree or order of integration is one or higher. The absence of unit root however, implies that the variables are stationary and the order of integration is zero.

4.4 Data Type and Source

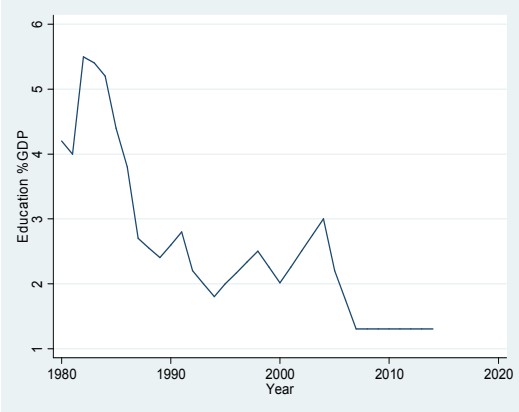
The study uses annual time series data for the period 1980 – 2014 obtained from published sources. The major sources of data included World Bank‘s World Development Indicators, IMF International Financial Statistics, and African Development Indicators. Other sources included annual reports of Bank of Zambia Ministry of finance and CSO.

5. Analysis And Discussion Of Results

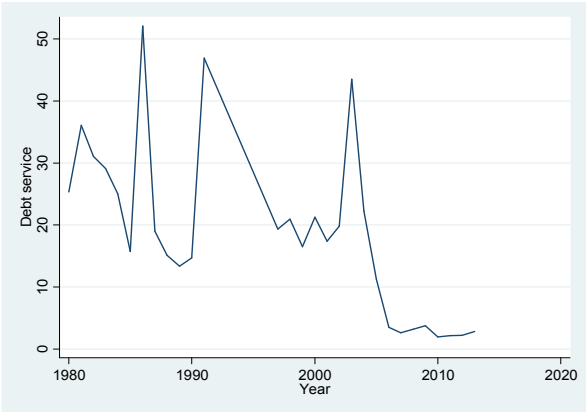
The trend in GDP growth rate with some of its selected determinants used in the study over the period 1980 to 2014 is shown in the graphs displayed in Figure 4.1 below. Also shown in Table 5.1 are descriptive statistics of these selected indicators for the period under study.



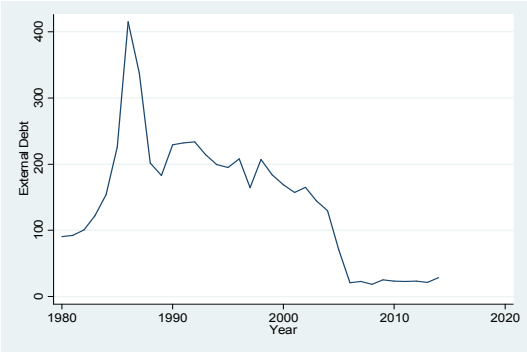
HK



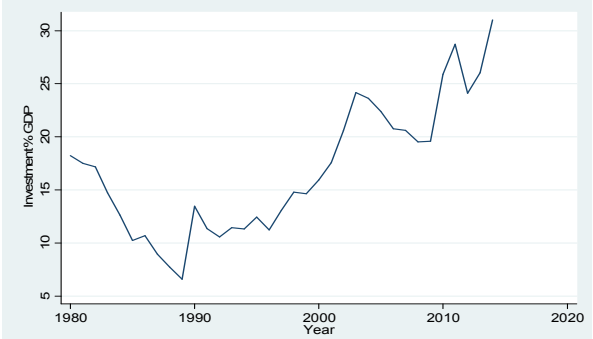
DSR



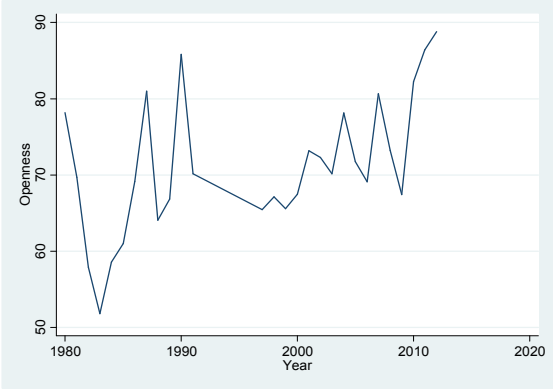
EDGDP



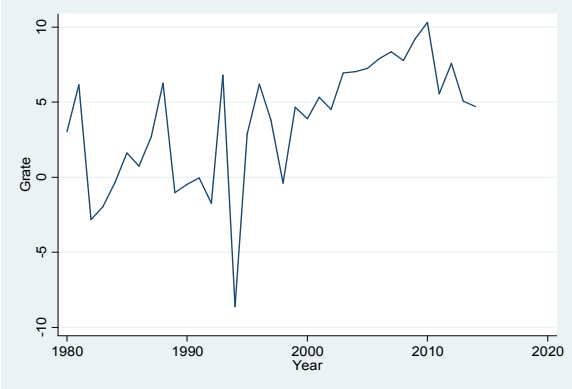
INVG



OPEN



GDPGR



TOT

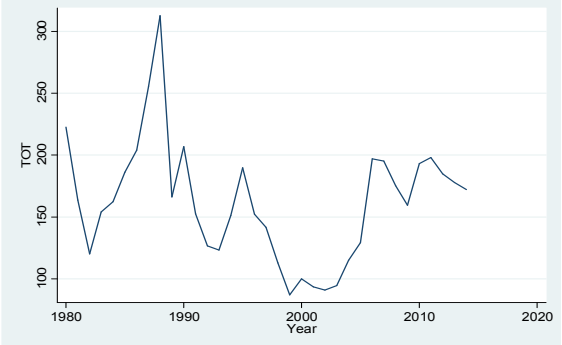


Table 5.1 Descriptive Statistics of the variables

INDICATOR	Mean	Standard Deviation	Minimum	Maximum
GDPGR	3.682199	4.117677	-8.625442	10.29821
INVG	16.84062	6.235907	6.601342	31.01133
HK	2.562552	1.203123	1.3	5.5
OPEN	71.18925	8.986797	51.76963	88.83684
EDGDP	143.8078	95.91534	18.65073	414.9423
DSR	18.54146	13.83736	1.937411	52.07694
LFP	22.19855	8.81392	12.34828	35.1392
TOT	161.9413	48.6591	87.12871	312.3077
INF	36.73504	40.20077	4.267026	165.534
RER	92.28705	57.52266	37.97227	272.5089

Source: Authors' Computation

5.1 Results of the Unit Root Test

The results of the examination of the stationarity properties of the variables used are presented in Table 5.1. The test is done at both the levels and first difference models with trend and no trend. The lag length of the variables is selected based on the information criterion that offered the minimum value, which in this case was the Akaike Information Criterion (AIC). Thus using the AIC, a maximum lag order of two (2) gave the least value and hence was selected.

Table 5.1: PP Unit Root Results

	Levels		First Difference		
Variable	**Trend**	**No Trend**	**Trend**	**No Trend**	**Order of Integration**
GDPGR	-5.737***	-3.922***	-	-	I(0)
INVG	-2.134	0.088	-5.437***	-4.856***	I(1)
HK	-2.146	-1.365	-4.360***	-4.437***	I(1)
OPEN	-3.618*	-2.278	-6.704***	-6.677***	I(1)
EDGDP	-2.546	-1.366	-4.533***	-4.479***	I(1)
DRS	-4.532*	-2.924**	-9.450***	-9.623***	I(1)
LBF	-32.717***	23.725***	-	-	I(0)
TOT	-2.769	-2.860*	-6.570***	-6.699***	I(1)
INF	-2.305	-1.970	-5.628***	-5.641***	I(1)
RER	-1.861	-2.252	-5.298***	-5.147****	I(1)

Note: *** (**) indicates the null hypothesis is rejected at 1 and 5 per cent levels of significance respectively

The results show that *GDPGR* and *LBF* are stationary at the levels, hence, *I*(0) irrespective of whether the test is done with a trend or no trend. This is because the absolute values of the test statistic for *GDPGR* and *LBF* are greater than the absolute values of the critical values at 1 per cent in both cases, implying rejection of the null hypothesis of unit root and hence, non-stationarity against the alternative hypothesis of no unit root, implying stationarity. All other variables are *I*(1) at 1 per cent level of significance, irrespective of whether the test is done with trend and intercept or intercept but no trend. Therefore, it can be concluded the series adopted for the study are mean reverting; implying shocks are temporal, remaining at most after first differencing. The mixed unit root results lend support to the use of the ARDL bounds test approach to examining cointegration.

5.2 Results of the Bounds Test for Cointegration

The essence of the F-test is to determine the existence or otherwise of a cointegrating relationship among the variables in the long run. The results of the bounds test procedure for cointegration is presented in Table 5.2 below.

Table 5.2: ARDL Bounds Test Results for Model

Test Statistic	Value	K
F-statistic	10.72958***	9

The critical values for the 95 per cent lower and upper bounds are 2.04 and 2.08 respectively. The results indicate the presence of co-integration. In other words, there exists a significant long-run relationship among current and future values of the regressors used in the model. The reason is that the F-statistic (10.72958) is greater than the upper bound critical value of 2.08 at 5 per cent level of significance. The null hypothesis of no cointegration is therefore rejected in favour of the alternative hypothesis of the existence of cointegration.

5.3 Analysis of estimation results

Given evidence of long-run relationship among the variables as shown by the co-integration results, the study

estimates long-and short-run results using the ARDL approach. The results are provided in Tables 5.3

Table 5.3 Results of the Estimated Long Run Coefficients Using the ARDL Approach

	Dependent Variable: $GDPGR_t$			
Regressor	**Coefficient**	**Standard Error**	**T - ratio**	**Probability**
OPEN	0.198139	0.0420293	4.71	0.005***
HK	0.243937	0.3389921	0.72	0.504
EDGDP	-0.1180803	0.0080251	-14.71	0.000***
DSR	0.324017	0.0431661	7.51	0.001***
LBF	0.0639256	0.0169472	3.77	0.013**
INF	-0.0740702	0.0073217	-10.12	0.000***
INVG	-0.004756	0.1151896	-8.72	0.000***
TOT	-0.0149547	0.0041919	-3.57	0.016**
RER	-0.1271687	0.009587	-13.26	0.000***

*Note: ***,**,* denotes the rejection of the null hypothesis at the 1%, 5%, and 10% significance levels respectively.*

Most of the variables considered in the determination of economic growth have their hypothesized signs. The coefficient of current debt flows (EDGDP) is found to be negative. The value of the coefficient of EDGDP is -0.1180803, which depicts that a 1 percent increase in EDGDP will bring about 0.11808 percent decrease in the output growth rate. The negative state of this variable supports the Classical view on debt, that government borrowing will have a negative impact on the national economy. This result also confirms the existence of the crowding out theory and debt overhang theory of Krugman (1989) in Zambia. This theory indicates that a rise in accumulated debt stock results in higher tax on future output and thus crowds out private investment and retard growth. Furthermore, the study corroborates the studies of Iyoha (1999), Elbadawi et al (1996) and Akram (2010).

The long run value of the DSR is 0.324017. The positive effect of debt service ratio as a percentage of exports on economic growth was unexpected. However, it has been argued that actual debt service payments are inadequate indicators of the debt burden (Fosu 1999). The positive relationship arises because of the dominance of the debt relief over debt service payment. Nevertheless, the debt service ratio for Zambia has not been overly high compared with other low-income countries.

Trade openness is found to have a positive impact on economic growth in the long run. This is in line with apriori expectations. Zambia's trade contributes positively to economic growth. A one percent increase in trade openness increases output in the long run by 0.2 percent.

The variable human capital shows a positive effect on economic growth in the long run. The result implies that human capital is an important determinant of output although it is insignificant.

Labour force participation is also found to have positive impact on economic output growth. This is line with our prior expectations. A one percent increase in Labour force participation as a percentage of total population increases output growth rate by 0.064 percent.

The negative coefficient of INVG may imply that wear and tear on public goods or government capital goods in the face of poor maintenance culture makes them growth-inhibiting in the long-run.

5.4 Results of the Error Correction Model

The third and final step of the bounds testing procedure is to estimate the short run dynamic parameters within the ARDL framework. Table 5.4 presents the result of the error correction model.

In the short run, deviations from the long run equilibrium can occur due to shocks in any of the variables in the model. Thus all the short run coefficients show the dynamic adjustments of all the variables to their long run equilibrium (Dritsakis, 2011). The signs of the coefficients in the Error Correction Model was not quite different from that attained in the long run model except for a few. The short-run results show EDGDP has a positive effect on economic growth. A one percent increase in EDGDP depicts a 0.024 percent increase in economic growth. The result obtained is not surprising. The implication is that, if external debts are used to finance growth-enhancing expenditure such as capital spending (e.g. infrastructure), it is likely to cause growth eventually. After all, debts are not necessarily bad as some levels of debts can be allowed in order to stimulate growth (see Adam and Bevan, 2005).

The variable IVNG which is used as proxy for physical capital is found to have positive and significant effect at 1% level of significance in the short run. The coefficient of the variable indicates that a one percent increase in INVG will result in 0.33 percent rise in GDPGR. The result is consistent with the findings of Hailemariam, (2011) for Ethiopia, Ali and Mustafa, (2011) for the case of Pakistan and Karagol, (2002) for the case of Turkey.

The debt service variable as a percentage of export is found to be negatively related to economic growth in the short-run. A one percent increase in DSR leads to a 0.20 decrease in economic growth. Debt service

payments reduce output growth directly by reducing productivity. This variable is significant at the 1 percent level. Large debt service requirements divert foreign exchange and capital from internal investment to principal and interest payments. The inability by government to service the debt promptly affects a country's credit, and if the problem persists, the nation will eventually have difficulty borrowing for new projects . . . The scissors effect of declining capital inflows along with increasing debt service payments obviously creates problems. (Karagol, 2002). This significant result confirms the crowding out effect for Zambia in the short-run. As a result of the increased pressure to obtain more foreign exchange to service the debt, the country may restricted imports and reduce trade.

Trade openness has a negative impact on growth output in the short-run. This result is however insignificant. As expected, increases in human capital HK significantly and positively impact on economic growth output in the short-run as well. Current inflation rate propels economic growth while past inflation rate impedes economic growth.

Table 5.4. Estimated Short Run Error Correction Model

Dependent variable: $D.GDPGR_t$				
Regressor	**Coefficient**	**Standard Error**	**T – ratio**	**Probability**
D.GDPGR(-1)	-0.1477982	0.0301225	-4.91	0.004***
D.TOT	0.0484606	0.0048326	10.03	0.000***
D.TOT(-1)	0.0426447	0.0041919	10.17	0.000***
D.OPEN	-0.0259469	0.0210939	-1.23	0.273
D.OPEN(-1)	-0.1613433	0.0172935	-9.33	0.000***
D.EDGDP	0.0245829	0.0048757	5.04	0.004***
D.EDGDP(-1)	0.0765712	0.0038263	20.01	0.000***
D.INVG	0.3315988	0.0707107	4.69	0.005***
D.IVNG(-1)	0.1963708	0.0595241	3.30	0.021**
D.DSR	-0.2035467	0.0270511	-7.52	0.001***
D.DSR(-1)	-0.2187907	0.0149479	-14.64	0.000***
D.HK	5.357201	0.3086634	17.36	0.000***
D.HK(-1)	-0.1733562	0.2608625	-0.66	0.536
D.RER	0.0130171	0.0057606	2.26	0.073*
D.RER(-1)	-0.0032003	0.005358	-0.60	0.576
D.INF	0.1187868	0.0054903	21.64	0.000***
D.INF(-1)	0.0624449	0.0057353	10.89	0.000***
ECT_{t-1}	-0.8819223	.0553918	-15.92	0.000***
Cons.	28.57195	1.414815	20.19	0.000***

*Note: ***,**,* denotes the rejection of the null hypothesis at the 1%, 5%, and 10% significance levels respectively.*

Significantly, the error correction term, ECM contains the expected sign and it is statistically significant. The reason is that, ECM is negative (-0.8819223) and statistically significant at 1 per cent level of significance. It implies convergence to long-run equilibrium every period after every short-run shock. Specifically, 88 per cent of short-run shocks will be corrected every period. This shows a reasonably high speed of convergence to long-run equilibrium after every short-run shock. The negative and statistically significant coefficient lends further support to the co-integration results obtained earlier.

The results of the Granger causality test is presented in table 5.5 below.

Table 5.5 Granger Causality Test

Variables	**Chi square**	**Prob.**
EDGDP GRANGER CAUSES GDPGR	10.062	0.007***
D(DSR) GRANGER CAUSES GDPGR	12.167	0.002***
D(HK) GRANGER CAUSES GDPGR	10.997	0.004***
D(INF) GRANGER CAUSES GDPGR	39.388	0.000***
D(EDGDP) GRANGER CAUSES D(DSR)	8.4714	0.014**
D(DSR) GRANGER CAUSES D(EDGDP)	7.52	0.023**
D(RER) GRANGER CAUSES D(TOT)	11.162	0.004***
D(DSR) GRANGER CAUSES D(OPEN)	8.4058	0.015**
D(OPEN) GRANGER CAUSES D(DSR)	8.5123	0.014**

*Note: ***,**,* denotes the rejection of the null hypothesis at the 1%, 5%, and 10% significance levels respectively.*

The result of the granger causality tests show that at 1% level of significance, EDGDP granger causes GDPGR. This result shows a unidirectional causation between EDGDP and GDPGR with the causation effect running from EDGDP to GDPGR. The results equally show that at 1% significance, DSR, HK and INF granger

cause GDPGR. There is bi-directional causality between EDGPR and DSR at 5% significance. RER granger causes TOT at 1% significance. Equally there is bi-directional causality between DSR and OPEN at 5% significance. This is evident by the Chi-square and p-values which are both significant at 5%.

5.5 Diagnostic Tests

To ascertain the goodness of fit of the ARDL model, its applicability and inference in policy making, there is the need to consider its statistical properties by conducting diagnostic and stability tests. The essence of the diagnostic test is to examine the heteroscedasticity, normality, functional form, and serial correlation associated with the model. The stability test of the coefficients is conducted by employing the cumulative sum of the recursive residuals (CUSUM). We graph the cumulative sums (CUSUM) of the recursive residuals from the regression. Each graph includes a 95 percent confidence band. The results reported in Table 5.6, suggest that the model was well specified and stable over the study period.

Table 5.6 Diagnostic Test Results

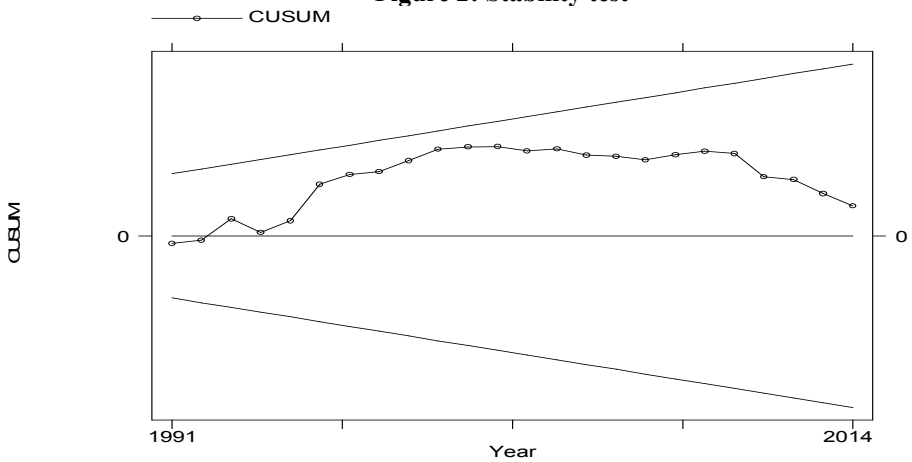
Test	Test Statistic	Probability
Serial Correlation:		
Breusch-Godfrey LM test for autocorrelation	0.267	0.6057
Specification Error:		
Ramsey RESET test	0.69	0.6383
Heteroscedasticity:		
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	0.37	0.5417
Normality:		
Jarque-Bera statistic	1.009	0.6038
R-squared = 0.9995	Adj. R-squared = 0.9969	F-Statistic = 379.84 (0.000)

*Note: *,**,*** denotes the significance of 10%, 5% and 1% levels respectively. None of the tests was significant at these levels.*

The above diagnostics indicate that the residuals are normally distributed, serially uncorrelated and homoscedastic. The Breusch-Godfrey LM test with a coefficient of 0.267 is an indication of the acceptance of the null hypothesis of no serial correlation in the residuals. Thus the problem of first serial correlation is eliminated. The overall regression is significant at the 1 percent significance levels as evident from the F statistic and R squared results. The F statistic value of 379.84 suggests the joint statistical significance of all the regression coefficients together, while the R squared value of 0.9995 implies that 99.95 percent of the variation in external debt is explained by the variation in the regressors.

The P-value of the Ramsey's RESET test statistic indicates that the alternative hypothesis of model misspecification is rejected, which implies the model is correctly specified. That is, the null hypothesis for the Ramsey's RESET is that the model is correctly specified or does not suffer from omitted variable bias, thus the P-value indicates a non-rejection of the null hypothesis. The Jarque-Bera statistic confirms that the residuals are normally distributed. The problem of heteroscedasticity was also eliminated as indicated by the Breusch-Pagan / Cook-Weisberg test for heteroskedasticity. Graphical representation of *CUSUM* recursive residuals (fig. 2) also gives the same conclusion of stability of the model. Thus the diagnostic results reported suggest that the model was well specified and stable over the study period.

Figure 2: Stability test



The figure above shows the outcome of the CUSUM test of stability which shows the model to be

stable, given the fact that the CUSUM line that is in the middle lies in between the two boarder lines, the two bands at 5% critical and does not stray out.

6. Conclusion and policy implications

The central focus of this study was to establish the impact of Zambia's external indebtedness on economic growth which is an important economic issue that persistently attracts the attention of policy makers with a view to proffering appropriate policy measures that will reduce the adverse effect of external debt and with positive implications on poverty. In this regard, we employed an open macroeconomic model which includes two external debt indicators (EDGDP and DSR) and other macroeconomic variables.

Using an ARDL approach to cointegration also known as the bounds testing approach, we were able to establish a long run relationship among the variables in use. External debt is found to have positive effect on economic growth in the short run and a negative effect in the long run. This suggests that in the short run, sourcing of more external debt could lead to economic growth in Zambia. The long run results however suggests the possibility of debt over hung effects. The results tally with the findings of similar studies (e.g. Elbadawi *et al*. 1996).

In the short run debt service as a percentage of exports is found to have a negative impact on economic growth indicating possible crowding out effects. In the long run however the debt service variable is found to have a positive and significant relationship with economic growth. The positive effect of debt service ratio on economic growth was unexpected in the short run. However, it has been argued that actual debt service payments are inadequate indicators of the debt burden (Fosu 1999). Nevertheless, the debt service ratio for Zambia has not been overly high compared with other low-income countries.

Labour force participation was found to have a positive significant impact on economic growth, in line with our apriori expectations. In the short run, current and past inflation have a positive impact on economic growth while the long run result is that inflation deters economic growth.

Current and lagged values of investment in the short run are found to have a positive impact on economic growth as hypothesized. However the long run negative impact of investment on economic growth was unexpected.

Trade openness proved to be a crucial determinant of economic growth in the long run. The trade openness variable is found to have a significant and positive relationship with economic growth. The human capital variable had a positive but insignificant impact on economic growth. Finally from the causality test, it was discovered that a unidirectional causality runs from external debt (EDGDP) to economic growth (GDPGR).

The simultaneous attainment of sustainable economic growth and external debts appear difficult at the moment and could remain elusive if aggressive measures are not undertaken. Proper macroeconomic management of the economy as a whole is important since it also determines the volume and servicing of external debt, as well as the credit rating. Availability of external finance should be consistent with a policy framework that is credibly maintained (fiscal stance, exchange rate policy, interest rate policy, pricing policy, etc.). It is important to create credibility including political will in order to spur investor confidence for both local and foreign investments.

Lastly, to mitigate the negative effect of total debt service, any borrowed funds must be invested wisely to generate sufficient returns to pay off the debt and its accumulated interest. If this is cautiously observed debt overhang and crowding out effects could be controlled or minimized. Furthermore, export promotion strategy could be embarked on to help generate adequate foreign exchange to meet external debt obligation. Prudent financial management practices coupled with export promotion strategies could help reduce the liquidity constraint effect, debt overhang effect, crowding-out effect and direct effect of debt.

References

Akram, W. (2010). *"Impact of Public Debt on the Economic Growth of Pakistan."* Centre for Poverty Reduction and Social Policy Development, Is Lambad.

Amoateng, K. & Amoako, A. B. (1996), "Economic growth, Export and External Debt Causality: The case of African countries", *Journal of Applied Economics*, 28, 21-27.

Ajayi, S. I. (1991). 'Macroeconomic Approach to External Debt: The Case of Nigeria'. AERC Research Paper No. 8. Nairobi: African Economic Research Consortium.

Borensztein, E. (1990) Debt Overhang, Debt Reduction and Investment: The Case of Philippines. (IMF Working Paper, No. WP/90/7).

Chowdhury, K. (1994)." A structural analysis of external debt and economic growth: Some evidence from selected countries in Asia and the Pacific" *Journal of Applied Economics,* 26, 112 - 113.

Choong, C., Lau, E., Liew, V.K., & Puah, C. (2010)." Does Debts Foster Economic Growth? : The Experience of Malaysia," *African Journal of Business Management,* Vol. 4(8), 1564-1575.

Cholifihani, M. (2008), "A Cointegration Analysis of Public Debt Service and GDP in Indonesia" *Journal of*

Management and Social Sciences Vol. 4, No. 2, (Fall 2008) 68-81

Cohen, D. (1989). 'How to Cope with Debt Overhang: Cut Flows rather than Stocks', in I. Diwan and I. Husain (eds), *Dealing with the Debt Crisis*. Washington, DC: World Bank.

Elbadawi, A. I., J. B. Ndulu, and N. Ndung'u (1996). 'Debt Overhang and Economic Growth in Sub-Saharan Africa'. Paper presented at the IMF/World Bank Conference on External Financing for Low-income Countries, December. Washington, DC: IMF/World Bank.

Fosu, A. K. (1996). 'The Impact of External Debt on Economic Growth in Sub-Saharan Africa.' *Journal of Economic Development*, 12 (1).

GRZ. (2008). *External Debt Operations Report.* Ministry of Finance, Investments and Debt Management. Lusaka: Government of the Republic of Zambia

Iyoha, M. A, (1999)." External Debt and Economic growth in Sub-Saharan African Countries" AERC Research Paper 90. African Economic Research Consortium, Nairobi.

Kabadiya, B., Uzun, A. and Karakoyi, C. (2012).*"The Impact of External Debt on Economic Growth in Transitional Economies."* Chinese Business Review Vol. ll

Karagol E. (2002) "The Causality Analysis of External Debt Service and GNP: The Case of Turkey", *Central Bank Review,* Vol. 2, No. 1, PP. 39-64.

Krugman, P. R. (1988), "Financing versus Forgiving a Debt overhang," *Journal of Development Economics,* 29 PP 253-268.

Mbah stella Adah, Agu Osmond Chigozie, Umunna Godwin. "Impact of External Debt on Economic Growth in Nigeria:" An ARDL Bound Testing Approach. *Journal of Economics and Sustainable Development. Vol.7, No.10, 2016.*

Patillo C., L. Ricci & H. Poirson (2002), "External Debt and Growth", *IMF Working Paper,* no 02/ 69.

Pesaran, H, Shin, Y. & Smith, J. (2001), "Bound testing Approach to Analysis of Long Run relationships,

Pesaran M. and Shin Y. (1997). An Autoregressive Distributed Lag Modeling Approach to Cointegration Analysis

Pesaran,M.H. & Shin,Y. & Smith,R.J. (2001)."Bounds Testing Approaches to the Analysis of level Relationships". *Journal of Applied Econometrics* (16):289-326

Pesaran, M.H. & Shin,Y. & Smith, R.J. (1999). "Bounds Testing Approaches to the Analysis of long Run Relationships". *Journal of Applied Econometrics* Cambridge University PP.1-41

Sachs, J. and Warner, A (1995) "Economic Reform and Process of Global Integration," *Booking papers Economic Activity* 1, 1-117

Safadari, M. and Mehrizi, M. A (2011). *"External debt and Economic growth in Iran".* Journal of Economics and International Finance. Vol. 3

Siddique, A., Selvanathan,E.A. & Selvanathan, S. (2015*).* The Impact of External Debt on Economic Growth:Emperical Evidence from Highly Indepted Poor Countries. Discussion Paper 15.10. University of Western Australia Department of Economics

Sulaiman,L.A. & Azeez,B.A. (2012). The Effect of External Debt on Economic Growth of Nigeria. *Journal of Economies and Sustainable Development.www.iiste.org 3*(8)

Usman, S. H. (2013) External Debt and Economic Growth: Evidence from Nigeria *International Journal of Economics*, Business and Finance Vol. 1, No. 10, PP: 360 -370, ISSN: 2327 - 8188 (Online) Available online at http://ijebf.com/

Uzochukwu A. (2005), "Nigeria Public debt and economic growth: An Empirical Assessment of Effects on poverty" working paper.

Wijeweer A., Br. Dollery & P. Palitta (2005), " Economic growth and External Debt Servicing: A Cointegration Analysis of Sri Lanka, 1952 to 2002", *Working paper series in Economics, University of new England school of economics,* No. 2005-8.

Were, M. (2001): "The Impact of External Debt on Economic Growth and Private Investments in Kenya: An Empirical Assessment", *Wider Development Conference on Debt Relief*, 17-18 August 2001, Helsinki.

World Bank, 2010." African Development Indicators-ADI," The World Bank, Washington, D.C.