

# **Evaluating the Impact of Bilateral and Multilateral Official Development Assistance on Economic Growth in Zambia**

A Dissertation  
presented to

**The Development Finance Centre (DEFIC)**  
Graduate School of Business  
University of Cape Town

In partial fulfilment  
of the requirements for the Degree of  
**Master of Commerce in Development Finance**

by

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**January 2020**

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## **ABSTRACT**

As a recipient of Official Development Assistance (ODA), the Republic of Zambia is considered one of the aid-dependent nations in Sub-Saharan Africa. Development assistance has been said to have had made absolutely no contribution to economic growth and development in the country on observation of the Gross Domestic Product (GDP) per capita figure over the years which indicates periods of stagnation in growth despite ODA receipts. Generally, this conclusion has in the past been drawn without consideration for, and appreciation of, the variations in the objectives and disbursement channels of ODA. Consequently, this study sought to investigate the separate impact of multilateral and bilateral ODA on GDP per capita which served as a proxy for economic growth and development in Zambia. Based on a modified neo-classical economic growth model that incorporates multilateral and bilateral ODA as determinants of economic growth, this study employed the ARDL model to investigate the long-run and short-run relationship between GDP per capita and ODA from 1975 to 2016. Two similar growth models were analysed substituting the net ODA variable with multilateral and bilateral ODA in order to assess the relationship. In addition to net ODA, the model included the variables investment, trade openness and the labour force as determinants of economic growth.

Findings from the study show that multilateral ODA had a significant negative impact on GDP per capita, while the bilateral ODA model showed a statistically insignificant negative relationship. The findings of the study support the notion that different types of foreign aid cannot be expected to have a uniform impact on growth and development in terms of effectiveness. The recommendations point to the importance of re-evaluation of modalities by donors to ensure that development assistance is more effective in achieving sustainable development goals.

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## **GLOSSARY OF TERMS**

ADB	Asian Development Bank
AfDB	African Development Bank
ARDL	Autoregressive Distributed Lag
DAC	Development Assistance Committee
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GNP	Gross National Product
GRZ	The Government of the Republic of Zambia
IMF	International Monetary Fund
HDI	Human Development Index
MDGs	Millennium Development Goals
ODA	Official Development Assistance
OECD	Organisation for Economic Co-operation and Development
SSA	Sub-Saharan Africa

## **ACKNOWLEDGEMENT**

I would like to acknowledge and express my gratitude to my supervisor Dr Latif Alhassan for his much-appreciated advice, guidance and patience through the journey of writing this dissertation. It was an honour to work with you.

I would also like to appreciate the support and encouragement provided by my family, friends, as well as my colleagues from the UCT Graduate School of Business; you surely made the experience worthwhile.

Most importantly, I would like to thank God for making this possible and providing me with the resources, encouragement, strength and inspiration I needed. To all, I am eternally grateful.

## **CHAPTER 1: INTRODUCTION**

### **1.1 Background of The Study**

The concept of development assistance dates back to the Marshall Plan of 1948 under which the United States of America funded the redevelopment of western Europe following the end of world war II. The development assistance model was after that replicated in various forms including military, humanitarian, technical assistance, debt relief and development aid across the less developed continents in the world.

Today most Official Development Assistance (ODA) is aimed at promoting economic development and improving welfare in developing countries with a large fraction channelled to the African Continent. The Official Development Assistance (ODA) as defined by the Organisation for Economic Co-operation and Development (OECD) Development Assistance Committee (DAC), encompasses concessional capital flows from donor countries belonging to the DAC. In addition to, non-members or multilateral institutions aimed at enabling sustainable development in the recipient countries. Also, the term ODA is often used interchangeably with foreign aid (Rao, 2003).

The effectiveness of ODA has been a widely debated topic for decades. The term ‘aid effectiveness’ refers to the role played by official development assistance flows in achieving economic and social development goals in recipient countries (Durberry, Gemmill, & Greenaway, 1998; Tarp, 2006). Economic and social development goals in developing countries are generally aligned to economic growth and improvement of living standards in line with the sustainable development goals (SDGs). Given the fact that the intended outcome of development assistance has not been achieved in every case that it has been provided, the debate regarding the effectiveness of aid is still ongoing with several empirical studies producing contrasting results across regions and countries, as evaluation techniques of the aid and growth nexus evolve with time. Particularly, economists such as Moyo (2009) have argued that aid has not complemented growth in Africa, but has given rise to aid dependency and suppressed economic development in the recipient countries, specifically in Africa. However, the reality is that ODA is often provided for various causes including assistance with natural disasters, to promote political stability, improve infrastructure and economic development and or to provide

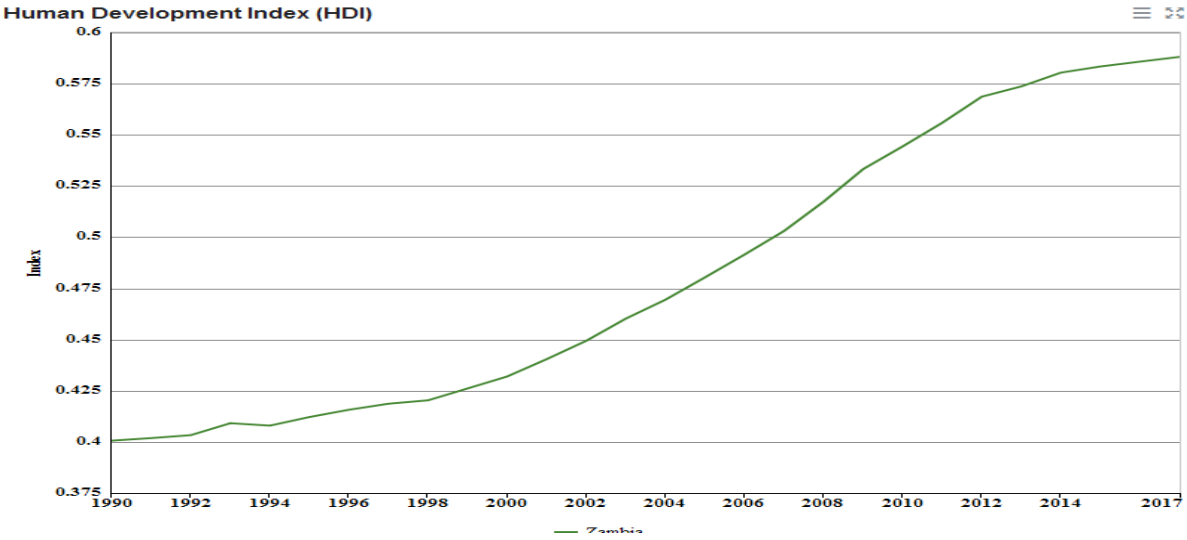
national budget support in some instances. The different donor practices, motives and, methods of aid allocation have been observed to have diverse effects on the aid-growth relationship, and it cannot be expected that all forms of aid translate into economic growth. Therefore, would it be prudent to consider all foreign aid and its effectiveness the same?

In the quest to establish the effects of ODA or foreign aid on economic growth, one would observe that consideration is often not given to donor motives, disbursement modalities and designs of aid as well as the implementation process in the recipient countries (Tarp, 2006). As it becomes more evident that aid flows should not be considered the same, the ongoing aid effectiveness debate has begun to evolve from arguments regarding the overall effectiveness of foreign aid, to impact being conditional on economic policy in recipient countries and most recently, the debate regarding the type of aid. Researchers in more recent studies have noted that development outcomes are possibly dependant on the choice between bilateral and multilateral channels when it comes to the disbursement of ODA (Biscaye, Reynolds, & Anderson, 2017).

Based on whether ODA is provided directly from one government to another or through a multilateral institution, ODA is classified in either of the two categories. Firstly, Bilateral ODA is administered directly through grants or loans from one government to another, while multilateral ODA constitutes contributions from various governments to multilateral agencies for use in their programmes aimed at fostering sustainable development in recipient countries (OECD, nd). These multilateral agencies include organisations such as the International Monetary Fund (IMF), World Bank, African Development Bank (AfBD), Asian Development Bank (ADB) and World Vision. Because donors have focus development areas which they fund, the magnitude of impact and contribution to economic growth cannot be the same due to differences in how bilateral and multilateral aid is delivered (Gulrajani, 2016). Multilateral aid channels have been said to be less fragmented and more effective than bilateral channels which tend to be vulnerable to political influence thus compromising the intended positive development outcomes in recipient countries (Gulrajani, 2016). The apparent geopolitical nature of bilateral aid has been made evident in a study by (Headey, 2008) who posits that during the cold war era, the quantities of bilateral aid from the western world channelled to developing countries, was influenced by the recipient country's allegiance with the west against Soviet Union ideologies . It is then safe to say, based on existing literature, that the effectiveness of

ODA on economic growth and development is conditional on various factors including the channel of disbursement.

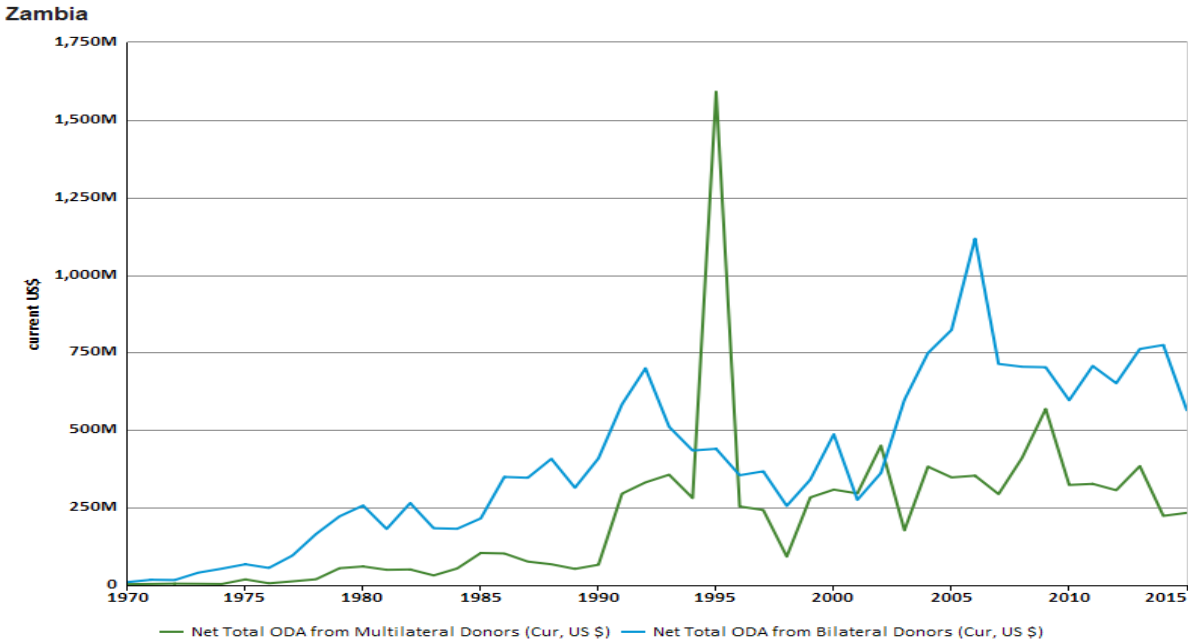
With regards to The Government of the Republic of Zambia (GRZ), they have been a recipient of ODA since before its independence in the early 1960s. However, before the 1970s, ODA to Zambia was largely in the form of technical assistance in support of government initiatives to fill skills gaps and promote the development of human capital in the country. The technical assistance received was through bilateral channels (Beuran, Revilla, & Revilla, 2011). Historical data shows that since the 1960s, total aid flows into Zambia displayed an increasing trend. However, observation of the country’s economic performance between the 1970’s and the year 2000 have given rise to the theory that foreign aid has been ineffective given the Gross Domestic Product (GDP) per capita figure (\$527.44) in 1975 compared to the figure (\$378.27) in 2001 indicating negative growth, 26 years later (Beuran et al., 2011, Worldbank data, 2019). However, the living conditions monitoring survey conducted by the GRZ in 2011 reported that living standards in Zambia had improved between 1996 and 2006 as the proportion of the population living below the poverty line had declined from 68% to 59.3% allowing Zambia to be considered a middle-income country (OECD, 2011). Observation of the country’s human development index (HDI) which is one of the measures of the long-term improvement of living standards, showed an increasing trend. As of 2017, Zambia’s HDI stood at 0.588 which was below the 0.645 average in the medium human development group but above the 0.537 average in Sub-Saharan Africa ranking the country at 144 out of 189 (UNDP, 2018). Figure 1 below shows the HDI score for Zambia between 1990 and 2017.



**Figure 1: Zambia Human Development Index (HDI) from 1990 - 2017**

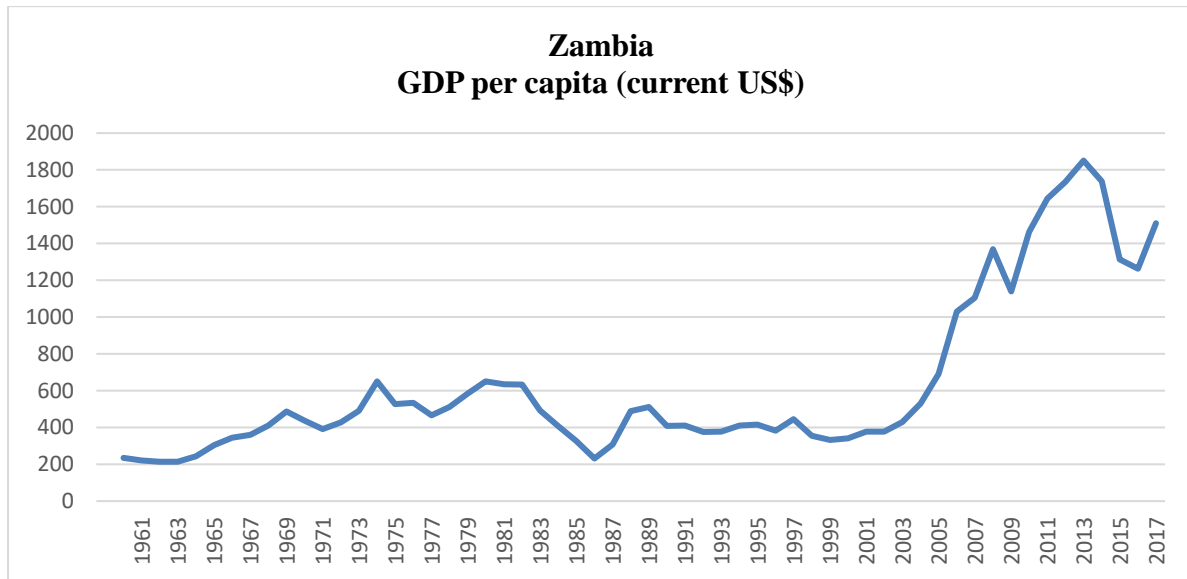
Source: AfDB Socio-Economic Database retrieved from (<https://dataportal.opendataforafrica.org>)

Foreign aid as a whole is argued to make recipient countries worse off with aid recipient economies characterised by slow GDP growth rates and increasing poverty levels (Moyo, 2009). Considering the facts at hand, ODA flows to Zambia have been deemed ineffective in existing literature, as the country has exhibited stagnation in growth rates from the time of its independence in the 1960s. However, at a glance, the observation of rising per capita GDP levels post the year 2000 illustrated in Figure 3 below and the coinciding peaks in Net ODA flows (see Figure 2) shortly before and after the increase in GDP per capita figures pose the possibility of a linkage between one of the types of ODA flows and the rise in GDP per capita levels through investment and improvement in living standards reported.



**Figure 2: Total Net ODA from Multilateral and Bilateral Donors to Zambia (Current US \$) From 1970 - 2015**

Source: AfDB Socio-Economic Database, retrieved from <https://dataportal.opendataforafrica.org>



**Figure 3: Zambia GDP Per Capital (Current US \$) From 1962- 2016**

*Source: World Bank – World Development Indicators, retrieved from <https://data.worldbank.org>*

Interestingly, despite the strong arguments by anti-aid advocates that foreign aid has only made Africa worse off, the literature continues to provide mixed results with regards to foreign aid as a determinant of growth. With the debate shifting towards macroeconomic policy environments in which aid is provided and whether the type of aid matters, one would observe that micro-level studies have provided more statistically significant positive results than macro-level evaluations. Studies with an aggregated approach regarding the ODA variable, have often yielded ambiguous results, suggesting either positive, negative or an insignificant relationship between ODA and growth (Durbarray et al., 1998). With these observations, this paper seeks to investigate the separate effects that bilateral and multilateral ODA have had on economic growth and development in Zambia, given differing views and varying data trends on the topic.

## **1.2 Statement of The Problem**

Various studies have been undertaken to evaluate aid effectiveness, have often used an aggregated approach, in terms of the type of aid, mostly focusing on a number of countries in the same region rather than on individual countries (Refer to Burnside & Dollar, 1997,2000; Durbarray et al., 1998; Easterly, 2003; Moreira, 2005; Phiri, 2017). Specifically, researchers of the aid and growth nexus have often not taken into account the variances between country income levels, the proportion of aid to GDP and that the ODA channels of disbursement that may affect the effectiveness of ODA. The importance of carrying out disaggregated studies is

highlighted by Tarp (2006) and proven by Adedokun (2017) research on the effects of aid in Sub-Saharan Africa yielded an insignificant negative impact on growth with aggregated data but yielded mixed results when a disaggregated approach was tested.

The level of aid disbursed through bilateral channels compared to multilateral channels differs across countries and continents. Studies have shown that the strategic interests of the donors influence the allocation of foreign aid provided by bilateral donors while multilateral aid has been said to be more focussed on development outcomes as it is allocated to recipient countries most in need (Biscaye et al., 2017; Gulrajani, 2016). Current development debates around ODA mostly focus on how development assistance can be made more effective in achieving developmental goals (Beuran et al., 2011). These developmental goals specifically being poverty reduction through industrialisation and economic growth. Previous studies that set to establish the causal link between aggregate official or unofficial development assistance and economic growth rates in the recipient countries have been deemed to be flawed. This being because no consideration for the fact that development assistance flows are directed to different sectors of an economy and have different purposes (Akramov, 2012). It should then be noted that the various ODA flows are less likely to impact economic growth and development uniformly, as has been expected.

Zambia has received both bilateral and multilateral aid in different volumes over the years, and existing literature under which Zambia has been included as part of cross-section studies have not considered the possible contrasting effects on economic growth based on the circumstances under which the aid is provided. As highlighted by Ram (2003), the general practice in aid and growth literature had been to utilise a combined aid variable. This generalisation of ODA has been said to place a constraint of equality on multilateral and bilateral aid with the assumption that they have a contemporaneous impact on economic growth. Some existing studies classified the two as separate variables and found a significant opposite impact. Similarly, this has been identified by some authors as the possible reason why the aid and growth relationship may be found to be statistically insignificant. Therefore, it is for this reason that the impacts of ODA on economic growth and development should be studied separately. Through the observation of the separate effects of multilateral aid and bilateral ODA on economic growth, the study aims to determine the level of impact on economic growth each type of aid has and to ascertain which may be effective in the African context.

### **1.3 Research Objectives and Questions**

This study seeks to investigate and establish the separate effects of multilateral and bilateral ODA on GDP per capita growth in Zambia. Existing literature indicates that the foreign aid and development relationship in Zambia is negative and suggests that foreign aid has not achieved the objective of accelerating economic development.

The study aims to achieve the following;

- i. To examine the impact bilateral and multilateral ODA on economic growth in Zambia.

The study seeks to answer the following question;

- i. What are the separate effects of bilateral and multilateral ODA on per capita GDP in Zambia?

### **1.4 Purpose and significance of the study**

Having reviewed existing literature available on this topic and observing the different approaches used to establish how effective official development assistance is to developing countries, some literature noted the importance of separating the aid variable which is often studied as an aggregate without regards for the differences in donor motivation and aid conditionalities underlying multilateral and bilateral aid flows. Accordingly there is substantial empirical evidence suggesting that bilateral aid tends to be more fragmented and vulnerable to political capture than multilateral aid and this negatively impacts development outcomes in recipient countries (Gulrajani, 2016). Fragmentation was considered as an obstacle to aid effectiveness as it makes it difficult for recipient countries to manage development due to the increased corruption and high transaction costs that may result from having several ODA flows from a number of donors, however, fragmentation may not always be negative (Gulrajani, 2016; OECD, 2009). In all, Multilateral aid has thus been identified as a more effective aid channel due to less fragmentation and the level of autonomy held by multilateral institutions; however, some studies have indicated the opposite.

This study contributes to the existent body of knowledge relating to the effectiveness of aid topic by establishing the relationship between aid and GDP per capita growth in Zambia and whether bilateral aid has had a greater impact than multilateral aid in an individual developing

country. By establishing the aid modalities that are more effective in Zambia, donors can make greater strides in achieving the intended development goals through the alignment of donor policies and practices to make ODA more effective (Akramov, 2012).

### **1.5 Organisation of the Study**

Following this introductory chapter which outlines the gaps in existing literature concerning the effectiveness of ODA on economic growth as well as the aid infrastructure in Zambia over the last forty years in comparison to economic growth performance, this study further investigates the relationship between bilateral and multilateral aid channels and economic growth in Zambia. The study is, therefore, organized as follows; Chapter two (2) will review the existing theoretical and empirical literature on the effectiveness of official development assistance (ODA) on economic growth. Chapter three (3) outlines the research methodology used and describes the methods used to carry out the study. After that, Chapter four (4) provides a discussion of the empirical findings from the study with an analysis and interpretation of the regression and co-integration test results. Lastly, Chapter five (5), concludes and provides recommendations for further research.

## **CHAPTER 2: LITERATURE REVIEW**

### **2.1 Introduction**

This chapter presents the prominent underlying economic growth theories used to motivate foreign aid flows and the expected impact on economic growth and development. Also provided is a review of empirical findings from selected studies giving regional and individual country insights on the effectiveness of Official Development Assistance (ODA). The chapter begins with a background to the foreign aid effectiveness debate, followed by a background of the foreign aid landscape in the Republic of Zambia. A review of the existing empirical literature then provides detail to the alternative views on the topic which includes whether development aid has been effective or not in various contexts as well as literature related to the comparison of multilateral and bilateral aid channels and their contribution to development outcomes.

#### **Is Foreign Aid Effective?**

The Marshall Plan of 1948 under which post-second world war Europe was re-developed, to date, stands as an example of one of the most successful foreign aid initiatives (United Nations, 2006). Another example of successfully administered development assistance would be the case in South Korea. Admittedly, South Korea is one of the countries that only after a decade of receiving aid, has achieved economic development and graduated from being an Official Development Assistance (ODA) recipient to an ODA donor (Doucouliagos & Paldam, 2008; OECD, 2019). These amongst others are cases where there is demonstrated success stories when it comes to official development assistance achieving its intended purpose.

Additionally, several examples exist where a positive impact of foreign aid has not been evident or reflected in the social-economic performance of countries, especially in Africa. Various economic growth theories have been used in studies to link capital inflows of foreign aid to economic growth rates in countries. However, there appears to be no consensus among empirical studies that have been conducted for on several developing countries to establish whether official development assistance fosters economic growth and development. The nature of the foreign aid debate has shifted over time from the assessment of the general impact of aid on growth through the closure of the savings and investment gaps, to the policy condition debate that surfaced in the 1990s on whether aid effectiveness is reliant on the existing policies and governance structures in the recipient countries. Researchers like Tarp (2006) have argued that

foreign aid is not equally effective; therefore the focus should be on how to improve modalities that can enhance effectiveness.

## **2.2 Objective of ODA: The theory on the expected economic impact of foreign aid**

The ideology on which current pro-foreign aid arguments have been based on is the “big push” theory that Professor Rosenstein-Rodan first conceptualised and formulated the foundation of the Jeffrey Sachs school of thought (Kiiza, 2013). The “big push” theory, which lies at the basis of Jeffrey Sach’s argument backing foreign aid to support development, was developed from the two-gap growth theory which requires the closure of a “financing gap” in an economy’s growth model to fuel economic growth. The “Big Push” theory advocates for increased lump sums of ODA to developing countries in order to increase public investment in these countries by filling the “financing gap” required for investment, productivity and sectoral growth. The underlying assumption of this theory is that poor or developing countries lack the capacity to pull themselves out of the “poverty trap” because of their lack of capital to finance income-generating public investments. The expectant effect of this “big push” is economic growth and development, lifting these developing countries out of poverty and allowing them to begin to grow on their own sustainably (Abuzeid, 2009; Kiiza, 2013).

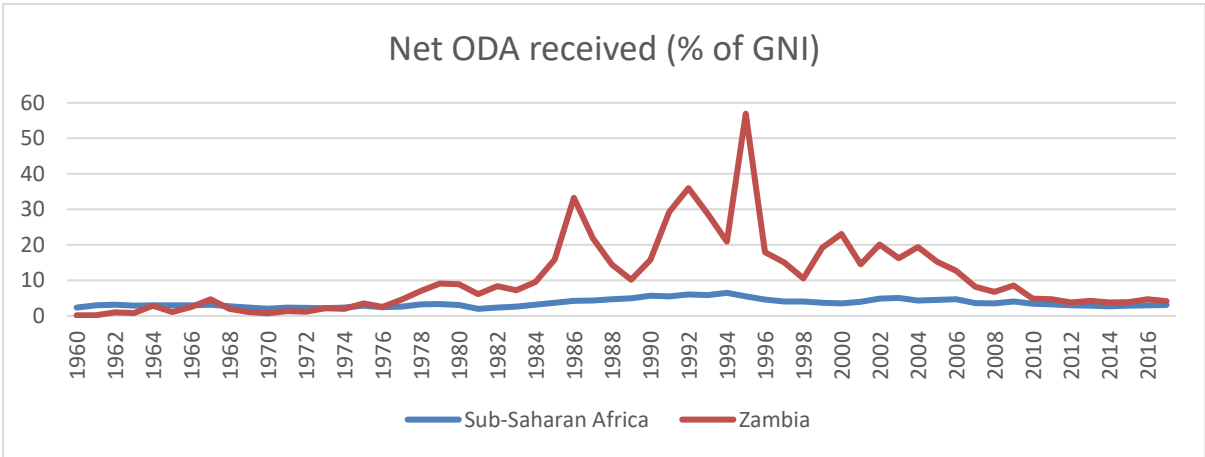
However, William Easterly (2006) challenges the Big push theory in his review of Jeffrey Sach’s book, *The End of Poverty: Economic Possibilities of our time*. Specifically, Easterly (2006) argues against the big push theory and suggests that a piecemeal approach to foreign aid is a better alternative to the big push theory. He further highlighted the cases where piecemeal aid projects have been more successful in aiding economic growth and development such as vaccination campaigns in Africa that reduced the number of measles cases between 1996 and 2000, and donor projects that assisted in the eradication of river blindness in West Africa. On the contrary, other literature on Africa indicates that despite the nations receiving billions of US dollars in foreign aid, has not exhibited significant economic growth and development.

## **2.3 Overview of ODA in Zambia**

The Republic of Zambia has been a recipient of Official Development Assistance (ODA) since the 1960s and has been considered an aid-dependent nation based on net ODA flows as a percentage of Gross Net Product (GNP). The ODA flows into Zambia have been observed to be closely linked to and influenced by the country’s economic standing and policy changes over

the years. Zambia saw a decline in external assistance from particularly from the United Kingdom following the implementation of its nationalisation policy and expropriation of foreign assets in the early 1990s, while external economic shocks in the mid-1970s caused by fluctuations in commodity prices, increased aid flows into the country. (Carlsson, Chibbamullilo, Oriuela, & Saasa, 2000).

Although aid dependency has declined since 2004, Zambia’s net ODA as a percentage of Gross National Income (GNI) as shown in Figure 4 remains 1.1% higher than the Sub-Saharan African (SSA) region average of three percent (3%) as at 2017 (World Bank, 2017). In several studies, Zambia has been put forward as an example of the failure and ineffectiveness of foreign aid in Africa based on the financing-gap growth model due to the stagnation of GDP per capita at an average of \$ 600 despite the large inflows of foreign aid received (Abuzeid, 2009). According to Inanga & Mandah, (2008), the effective utilisation of all aid receipts to Zambia since the 1960s should have resulted in rapid economic growth and an average GDP per capita of above \$20,000; unfortunately, this has not been the case.



**Figure 4: Net ODA received (% of GNI) (1960- 2017)**

*Source: World Bank – World Development Indicators, retrieved from <https://data.worldbank.org>*

The aid inflows to Zambia began to escalate during the late 1970s to early 1980s, and the inflows were largely in the form of technical assistance for projects that were initiated by the Government of Zambia, mostly for food aid and debt-service related operations (Beuran et al., 2011; Fagernas & Schurich, 2004). From the 1970’s, ODA to Zambia has generally displayed an increasing trend with bilateral aid representing a larger portion of the aid flows. With the establishment of the Millennium Development Goals (MDGs) in 2000, there was an increase

in ODA flows owing to donor commitments to increase aid to the African continent to which Zambia was a recipient country (Beuran et al., 2011).

Many bilateral donors also provided development assistance through multilateral aid channels for structural adjustment programs proposed by the IMF and World Bank. Therefore, the increasing trend of multilateral and bilateral aid between the 1970s and the 1990s was owing to the linkage of some bilateral aid flows to multilateral aid flows, however, bilateral flows remain the greater portion of total ODA flows to Zambia and other developing nations (Andersson, Bigsten, & Persson, 2000).

Zambia was reclassified a lower-middle-income country by the World Bank following the positive macroeconomic performance with an average GDP growth rate of above five percent (5%) between 2003 and 2010 which resulted in a scale-down of traditional multilateral and bilateral ODA flows into the country post-2011 (Prizzon, 2013).

## **2.4 Theoretical Framework: ODA and Growth**

Official Development Assistance (ODA) can provide developmental impact in several ways; however, the majority of existing aid effectiveness literature focusses on the relationship between aid inflows and GDP per capita rates. Studies related to the aid and growth relationship are based on economic growth theories in which ODA is considered a capital input or investment that increases productivity and generates growth in an economy. In this section, we review the most prominent growth theories that have influenced the aid effectiveness debate.

### **2.4.1 The Harrod-Domar Two-Gap Growth Theory**

Traditional studies that were undertaken to analyse the relationship between aid and growth have mostly taken the two-gap or financing gap approach which identifies investment as the key driver of economic growth in developing economies (Morrissey, 2001). Based on the motive for the provision of foreign aid which is to support economic growth and development, the underlying presumption under this theory is that foreign aid generates investment in recipient countries and thus has a positive effect on economic growth. Chenery and Strout (1966) formulated this aid and growth theory based on the classic Harrod (1939) and Domar (1946) theory of economic growth. Correspondingly, Chenery and Strout in the formulation of this aid and growth theory identified two financing gaps that constrain growth in an economy, the savings gap and the foreign exchange gap. The ideology is that if inflows of foreign aid fill

these gaps, the ultimate result will be economic growth (Rao, 2003). However, the assumptions under this model are cited to be simplistic as the presumption is that savings and investments are the main drivers of economic growth. Additionally, It is unrealistic to assume that all aid is invested because some aid tends to be disbursed on humanitarian grounds as a result of natural disasters or famine (Tarp, 2006).

The Harrod-Domar two-gap financing theory does not factor in the productivity levels of capital nor the effects of financial shocks to an economy and thus it has been considered to be empirically weak and a dubious concept (Mbah & Amassoma, 2014; Rao, 2003). However, According to Easterly (2003), as cited by Mbah & Amassoma (2014), it is the generally accepted growth model in empirical research relating to the contribution ODA has to economic growth, and it is still used by development finance institutions like the World Bank.

#### **2.4.2 The Neo-Classical Growth Theory**

Another theory that dominates aid and growth literature is the Solow-Swan neo-classical growth theory. The neoclassical growth model addresses some of the weaknesses identified in the two-gap model based on the Harrod and Domar growth theory because Solow, (1956) criticized the Harrod-Domar model for using short-run tools for the analysis of long-run issues. Thus, unlike the the Harrod-Domar model that assumes investment to be the only determinant of growth, the neo-classical theory acknowledges other factors, such as capital and labour, as determinants of growth and incorporates the productivity levels of capital (Morrissey, 2001).

Under the neo-classical theory, the per capita income growth is determined as a factor of the capital-labour output ratio which is dependent on savings and population growth in an economy. The underlying model under the Solow growth theory is the Cobb-Douglas production function  $Y = f(A, L, K)$  from which Solow (1956) stated the growth equation as  $Y = AK^\alpha L^{1-\alpha}$ . Where, A is the total productivity factor, K is capital and L is Labour.

The notion of this growth model is that diminishing returns to capital accumulation exist; therefore, the effects of increased investment on growth can only be short-term. Whilst, long-term growth is driven by exogenous factors such as technology which increases production efficiency in an economy. Lastly, Solow put forward technology as the variable to represent the total productivity factor in the economic growth equation as it was considered a key contributing factor to economic growth.

## **2.5 Empirical Literature**

The effectiveness of aid has been widely researched over the last few decades however, findings have not been conclusive. The following are some studies that have been conducted regarding aid effectiveness in developing economies. Different approaches and methodologies to explaining the aid and growth nexus have been used by the various researchers, and as a result, overall findings have not presented consensus regarding foreign aid and economic growth. There is an increasing body of evidence that shows that aid is effective on condition of variables such as sound macroeconomic policies (Morrissey, 2001), but the most influential aid and growth study that was conducted by Burnside and Dollar (2000) who argued that aid is effective in a good policy environment, has been challenged in subsequent studies by Dalgaard, Hansen, & Tarp, (2004) and Easterly (2003) among others. Findings based on different regions or countries have also been contradictory, thus, the inconclusive findings across the various studies, however, for the purpose of this study, the alternative views across the empirical studies have been segmented as follows;

### **2.5.1 Aid Effectiveness in a Good Macroeconomic Policy Environment:**

A study done by Burnside & Dollar (2000) originally done in 1997 examined the relationship between foreign aid, economic policies, and growth of GDP per capita. Burnside and Dollar conducted an analysis based on a modified neoclassical growth model with a range of policy distortions including inflation, budget surplus, and openness, for a panel of 56 countries, dividing the data ranging over six 4-year periods from 1970 – 1973 and 1990 - 1993. The findings from the study indicated that aid has a positive impact on economic growth given that the recipient country has sound monetary, fiscal and trade policies. Moreover, the findings of Burnside and Dollar were given support in a study titled “New Evidence on the Impact of Foreign Aid on Economic Growth” by Durberry et al. (1998). Most importantly, the authors identified the need to take into account recent advances in growth theories related to foreign aid which have allowed for the development of more sophisticated growth equations to employ in studies. It was noted that literature investigating the effectiveness of aid on economic growth used single-equation techniques which produced ambiguous results. For instance, the study used an augmented Fischer-Easterly growth model which allowed for macroeconomic and policy variables to affect long-run economic growth. The data used in the study by Durberry et al., (1998) was for 68 developing countries and the finding from this study gave robust evidence that increased aid flows to developing countries had a positive impact on economic

growth given stable macroeconomic policies in the recipient country. In addition to these findings, it was observed that results showed variance based on the country's income level, quantity of aid received and the geographic location when the authors' categorised countries in the data set. In all, macro-level studies involving several countries in the sample tend to give more ambiguous results mostly with insignificant effects of aid on growth.

In more recent studies, findings have been that aid and growth have a negative or insignificant effect on growth however the consensus amongst the literature is that in the presence of good macroeconomic policies, aid provided a positive effect on growth;

Furthermore, a study by Girma, (2015) investigated the effectiveness of foreign aid on economic growth in Ethiopia in order to reevaluate with more recent methodology, the controversial findings of previous research done in Ethiopia which presented opposite results. The author also set out to test the dependency of aid effectiveness on macroeconomic policy using data from 1974 to 2011. The study illustrates that it is important to identify there are donor-specific and country-specific factors that may either promote or hinder the effectiveness of aid. In doing that the aid and growth relationship based on the macroeconomic policy environment in Ethiopia was evaluated based on the neoclassical growth model using the ARDL approach to cointegration. Findings from this study show that the aid variable alone had a negative effect on real GDP growth resulting in a 0.282 percent (%) decline in real GDP following a one percent (1 %) increase in foreign aid. However, with the incorporation of the policy index, findings were that aid had a positive effect on economic growth if supplemented with a stable macroeconomic environment, in line with the findings of previous studies. In conclusion, Girma, (2015) showed that donor conditionalities, poor governance, and weak institutions as contributing factors to the failure of aid to enhance growth in developing countries, including Ethiopia .

Mwanamanga (2015) investigated the aid and growth relationship in Malawi using OLS time-series analysis for data between 1960 to 2012. Mwanamanga's study highlights that most aid and growth studies employ a cross-country and panel data approach which does not account for the differences among the subject countries and this was therefore was the motivation to study aid effectiveness in Malawi which is amongst the most aid-dependent countries in the world. Mwanamanga's study aimed at examining the relationship that aid had with selected macroeconomic variables and also to investigate whether the choice of econometric model used

in an aid and growth study would have an effect on the results. The study tested the hypothesis on three models, the Papanek model, the Burnside and Dollar aid-policy model, and an Aid-growth non-linear model. The findings were that there was a significant negative relationship between foreign aid and growth in Malawi. All models tested yielded similar results confirming that the choice of model used in a study does not matter for Malawi. Findings showed that foreign aid increases government consumption and key macroeconomic variables such as inflation were also affected negatively. This was highlighted by Mwanamanga (2015) as Dutch disease effects of aid on Malawi. The study found that the effectiveness of aid is dependent on existing macroeconomic policies at the time it is provided and corroborates with the hypothesis posed by the Burnside and Dollar study that indicated that foreign aid is more effective in the presence of sound macroeconomic policies.

Tang & Bundhoo (2017) examined the impact of foreign aid on top ten Sub-Saharan African countries which are largest recipients of foreign aid, Namely, Tanzania, the Democratic Republic of Congo (DRC), Kenya, Malawi, Uganda, Cote D'Ivoire, Nigeria, Ethiopia, Mozambique, and Ghana. Accordingly, the researchers set out to establish how the economic and institutional environments in the recipient countries affected the contribution of ODA to economic development. The policy factor was incorporated in the study through the construction of a policy index similar to the index constructed by Burnside and Dollar. The policy index was estimated as a function of government consumption, trade openness and inflation. In addition, the study's model also incorporated an institutional quality variable which was a measure of corruption levels, accountability, and regulatory quality. With the use of panel data for the ten countries for the periods 1990 to 2012, the authors used the Solow growth model and tested the Two-Gap model to examine the relationship. Five estimation methods were used and the findings from this study were mixed. Initial results showed that the aid variable on its own had an insignificant impact on economic growth without the lagged aid and policy variables. However, the overall results showed that in a good policy environment with good institutional qualities, aid increases growth. In summary, the study also noted that the impact of ODA on growth may not be immediate but may gradually translate into growth as aid intended for investment and capital projects may only have an effect in the medium and long-term.

Adedokun, (2017) investigated the relationship between foreign aid, governance, and economic growth in 47 Sub-Saharan African countries between 1996 to 2012 and finds that foreign aid

has an insignificant negative relationship with economic growth. However, Adedokun (2017) further investigates and finds that differences among recipient countries in terms of governance structures, and volume of aid receipts affect the level of impact aid has on economic growth. From the aggregated and disaggregated approach, findings were that in West and Central Africa, foreign aid had a negative effect on economic growth while in East and Southern Africa, the impact was positive. Therefore, the study suggested that the governance structures in East and Southern Africa were more sound thus supporting the findings of previous studies that have purported that the effectiveness of development assistance is greater in countries with good policies and institutional frameworks.

The aid effectiveness in a good policy environment theory originally coined by Burnside and Dollar has however been opposed in the existing literature by authors who argue that macroeconomic policies do not influence the relationship between foreign aid and growth. Specifically, Easterly (2003) in a publication titled “Can foreign aid buy growth?” questioned whether the results in the Burnside and Dollar study would still constant if alternative definitions of “aid”, “policy” and “growth” were used. Therefore, Easterly replicated the study done by Burnside and Dollar (2000) however using a wider data set as more data over the same sample period had become available at the time of the study. The findings from Easterly’s (2003) study were contradictory to the findings of Burnside and Dollar (2000) as it found no significant interaction between foreign aid and policy, thereby not supporting the theory that aid facilitated economic growth in recipient countries with sound policies.

Furthermore, Hansen & Tarp (2000) examined the relationship between foreign aid and real GDP per capita growth rates. The findings of this study revealed that aid increases the growth rate, but the study rejected the theory that the effectiveness of aid and growth is conditional on macroeconomic policies as alluded to by Burnside and Dollar.

Similarly, Dalgaard et al. (2004) also investigated the foreign and economic growth relationship and the results of the study illustrated that aid has had a significant positive impact on productivity in many countries in the long-run. The approach taken by Dalgaard et al. (2004) was to investigate under which conditions foreign aid is most effective in the long-run while incorporating the climatic conditions in the recipient countries. Moreover, the authors justify the importance of incorporating climatic conditions in the study because the research noted that

many aid recipients are dependent on the agricultural industry. Thus, overall productivity in the country is affected by climatic conditions.

Correspondingly, previous works also drove the motivation behind the focus area of Bloom and Sachs (1998) that showed that GDP per capita was affected by geographic factors. Namely, being located in a tropical climate prone to tropical diseases and being a landlocked country. Although Bloom and Sachs (1998) find a significant positive impact of aid in some countries, the authors also find that the effect of aid flows in some tropical countries was less effective. In addition to this, they also found weak evidence to support the claim that aid is more effective in good policy environments.

Rajan & Subramanian (2008) examined the aid and growth relationship in both cross-sectional and panel contexts while also addressing the problem of endogeneity identified. Rajan & Subramanian's (2008) approach utilised the cross-sectional and panel approaches due to the ability of the panel technique to address the shortcomings of the cross-sectional approach. Specifically, the inability to control for differences amongst the countries in the sample. Findings from both the cross-section and panel estimations were that the aid and growth relationship is not robust. There was weak evidence to support that aid works better in a good policy environment and weak (mixed) evidence suggesting that aid is more efficient depending on geographical factors. Furthermore, the authors indicated that spurious correlations between aid and growth could exist where aid flows are directed to countries that are already doing well economically or those that are not doing well. In all, they argue that aid flows may be influenced by a country's situation such as those experiencing natural disasters or those that have historically used the aid efficiently resulting in a negative or positive correlation.

### **2.5.2 A Positive Aid and Growth Relationship**

Mcgillivray (2004) undertook a review of the existent empirical literature on the macro-level effectiveness of foreign aid on economic growth. Mcgillivray (2004) concludes that the majority of literature indicates a positive effect of aid on economic growth and poverty reduction. This is as a result of recent studies employing improved empirical methods and have had better access to data which have allowed authors to observe the positive impact aid has had on economic growth and poverty reduction. Furthermore, not only does Mcgillivray (2004) emphasize that several studies highlight the importance of a good policy environment in donor recipient countries determines the level of impact that foreign aid has on economic growth,

but also illustrates that more studies have evidence of the effectiveness of aid regardless of the policies in recipient countries.

Moreira (2005) carried out a study aimed at improving the existing procedures which were viewed as the cause of ambiguous results in macro aid and growth studies also known as the 'micro-macro paradox' through the use of econometric procedures said to be different from the most prevalent used in previous studies. Moreira (2005) uses expanded versions of the Papanek type regression with the assumption of an equal contribution of foreign aid to economic growth for developing countries. The results obtained from this study indicated a positive relationship between foreign aid and economic growth. However, the researcher noted for aid and growth relationship analysis to provide sufficient results, consideration of time lags and their incorporation into the analysis is required.

A study by Shaikh, (2011) investigated the impact of foreign aid in Pakistan on per capita GDP growth over the period 1972 to 2008. Basing the study on the neoclassical growth theory, Shaikh (2011) used cointegration and ordinary least squares methods, incorporating a human capital variable to determine the relationship between official development assistance and economic growth in Pakistan. This study differed with previous studies because it employed a physical capital and human capital variables proxied by the number of students enrolled in secondary level education. Findings from this study contributed to theories linking foreign aid economic growth, as a positive relationship between foreign aid and growth was established in the case of Pakistan.

Clemens, Radelet, Bhavnani, & Bazzi, (2011) identified two traits exhibited by previous aid and growth studies as the cause of variation in the findings across the plethora of literature relating to the aid and economic growth nexus. The two traits both relate to previous studies and ignore the timing of the effects of aid. Most importantly, the authors are of the notion that the effects of aid, depending on the intended purpose of the aid, may only come after rather than immediately. Particularly, the authors use humanitarian aid as an example of aid that should not be expected to directly influence economic growth and development at any point in time. The study revisited three of the most influential aid and growth studies with diverse findings by Boon (1996), Burnside & Dollar (2000) and Rajan & Subramanian (2008) to incorporate the time lag element as well as use an aid variable that excluded aid flows that would only influence growth after decades. While employing the same methodologies used in

each of the studies, Clemens et al. (2011) find that the results of each study changed when a time lag was introduced. Subsequently, the authors highlighted that although their findings did not suggest a robust positive aid and growth relationship across all countries, they did find a modest positive lagged relationship between aid and growth. Lastly, Clemens et al. (2011) emphasised the fact that the positive effects of aid on economic growth can be observed when the aid variable is given a chance to impact on economic growth with a time lag.

Alemu & Lee (2015) investigated the aid and growth relationship in a group of low-income African countries in comparison to a group of middle-income African countries between 1995 and 2010. The authors indicated the importance of disaggregating African countries in aid and growth empirical studies due to the existing diversity among African countries in the historical, political, demographic, geographic and economic contexts. In addition, the authors noted that middle-income countries had better a better economic infrastructure which attracted more foreign direct investment (FDI) than lower-income countries, thereby posing better opportunities for economic growth than foreign aid would. Turning to the relationship between foreign aid and economic growth in low-income African countries, Alemu and Lee (2015) found a positive correlations using a dynamic generalised method of moments (GMM) model. Conversely, this was not the case for the middle-income African countries. The study findings showed that a one per cent increase in FDI had a greater impact on economic growth in middle-income African countries than foreign aid.

### **2.5.3 Negative Foreign Aid and Growth Relationship**

Ekanayake & Chatrna (2010) studied the effects of foreign aid on economic growth in 85 developing countries and accounted for differences in four regions, including Africa, Latin America, the Caribbean, and Asia. The authors studied the effects over 27 years (1980 to 2007) in order to better understand the effects on growth, also studied the effects over shorter periods within the 27 years studied. Findings from this study indicated mixed effects of foreign aid on economic growth in the different regions, but, foreign aid had a negative effect on growth in all the regions studied except Africa which indicated a positive effect.

In the case of the Republic of South Africa, Leshoro (2013) found that the relationship between foreign aid and economic growth was negative between 1980 and 2009. The author identified foreign aid as one of the main sources of capital in the country and noted that South Africa was

classified as one of the richest countries in Africa by GDP. However, poverty and inequality remained rife in the country.

Additionally, (Leshoro, 2013) tested for a short and long-run relationship between total ODA as a percentage of GDP and the GDP per capita growth rate using the Autoregressive Distributed Lag (ARDL) with a bounds test approach and found that there was a small inverse relationship of 0.09% between the variables in the short-run. Whilst, in the long-run the ODA variable indicated a marginal negative effect on GDP per capita growth. Furthermore, the study highlighted that aid disbursements following the end of apartheid were less effective in achieving improved economic welfare due to the fact that the foreign aid was aimed at institutional reforms. On this basis the author concluded that aid effectiveness on aid on growth was dependent on existing policies in recipient countries.

Mbah & Amassoma (2014) investigated the link between foreign aid and economic growth in Nigeria used the two-gap financing theory that poses that aid flows should translate into economic growth through investment and savings. As a foreign aid recipient, the authors noted that despite the rising aid flows into the country, poverty and unemployment levels remained high. The view was that ideally, aid flows should have played a role in supplementing domestic resources to drive Nigerian economic growth and improve standards of living based on the theoretic framework of the Harrod-Domar two-gap model.

Although the authors acknowledged the dubious assumptions underlying the two-gap model, they promoted its use with the fact that it remains the most widely used model by institutions that implement aid policy such as the World Bank. Mbah & Amassoma (2014) observed aid flows into Nigeria between 1981 and 2012 against GDP levels with the assumption of an open economy using the ordinary least square estimation and the Johansen cointegration test methods to establish a relationship between the variables. Other variables included in the study as per the two-gap theory included investment, exports, and imports. The conclusion drawn from the study was that a non-significant negative relationship exists between foreign aid and economic growth in Nigeria. Notably, funds received as foreign aid were not channeled towards development projects as a result of corruption thereby limiting the potential for foreign aid to impact growth highlighting the need for a good economic policy environment to improve donor aid effectiveness.

In the case of Kenya, Veledinah (2014) analysed the impact of Official Development Assistance (ODA) with the application of the Solow growth model and Vector Error Correction Model (VECM) on time series data spanning from 1970 to 2012. Specifically, the study focused on the short-run impact of ODA on economic growth and results showed an insignificant relationship between ODA and economic growth with the conclusion that it does not foster economic growth in Kenya. As a result, Veledinah (2014) attributed the insignificant short-run effect of aid on growth in Kenya to the Dutch disease and also the volatility of ODA flows to Kenya from 1970 to 2012. ODA flows from multilateral and bilateral donors had been suspended in 1991 and 1997 due to failure by the Kenyan government to comply with donor conditions; hence the author's decision to study the short-run impact on growth.

Finally, Phiri's (2017) study evaluated the impact of aid on the economic growth of 12 least developed countries in Sub-Saharan Africa over 20 years using the Solow growth model and regression analysis. The results presented a reduction in real GDP by 0.03% following a percentage increase in net ODA for the countries under evaluation. Consequently, Phiri concluded that net official development assistance had an insignificant relationship with real GDP growth. The author, however, argued that total factor productivity and capital accumulation significantly positively impact real GDP growth and therefore, proper allocation of aid is the answer to ensuring aid is effective.

### **2.5.5 The Effectiveness of Different Types of Aid**

Authors such as Biscaye et al. (2017), Headey (2008), Minoiu & Reddy (2009) and Ram (2003) highlighted the importance of studying the effects of multilateral and bilateral aid separately due to the main differences between the two types of aid. For instance, Bilateral aid has been said to be allocated according to the strategic interests of the donor countries while multilateral aid is said to be more focused on initiating and supporting development initiatives in recipient countries. Also noted in some studies is that the significant opposite effects on growth that the two types of aid may have may distort empirical findings when equality is implied for the two parameters by studying aid as a whole. Some researchers have taken an interest in empirically analysing how the differences in donor practices may affect development outcomes and findings were as follows;

Ram (2003) noted that the universal practice in most empirical studies on foreign aid and growth was the use of an aid variable that included both multilateral and bilateral aid without

acknowledgement of the differences between the two types of aid. He emphasised the importance of studying the effects of the two types of aid separately due to the differences in donor motives, conditionalities attached to the aid packages and the relationships between donors and recipients. In addition, Ram (2003) used the aid and growth model specified in Burnside and Dollar's study as well as the same data and sample used in the study, however with a disaggregated approach for the aid variable in order to study the effects separately. The study concluded that a percentage increase in bilateral aid had a sizeable positive effect on growth, while a percentage increase in multilateral aid had a significant negative effect on growth rates. In all, the author noted that an aid variable that included both multilateral and bilateral implied a constraint of equality for the two types of aid and this constraint caused the results to be statistically insignificant.

Headey, (2008) highlighted the fact that researchers have not acknowledged some of the changes that have taken place in the international aid regimes nor taken into account events that may have affected bilateral and multilateral aid flows including the cessation of the cold war. Another event highlighted as one that may have affected aid flows was the introduction of the Washington consensus which is a set of prescribed policies that were promoted through multilateral donors such as the World Bank and the IMF. Therefore, Headey (2008) findings were that during the cold war, bilateral aid had no significant effect on economic growth, and he attributed the poor performance of bilateral aid flows pre-1991 to what he referred to as the cold war effect. The events were said to have had influence and presented a bias on the allocation, composition, and implementation of aid, as large quantities of bilateral aid from the west were generally channeled to recipient countries that opposed Soviet Union ideologies. Findings further proved that bilateral aid had a significant positive effect after the end of the cold war era. (Headey, 2008) replicates Burnside and Dollar (2000) and uses panel data for 56 developing countries as done by Ram (2003). However, findings were the opposite to that of Ram (2003) and the conclusion was that the effectiveness of multilateral aid flows was twofold in comparison to bilateral aid flows. Also, the impact of multilateral aid was found to be positive and significant before and after the cold war era. The author further identified the poor performance of bilateral aid as the cause of negative results in aid effectiveness studies with an aggregated aid approach with a data set including the cold war period.

Minoiu & Reddy (2009) studied the effects of aid in two categories they identified as developmental and non-developmental aid. Specifically, developmental aid was defined as aid

that was disbursed to foster development and growth in recipient countries while non-developmental aid was defined as foreign aid flows not intended to spur development. In addition to the developmental and non-developmental aid variables, multilateral aid in the study was identified as a separate component of aid that was purely developmental in terms of characteristics. The study employed both cross-sectional and panel regressions and replicated the model presented by Rajan & Subramanian (2008). Findings showed that foreign aid flows that had a developmental element had a positive and robust effect on economic growth. Multilateral aid proved to be more effective than aid disbursed by bilateral donors.

Olanrele & Ibrahim (2015) studied the impact of four different types of aid to Nigeria on economic growth between 1970 and 2012 using the two-stage least squares estimation method. The aid variable was categorised into developmental aid and non-developmental aid in line with the works of Minoiu & Reddy (2009), and the variables were further broken down into four categories. Namely, multilateral aid, bilateral aid from Nordic countries, bilateral aid from Nigeria's main trade partners and bilateral aid from the top five countries on the 2013 Commitment to Development Index (CDI). Findings showed that all four types of aid had a positive impact on growth in Nigeria with multilateral aid showing the most significant with the largest significant coefficient followed by bilateral aid from Nigeria's trade partners. The study's findings also reaffirmed the aid effectiveness based on a good macroeconomic policy environment hypothesis as the results showed that the net exports and political stability variables also had a positive impact on economic growth in Nigeria.

Biscaye et al. (2017) conducted a qualitative study in which they reviewed 45 empirical studies that compare the development outcomes of aid delivered multilaterally or bilaterally to determine the consistency of evidence supporting the effectiveness of one aid channel against the other. The study did not only focus on the effects on GDP growth, and development outcomes, but also included human development, government development spending, investment, and governance. The author's findings found that in nine studies, bilateral aid was more effective in nine studies, multilateral aid was more effective in 13 studies, while ten studies showed mixed findings. The remainder of the studies reviewed found no significant differences in foreign aid effectiveness. Thereafter, the authors conducted ANOVA tests to verify if the differences in findings were owing to differences in methodologies, particularly the number of countries in a data sample as well as the data period. Subsequently, the findings showed that the mean of the number of years of data studied did not vary across the studies

selected. Studies, however, did have variances in the mean number of countries selected in the data sample to which Biscaye et al.(2017) noted that studies with a lower average of countries in the data sample found bilateral aid more effective. Nevertheless, the (seven) 7 studies that focused solely on Sub-Saharan Africa did not find bilateral aid more effective. Overall findings from this study could not allow the authors to conclude on the effectiveness of either kind of donor aid however, they did conclude that there is a variation in the effectiveness of bilateral compared to multilateral aid across the different countries, regions and time periods.

## **2.6 Chapter Summary**

Chapter two (2) provided a review of the theoretical and empirical theories surrounding the foreign aid effectiveness debate. From the theoretical aspect, one would note that generally, the expected contribution of foreign aid to economic growth is that of investment and capital accumulation that generates growth. Most importantly, the reviewed empirical literature revealed non-conclusive results because various studies provide mixed results regarding the aid and growth relationship. However, as noted by many authors, this is owing to the variations in the approach taken to examine the aid and growth nexus. The disparities in the level of development for countries used in some aggregated data samples were also identified as a key contributing factor to mixed results in the literature. Finally, although, several growth models are used across the studies; most of the studies base their models on modified neoclassical and endogenous growth models using panel data. The next chapter discusses the research methodology employed in this study.

## **CHAPTER 3: METHODOLOGY**

### **3.1 Introduction**

This chapter outlines the research approach taken in this study with regards to the data collection as well as the chosen empirical framework for this study. The chapter further goes on to detail the methods used in the empirical analysis of the relationship between GDP per capita, multilateral and bilateral ODA and the included independent variables in the selected economic growth model.

### **3.2 Research Approach and Strategy**

The study was a quantitative study with a deductive approach. An Autoregressive Distributed Lag (ARDL) regression model was used to test the hypotheses regarding the relationship between bilateral versus multilateral aid flows, and economic growth in Zambia measured by per capita gross domestic product (GDP per capita). Existing studies conducted within a similar context including Burnside & Dollar (2000), Easterly (2003), Durberry et al., (1998) and Rajan & Subramanian, (2008) employed the OLS estimation technique to determine the relationship between ODA and economic growth. If the OLS method is used to estimate the relationship of variables of a non-stationary time series, there is the likelihood to have misleading inferences. Therefore, due to the non-stationarity of some variables used in this study, the ARDL approach was deemed more appropriate for this study. To capture the long-run effects of ODA on growth through investment and capital accumulation, the neo-classical economic growth model forms the basis of the theoretical model used to analyse the relationship between ODA and economic growth. Based on reviewed existing literature on aid and economic growth, the relationship between the two variables is based on exogenous economic growth theories. ODA is considered a capital input or investment that increases productivity and generates growth in an economy, represented by per capita GDP in this study. The decision to the neo-classical growth model as opposed to an endogenous growth model is motivated by the fact that traditional theory suggests that ODA contributes to economic growth/development exogenously through the financing of public investment which contributes to long-term growth. As noted by Durberry et al. (1998), economic growth is not a function of capital accumulation only; therefore, variables to capture economic policy in Zambia such as trade openness were incorporated into the model in addition to investment, multilateral and bilateral aid flows.

**3.2.1 Data Source, Sample and Sample Period**

This research used secondary time-series data collected from sources including the World Bank world development indicators database and the African Development Bank socio-economic indicators database.. The data collected was annual data spanning from 1975 to 2016 to provide a 41-year data period. The data collected during the time series from the World Bank database included GDP per capita at current prices, foreign direct investment (net inflows as a percentage of GDP) to represent investment in the economy and the total population of people aged 15 to 64 as a percentage of GDP to represent the labour force. In addition, trade as a percentage of GDP to represent trade openness policy collected from the World Bank database, and Net bilateral and Multilateral ODA collected from the African Development Bank database.

**3.2.2 Empirical framework**

Various empirical models have been widely employed in donor aid and growth literature with variants of the Burnside & Dollar (2000) model dominating the majority of post-2000 studies. The model found most appropriate to this study is the neo-classical economic growth model based on the works of Solow (1956) Most advocates of ODA have argued the model serves as an input that generates investment and capital accumulation that improves economic efficiency in the country thus fuelling economic growth. Economic growth is essential for sustainable improvements in welfare and poverty reduction in developing countries. In line with the aid and growth literature by (Durberry et al., 1998), Girma, (2015) and Tang & Bundhoo (2017), the following aid and growth model is specified below:

$$GDPpC_t = \alpha_t + \beta_1 Labour_t + \beta_2 AIDb_t + \beta_3 AIDm_t + \beta_4 FDI + \beta_5 TradeOP_t + \epsilon_t \dots (3.1)$$

where GDPPC denotes GDP per capita as the proxy for economic growth; AIDb is Net Bilateral ODA; AIDm defined as the Net Multilateral ODA; FDI denotes Investment and TradeOP is Trade Openness, which represents the macroeconomic policy variable.  $\beta_1$  to  $\beta_4$  represent the coefficients to be estimated, and  $\epsilon$  is the error term.

However, to address the challenges of multicollinearity amongst the multilateral and bilateral ODA variables two models were used in this study and were specified as per equations 3.2 and 3.3 below;

$$GDPpC_t = \alpha_t + \beta_1 Labour_t + \beta_2 AIDm_t + \beta_3 FDI + \beta_4 TradeOP_t + \epsilon_t \dots \dots \dots (3.2)$$

$$GDPpC_t = \alpha_t + \beta_1 Labour_t + \beta_2 AIDb_t + \beta_3 FDI + \beta_4 TradeOP_t + \varepsilon_t \dots \dots \dots (3.3)$$

where GDPPC denotes GDP per capita as the proxy for economic growth; AIDb is Net Bilateral ODA; AIDm defined as the Net Multilateral ODA; FDI denotes Investment and TradeOP is Trade Openness, which represents the macroeconomic policy variable.  $\beta_1$  to  $\beta_4$  represent the coefficients to be estimated, and  $\varepsilon$  is the error term.

### 3.2.3. Definition and Measurement of Variables

The variables selected for this study were based on the economic growth model selected for use in this study, and the selection was informed by the literature reviewed. In order to incorporate macroeconomic policy factors that may have an effect on the impact of ODA on economic growth, a variable representative of policy was introduced in the model.

#### Dependent Variable:

- **GDP per capita (GDPPC)** – Is the selected proxy for economic development. It is measured by Zambia’s GDP Per Capita at current US Dollar Prices from 1975 to 2016. Specifically, GDP per capita is a ratio of the country’s GDP in relation to its total population and is the selected indicator for economic development for this study because it is considered one of the measures of living standards in an economy.

#### Independent Variables:

- **Labour** – This variable represents the labour force in the Zambian economy which was measured as a percentage of the population aged between 15 and 64 out of the total population. In the neoclassical growth model, the labour force is considered one of the factors of production and is expected to contribute positively to general output and economic growth.
- **Foreign Direct Investment (FDI)** – The FDI is a representation of investment in the selected economic growth model which is measured by the net inflows of foreign investment as a percentage of GDP. The World Bank defined FDI as the sum of equity capital, reinvestment of earnings and other long and short-term capital as reported in the balance of payments (The World Bank, 2019). Investment is said to be one of the key drivers of economic growth in developing countries as it provides a transfer mechanism of skills and technology which are essential for economic growth. FDI

- **Net Bilateral ODA (AIDb)** – Measured by the Net total Official Development Assistance to Zambia by Bilateral donors at current US Dollar prices.
- **Net Multilateral ODA (AIDm)** - was measured by the Net total Official Development Assistance to Zambia by Multilateral donors at current US Dollar prices.
- **Trade Openness (TradeOP)** – Trade openness was used to capture the economic policy environment in Zambia over the period under review. The variable has been used by (Akramov, 2012; Burnside & Dollar, 2000; Durberry et al., 1998; McGillivray, 2004) to develop policy index or measure the policy environment in developing countries. Trade openness was measured as a ratio of total trade to GDP. The neoclassical growth model hypothesises economic growth that influenced by labour capital and technology as the driving forces. Openness to trade is made possible through macroeconomic policy and is said to impact growth positively through channels such as technological advancement and better access to production inputs that may raise domestic production efficiency (Durberry et al., 1998).

Based on the neoclassical economic growth theory, below are the expected signs of the relationship between the independent variables and GDP per capita.

**Table 1: Independent Variable Expected Signs**

<b>Independent Variable</b>	<b>Coefficient Symbol</b>	<b>Expected Sign</b>
Labour Force	<i>Labour</i>	Positive
Foreign Direct Investment	<i>FDI</i>	Positive
Multilateral ODA	<i>AIDm</i>	Positive
Bilateral ODA	<i>AIDb</i>	Positive
Trade Openness	<i>TradeOP</i>	Positive

### **3.2.4 Estimation Approach**

The objective behind any econometric model is to obtain estimates for the parameters of the independent variables included in the model (Gujarati, 2003). The relationship between multilateral and bilateral Official Development Assistance (ODA) and Economic Growth in Zambia was estimated using the Autoregressive Distributed Lag (ARDL) framework and analysed using the EViews statistical software.

### **3.2.5 Unit Root Tests**

This study utilised annual time-series data on GDP per capita, FDI, Labour force, ODA and trade as a percentage of GDP to analyse the aid and growth relationship in Zambia. It is important to note that due to the nature of time-series data, one may face various estimation challenges, one of non-stationarity in particular. Economic times series variables often contain a trend as they may increase or decrease over time causing the mean and variance to also change over time. This property is referred to as non-stationarity. If the data are non-stationary, the regression of one time-series variable on another time-series variable may give results of a statistically significant relationship between the variables even if no relationship exists and this known as spurious regression. Other problems that may arise during the estimation of time-series data include the random walk phenomena and the inability to conduct causality before establishing stationarity (Gujarati, 2003; Nkoro & Uko, 2016).

Time series that contain a unit root can be affected by random shocks over time, and this is what constitutes the random walk phenomena. In order to establish whether the time-series observations are stationary, we must check if the time series contains a unit root (Gujarati, 2003). Unit root tests allow for the determination of the number of times a time-series must be differenced to become trend stationary and this is referred to as the order of integration.

Several unit root testing methods exist; however, the most prominent tests in the literature include the Augmented Dickey-Fuller and the Phillip-Perron tests. Particularly, in this research, stationarity of the variables was tested by applying the Augmented Dickey-Fuller test which is the method most commonly used as it addresses the problem of autocorrelation in the error process which may cause the OLS estimation to be inefficient (Nkoro & Uko, 2016).

### **3.2.6 Cointegration Test**

Because trending time series usually result in spurious regressions, the solution is to difference the data in order to achieve stationarity (Gujarati, 2003). The Differencing process, however, may lead to the loss of long-run properties of the variables when modified to be made stationary. Fortunately, this can be solved by measuring variables in the level form while maintaining stationarity with short-run and long-run properties simultaneously (Gujarati, 2003).

As a result of the problem associated with the loss of long-run information relevant to the study through differencing to achieve stationarity, cointegration techniques became the solution to

determining long-run relationships between time-series variables that are non-stationary. If a long-term or equilibrium relationship exists between two time-series variables are said to be co-integrated. Cointegration allows for the retrieval of long-run information lost through the differencing process as it allows for the integration of short-run dynamics of the time-series to be integrated into the long-run relationship between variables (Gujarati, 2003; Nkoro & Uko, 2016).

The presence of co-integration in the time-series data establishes the existence of an error correction mechanism in the model, and thus it can be stated that there is a long-run or equilibrium relationship between the variables. Where co-integration is rejected, then there is no long-run relationship between the variables. Accordingly, the literature shows that there several existing methods for testing for cointegration with the most widely used methods being the method proposed by Engle and Granger (1987) and Johansen (1988). The Engle and Granger method cannot be applied in cases where the variables are integrated of different orders, therefore, the Johansen test was developed to address the weaknesses identified in the Engle and Granger method. The Johansen test, however, requires that all variables are not of mixed order and also requires that the variables are stationary (Shrestha & Bhatta, 2017).

This study, however, applied the ARDL bounds test to assess the existence of a long-run relationship between the variables. The null hypothesis under the bounds test is that no long-run relationship exists among the variables. The Wald test (F-test) was then used to test this hypothesis. If the F-statistic falls above the upper bound critical values, it then confirms that there is cointegration among the variables and a long-run relationship exists (Pesaran, Shin, & Smith, 2001). If it falls below the lower bound critical values, the null hypothesis is accepted because it establishes that no cointegration exists and therefore, no long-run relationship exists (Wong, 2018).

### **3.3 Long and short-run regression estimates**

The Johansen test cannot be applied if the variables are of a mixed order of integration and the Johansen and Juselius (1990) method cannot be used when one cointegrating vector exists. Therefore, an ARDL model could be applied in instances where variables are of different or mixed orders  $I(0)$  or  $I(1)$ , that is, both stationary and non-stationary (Nkoro & Uko, 2016; Shrestha & Bhatta, 2017). The ADRL bounds test approach to cointegration requires that the order of integration of the variables be determined by way of unit root testing to ensure they

are either  $I(0)$  or  $I(1)$ . The bounds test approach cannot be applied if variables are integrated of order two  $I(2)$  as this may present spurious results (H. M. Pesaran & Shin, 1997).

The ARDL framework allows for inferences of long-run estimates which may not be possible using alternative cointegration methods such as the Engle-Granger and Johansen tests. An error correction model (ECM) can then be derived from the ARDL model allowing for the integration of short-run dynamics without the loss of long-run properties. According to Nkoro & Uko (2016), there are instances where the ARDL approach cannot be applied. These include an instance where the F-statistic indicates multiple long-run relationships among the variables in which case the more appropriate method would be the Johansen and Juselius (1990) method. However, the establishment of a single long-run relationship allowed for the use of the ARDL method.

### **3.4 Diagnostic Tests**

To ensure that the models have been specified correctly, it is important to check if the assumptions of homoscedasticity, normality and the non-existence of autocorrelation hold. The first assumption requires that there is no heteroscedasticity among the error terms. Heteroscedasticity exists when the error terms do not have a constant variance, while normality indicates the normal distribution of the residuals. The last assumption requires that the error terms are uncorrelated. The problem that occurs if these assumptions do not hold is that the wrong inferences could be made about the data (Brooks, 2008). In summation, Heteroscedasticity was tested for using the Breusch- Pagan- Godfrey test while normality and serial correlation was tested for using the Breush-Godfrey and Jarque-Bera tests respectively.

### **3.5 Chapter Summary**

Chapter three (3) outlined the research design and approach used to empirically analyse the relationship and separate impact of bilateral and multilateral ODA on economic growth and development. Additionally, the analytical framework used to investigate the relationship between the selected variables as well as the detailed research approach, data sources and sample period and data analysis methods. The next chapter presents the findings and discuss the results.

## CHAPTER 4: DISCUSSION OF FINDINGS

### 4.1 Introduction

In this chapter, the results obtained from the estimation of the model are presented and discussed in detail. After that, the initial tests that were carried out on the data sample include the test for stationarity of the time-series data is highlighted, as this is an important step in time-series analysis. Tests were then also conducted to select the optimal lag length after which, the results obtained from cointegration tests and the estimation of the ARDL model are interpreted.

### 4.2 Descriptive Statistics

The presentation of the descriptive statistics for each variable is made below in Table 1. The statistics include the mean, median, maximum and minimum values, and the standard deviation. Based on the standard deviations for each variable, it was observed that data points tend to vary largely from the mean except for the labour force variable, which presented a standard deviation of 0.006999. The large standard deviation statistics for the GDP per capita, GDI, ODA and Openness to trade variables could be attributed to the non-stationary characteristic of time series data which rarely revert to the mean over time. We also observe from the skewness statistics that GDP per capita, FDI, Labour, and TradeOp are all positively skewed while LAIDb and LAIDm are negatively skewed. Based on the p-values shown against the Jarque-Bera statistic, it can be noted that the labour and Trade openness variables follow a normal distribution however the rest of the variables do not vary largely form a normal distribution and have some degree of symmetry based on the skewness and kurtosis values which are close the normal distribution value of 3. In order to limit biasness in terms of normality, natural log-transformations are taken.

**Table 2: Descriptive Statistics**

	<b>LGPPC</b>	<b>LAIDb</b>	<b>LAIDm</b>	<b>FDI</b>	<b>LABOUR</b>	<b>TRADEOP</b>
<b>Mean</b>	6.361327	19.62008	19.02586	3.575016	0.504413	75.15563
<b>Median</b>	6.194541	19.87970	19.52566	3.255291	0.504399	72.64394
<b>Maximum</b>	7.523370	21.00806	21.36158	9.605168	0.524165	96.02221
<b>Minimum</b>	5.445749	16.29105	15.78787	-0.991565	0.494286	59.47442
<b>Std. Dev.</b>	0.542969	1.100077	1.139922	2.646472	0.006999	9.661716
<b>Skewness</b>	0.849031	-1.426680	-0.814600	0.557501	0.712760	0.527721
<b>Kurtosis</b>	2.558320	4.446640	3.418072	2.362459	3.660471	2.481424
<b>Jarque-Bera</b>	6.028720	6.951903	4.833002	7.449562	4.216725	2.362418
<b>Probability</b>	0.049077	0.030932	0.089233	0.024118	0.121437	0.306907
<b>Sum</b>	298.9824	922.1439	780.0604	23.67014	20.68095	3081.381
<b>Sum Sq. Dev.</b>	13.56150	55.66779	114.0140	322.1755	0.002182	3733.950
<b>Observations</b>	47	47	47	47	47	47

Source: EViews Output

### 4.3 Tests for Multicollinearity

On conducting a regression analysis, it is important to ascertain the independence of the variables by ensuring that no perfect linear relationship exists amongst the variables, that is, that there is no presence of multicollinearity. The problem of multicollinearity is said to be common in time-series data which share a common trend and is generally a sample regression phenomenon due to data deficiency (Gujarati & Porter, 2009). Consequently, multicollinearity amongst the variables was tested for using the correlation matrix, and results are presented in Table 2.

From the correlation matrix in Table 2, it revealed that the correlation coefficients are indicative of a positive relationship between GDP per capita and the independent variables. The majority of the correlation coefficients are below or within a range of 0.5 indicating a moderate to a weak linear relationship with GDP per capita. Bilateral ODA (AIDb) and Multilateral ODA (AIDm), however, produced a correlation coefficient of 0.912401 indicating a strong positive linear relationship. To address the problem of multicollinearity two models were specified to separate the Bilateral and Multilateral ODA variables

**Table 3: Correlation Matrix**

<b>Correlation Probability</b>	<b>LGDPPC</b>	<b>LAIDb</b>	<b>LAIDm</b>	<b>FDI</b>	<b>LABOUR</b>	<b>TRADEOP</b>
LGDPPC	1.000000 ----					
LAIDb	0.374968 0.0094	1.000000 ----				
LAIDm	0.274251 0.0621	0.912401 0.0000	1.000000 ----			
FDI	0.420880 0.0032	0.589975 0.0000	0.588929 0.0000	1.000000 ----		
LABOUR	0.469705 0.0009	0.552322 0.0001	0.641518 0.0000	0.598031 0.0000	1.000000 ----	
TRADEOP	0.415075 0.0037	-0.250789 0.0891	-0.231640 0.1172	0.027616 0.8538	0.202119 0.1731	1.000000 ----

*Source: EViews output*

#### 4.4 Test for Stationarity (Unit Root Test)

Table 3 summarises the results obtained from the Augmented Dickey-Fuller (ADF) tests. Each of the variables was tested using EViews and the Table 3 indicates the t-statistic and p-value for each variable at the level and first difference. Statistical significance can be inferred from the p-value and t-statistics at the one (1), five (5), and ten (10) per cent levels.

The variables are said to be non-stationary if a unit root exists, and the null hypothesis under the ADF test is that the variable has a unit root (the variable is non-stationary). The alternative hypothesis is that the variable is stationary and does not have a unit root. The null hypothesis is therefore rejected if the corresponding p-value below 0.05 (5%).

The ADF test results showed that at a five (5) significance level, some variables exhibited stationarity at a level while other variables were stationary at first difference. The variables labour, FDI, and logged Net Bilateral ODA (LAIDb) were found to be stationary at level, while Trade openness, logged Net Multilateral ODA (LAIDm), and logged GDP per Capital (LGDPPC) were stationary at first difference. This means that is; the variables are of mixed order of integration (both I (0) and I (1)).

**Table 4: Summary of Augmented Dickey-Fuller (ADF) Unit Root Test Results**

Variable	Level of Significance	Critical Values	ADF at level		ADF at 1 <sup>st</sup> Difference.		Order of Integration
			t-statistic	p-value	t-statistic	p-value	
Logged GDP per capita (LGDPPC)	1%	-4.205					
	5%	-3.527	-1.5495	0.7890	-4.522	0.0045	<b>I(1)</b>
	10%	-3.195					
Foreign Direct Investment (FDI)	1%	-4.324					
	5%	-3.581	-6.1760	0.0000			<b>I(0)</b>
	10%	-3.225					
Logged Net Bilateral ODA (LAIDb)	1%	-4.297					
	5%	-3.568	-38886	0.0218	-	-	<b>I(0)</b>
	10%	-3.218					
Logged Net Multilateral ODA (LAIDm)	1%	-4.171					
	5%	-3.511	-2.9084	0.1695	-10.056	0.000	<b>I(1)</b>
	10%	-3.186					
Trade Openness (TradeOP)	1%	-4.297					
	5%	-3.568	-3.070	0.127	-6.161	0.000	<b>I(1)</b>
	10%	-3.218					
Labour	1%	-4.244			-	-	

	5%	-3.544	-6.678	0.000			<b>I(0)</b>
	10%	-3.205					

Source: EViews Output

#### 4.5 Lag Selection

The appropriate lag length selection is important for the variables in order to ensure that the error terms do not suffer from issues such as serial correlation, heteroscedasticity, and non-normality (Nkoro & Uko, 2016). The selection of the optimal lag level is significant as including or omitting of lags than necessary would result in overfitting or underfitting of the model. As a result, this study lag length selection was carried out on EViews, and the results indicate the selected number of lags considered optimal under each of the model order selection criteria. Table 4 and 5 presents different lag levels and the accepted optimal lag level by different criteria.

**Table 5: Results of Lag Selection – Model 1 (AIDm)**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-375.9304	NA	34.06767	17.71769	17.92248	17.79321
1	-207.8657	289.2276	0.044303	11.06352	12.29226*	11.51664
2	-163.8366	65.53168	0.019200	10.17845	12.43114	11.00917*
3	-133.1736	38.50702*	0.016794	9.91505	13.19170	11.12338
4	-101.9372	31.96276	0.016426*	9.624988*	13.92559	11.21092

Source: Eviews Output

**Table 6: Results of Lag Selection – Model 2 (AIDb)**

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-351.0932	NA	10.73092	16.56247	16.7626	16.63799
1	-167.5940	315.7892	0.006807	9.190421	10.41916*	9.643544
2	-131.4892	53.73744*	0.004265	8.673916	10.92661	9.504642*
3	-102.5622	36.32691	0.004044*	8.491266	11.76792	9.699594
4	-72.62315	30.57393	0.004213	8.264332*	12.56494	9.850263

Source: EViews Output

The criteria presented in the results include the Sequential Modified LR criteria (LR), Akaike information (AIC), Final Prediction Error (FPE), Hannan-Quin information (HQIN) and the Schwarz Information (SC) criterion. The \* indicates the optimal lag length selected for each criterion with the least number of lags being most desirable.

#### 4.6 Cointegration Bounds Test

The existence of a long-run relationship was tested using the bounds testing approach to cointegration per the works of Pesaran & Shin, (1997). The null hypothesis under this test is that a long-run relationship does not exist among the variables; that is, there is no cointegration. The null hypothesis is rejected if the computed F-statistic is greater than the upper bound critical value at a joint significance level (M. H. Pesaran, Shin, & Smith, 2001). Table 6 presents the results of the bounds test.

**Table 7: ARDL Bounds Test Results**

	<b>Model 1 (AIDm)</b>		<b>Model 2 (AIDb)</b>	
<b>F-Statistic</b>	<b>5.15593</b>		<b>4.760668</b>	
<b>Significance level</b>	Lower bound I(0)	Upper bound I(1)	Lower bound I(0)	Upper bound I(1)
<b>10%</b>	2.2	3.09	2.2	3.09
<b>5%</b>	2.56	3.49	2.56	3.49
<b>1%</b>	3.29	4.37	3.29	4.37

*Source: Author's assessment - EViews Output*

As shown in Table 6 above, the computed F-statistics of 5.155930 and 4.760668 respectively are greater than the upper bound critical values at the ten (10), five (5) and one (1) percent (%) levels of significance. Based on the he null hypothesis, which stated that no cointegration exists amongst the variables, this is therefore rejected in both models because the results indicate the existence of a long-run relationship. Accordingly, the single long-run relationships indicated by the results confirm that the ARDL model is appropriate for the study.

#### 4.7 Regression Model Results (ARDL Long-Run Test)

Table 7 indicates the results of the estimated long-run relationship. The findings presented R-squared values of 0.949247 and 0.949500 for model 1 and 2, respectively (Table 4.9). The R-squared values imply that the independent variables in model 1 can explain 94.92% of the variations in the GDP per capita variable while in model 2, 94.95% of the variations are explained by the independent variable.

Based on the results obtained from the analysis, it was observed that Net Bilateral ODA had a negative impact on GDP per Capita in the long run. However, this negative effect was insignificant. The results also revealed that Net Multilateral ODA also had a significant

negative impact on GDP per capita, indicating that a unit increase in multilateral ODA flows resulted in a decrease in GDP per capita by 0.200. As indicated by Ram, (2003), the negative effect of multilateral foreign aid on GDP per capita could be attributed to the stringent conditions attached to multilateral ODA in terms of structural adjustment programs that may affect growth negatively. These results are also contrary to the findings posed by Headey (2008), Minoiu & Reddy (2009) and Olanrele & Ibrahim (2015) who concluded that multilateral aid has a more robust positive effect than bilateral aid due to the nature of multilateral institutions that are said to hold some level of autonomy.

In the present study, though insignificant, the negative impact of bilateral ODA on growth was smaller than that of the multilateral ODA. The insignificance of the bilateral ODA variable on growth could be the cold war effect highlighted by Headey (2008) and Biscaye et al. (2017) which resulted in the poor performance of bilateral aid flows before 1991. Another cause could be the erratic bilateral ODA flows to Zambia influenced by political government/donor relations over the period as highlighted by Appolinario, (2009).

The data used spans from 1975 to 2016, as a result, there is a possibility that aid flows prior to 1991 may have not necessarily have had a significant impact of GDP per capita from 1970 to 1990. A quick observation of the data also shows that foreign donor aid flows to Zambia increased from 1991 following the change of government.

**Table 8: Long Run Results**

Variable	Model 1		Model 2	
	Coefficient	t-Statistic	Coefficient	t-Statistic
Constant	56.585*** (12.827)	4.411	59.135*** (14.143)	4.181
LAIDm	-0.200* (0.104)	-1.931		
LAIDb			-0.042 (0.218)	-0.193
FDI	0.520*** (0.098)	5.331	0.482*** (0.107)	4.508
TRADEOP	0.012 (0.009)	1.305	0.003** (0.012)	2.396
LABOUR	-97.792*** (26.459)	-3.696	-110.853*** (28.045)	-3.953

*Note: FDI= Foreign Direct Investment; LAIDb= Net Bilateral ODA; LAIDm= Net Multilateral ODA; LABOUR= Labour Force; TRADEOP= Trade Openness; \*\*\*, \*\* and \* denotes significance at 1%, 5% and 10% respectively.*

*Source: Author's assessment - Eviews Output*

The Labour and FDI variables in both models, on the other hand, were also found to have a significant impact on GDP Per Capita in the long run. Labour showed a significant negative impact in the long run, while FDI showed a significant positive impact on GDP per capita in the long run. Labour, in this case, was measured as the percentage of the population aged 15 to 64 years as a percentage of the Zambia population, while FDI was a representation of investment in the economy which contributes to economic growth. Results show that a unit increase in FDI increased GDP per capita by 0.520 and 0.482 in models 1 and 2 respectively, holding all other variables constant. A unit increase in the labour variable led to a decreased GDP per Capita by -97.79 and -110.85 units in models one (1) and two (2) respectively. Because the labour variable used is a function of population, this negative relationship between Labour and GDP could be attributed to the low GDP growth rate in relation to the population growth rate.

Furthermore, the t-test and probability test results presented indicate that Trade Openness has a positive but insignificant (5%) impact on GDP per Capita in model 1. However, the coefficient was significant in model 2. In model 2, the results show that a unit increase in trade openness led to increased GDP per capita by 0.003 units. Trade Openness which is measured as a ratio of total trade to GDP in this study, is representative of economic policy in Zambia that would directly affect productivity in the country and ultimately GDP growth. Trade Openness is said to impact growth positively through channels that promote technological advancement and better access to production inputs that may raise domestic production efficiency (Durberry et al., 1998). According to Keho (2017), trade openness in certain cases poses a negative impact on economic growth as it may increase inflation and lower exchange rates low-income in countries like Zambia that may be vulnerable to external trade shocks due to its dependency on copper that is exported in its unrefined form; however, the results show that this is not the case.

On overall, the results from this study show that indeed the bilateral and multilateral ODA in the context of Zambia, impact GDP per Capita differently. Thereby we can conclude that there is a variation in the levels of effectiveness of bilateral ODA compared to Multilateral ODA. The two aid variables differ in terms of their magnitude of impact on economic growth, as well as, in terms of statistical significance. Most certainly, multilateral ODA poses a significant impact on per capita GDP when compared to bilateral ODA of which flows are in larger quantities.

Turning to the results of the short-run co-integration relationship, these are illustrated in Table 8. The cointegrating equation (CointEq) in the models signifies the speed at which the variables adjust to equilibrium. The error correction coefficients in models 1 and 2 are -0.342741 and -0.326870 respectively. Both values are negative and highly significant given the large t-statistics of -6.007621 in model 1 and -5.786954 in model 2. This implies the existence of long-run causality between GDP Per Capita and the independent variables. The data used is annual data; therefore, the coefficient shows that the speed of adjustment towards equilibrium is 34.27% in model 1 and 32.69% in model 2 annually.

In addition, the short-run results from the regression analysis indicate the short-run causal effect between the independent variables and GDP per capita. Net Multilateral ODA shows a significant negative relationship with GDP per capita, while Net Bilateral ODA is negative and still insignificant in the short-run. The results indicate a negative relationship between FDI and GDP growth in the short run while labour shows a significant positive short-run relationship in both models (Table 8). The Trade Openness variable in the Multilateral ODA model shows a negative but insignificant relationship with GDP per capita in the short-run; however, this relationship is significant in the bilateral ODA model.

**Table 9: Short Run Error Correction Results**

Variable	Model 1		Model 2	
	Coefficient	t-Statistic	Coefficient	t-Statistic
D(LAIDM)	-0.080** (0.038)	-2.120		
D(LAIDB)			-0.030 (0.080)	-0.374
D(FDI)	0.002 (0.113)	0.198	0.005 (0.012)	0.436
D(FDI(-1))	-0.153*** (0.030)	-5.120	-0.124*** (0.027)	-4.674
D(FDI(-2))	-0.099*** (0.023)	-4.286	-0.086*** (0.021)	-4.027
D(FDI(-3))	-0.052*** (0.014)	-3.638	-0.043*** (0.014)	-3.089
D(TRADEOP)	-0.003 (0.003)	-0.935	-0.001 (0.003)	-0.343
D(TRADEOP(-1))			-0.0069** (0.003)	-2.260
D(LABOUR)	48.478** (18.853)	2.571	35.615* (18.028)	1.976
CointEq(-1)	-0.343***	-6.008	-0.327***	-5.787

(0.057)

(0.056)

*Note: LGDPPC=GDP Per Capita; FDI= Foreign Direct Investment; LAIDm= Net Multilateral ODA; LAIDb= Net Bilateral ODA; LABOUR= Labour Force; TRADEOP= Trade Openness; \*\*\*, \*\* and \* denotes significance at 1%, 5% and 10% respectively. Source: Author's assessment - EViews Output*

#### 4.8 Diagnostic Tests

Diagnostic tests were carried out to ensure that the assumptions of homoscedasticity, normality and, the absence of autocorrelation hold in the estimated ARDL model. Normality was tested using the Jarque-Bera test, while autocorrelation and heteroscedasticity for tested for using the Breusch-Godfrey LM and Breusch-Pagan-Godfrey tests respectively. The results are presented in Table 9.

**Table 10: Diagnostic Test Results.**

Test	Probability (AIDm – Model 1)	Probability (AIDb – Model 2)
<b>R-squared</b>	0.949247	0.949500
<b>Normality:</b> Jarque-Bera Test	0.796764	0.925170
<b>Heteroscedasticity:</b> Breusch- Pagan- Godfrey Test	0.6332	0.9672
<b>Autocorrelation:</b> Breusch-Godfrey (LM) test	0.6815	0.5639

*Source: Author's assessment - EViews Output*

##### 4.8.1 Normality Test

This study utilised the Jarque-Bera (JB) test for normality in order to ensure the model satisfies the normality assumption of the Classic normal linear regression model. The test ascertains whether the residuals are normally distributed through the computation of the skewness and kurtosis of the residuals and ultimately, the computation of the JB statistic. The null hypothesis under the Jarque-Bera test is that the residuals are normally distributed (Gujarati, 2003). The null hypothesis is rejected in a case where the computed p-value is low, indicating that the value of the JB statistic which is expected to be zero is very different from zero. From this study, the results of the test show that the computed 0.796765 and 0.925170 p-values of the JB statistics are reasonably high and greater than the 1%, 5%, and 10% significance levels. We, therefore, do not reject the null hypothesis and confirm that the residuals are normally distributed in both models 1 and 2.

#### **4.8.2 Test for Heteroscedasticity**

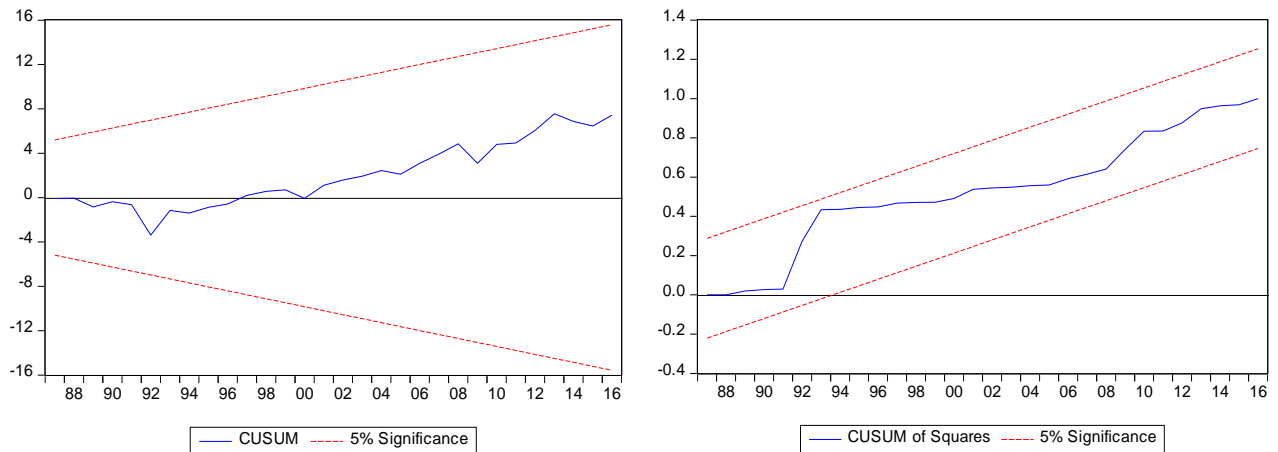
This study employed the Breusch-Pagan-Godfrey (BPG) test to test for heteroscedasticity. The null hypothesis under the BPG test is that the residuals are homoscedastic. This implies that heteroscedasticity is absent amongst the residuals. The indicated p-values from the results of the test are 0.5639 for model 1 and 0.6815 for model 2. The p-value figures are greater than the 0.05 significance level; therefore, the null hypothesis was accepted, confirming that the residuals are homoscedastic in both models.

#### **4.8.3 Test for Autocorrelation**

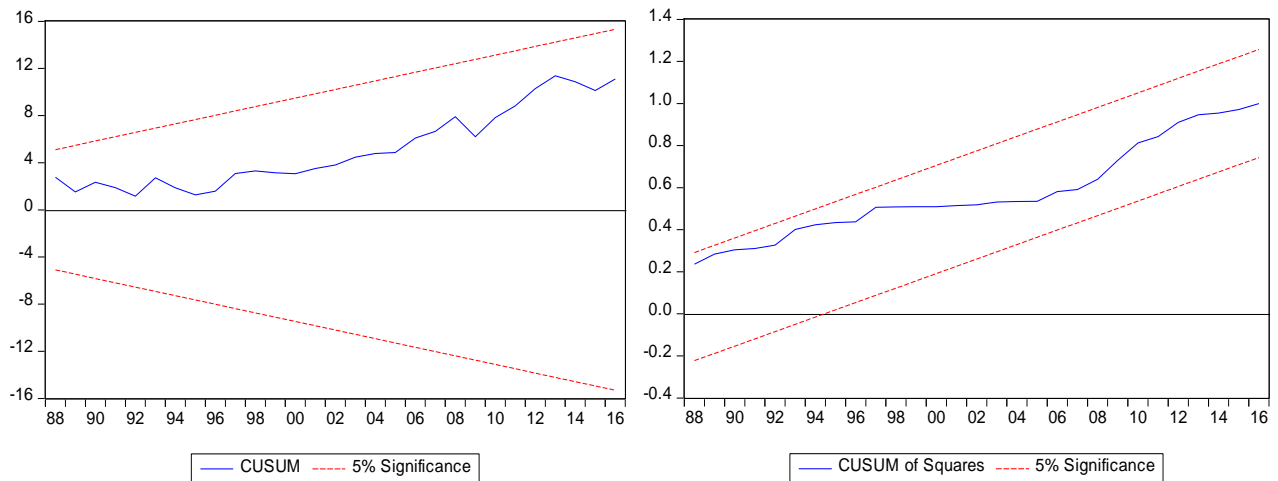
The existence of serial correlation, also known as autocorrelation, amongst the residuals was tested using the Breusch-Godfrey (BG) LM test. The null hypothesis under the BG test is that the residuals are not serially correlated while the alternative hypothesis states that the residuals are serially correlated (Gujarati, 2003). The results of the test presented P-values of 0.6332 for model 1 and 0.9672 for model 2, which are both greater than the 0.05 significance level. As such, the conclusion that could be drawn from the test is that there is no presence of autocorrelation in the residuals in both models. On this basis, the null hypothesis was therefore accepted.

#### **4.9 Stability Tests**

The cumulative sum of the recursive residuals (CUSUM) test is a stability test that checks if coefficients change systematically over time. The null hypothesis under the CUSUM test is that the parameters are stable, and this is the desirable and required outcome to ascertain model stability. The alternative hypothesis is that the parameters are not stable. Based on the results shown in figures 5 and 6 below, we observe that the CUSUM and CUSUM of squares plots (CUSUMQ) for each of the models indicated by the blue line is within the 5% critical lines depicted in red, indicating the stability of the parameters. As there is no divergence out of the 5% critical lines for both models under CUSUM and CUSUMQ tests, this confirms the stability of both models. The CUSUMQ plot for both models shows a dip around the 2008 mark. The external shock can explain the dip to the Zambian economy experienced during that period following the sharp fall in global copper prices during the global financial crisis of 2008. The effects of the shock are evident in the data where trade as a percentage of GDP (represented by the Trade Openness variable) and GDP per capita declined sharply between 2007 and 2009. Because Zambia is heavily dependent on copper, the sharp fall in prices adversely affected the economy.



**Figure 5: CUSUM and CUSUM of squares Stability Test Results (Model 1 – AIDm)**



**Figure 6: CUSUM and CUSUM of squares Stability Test Results (Model 2 – AIDb)**

*Source: EViews Output*

#### 4.10 Chapter Summary

Chapter four (4) provided a presentation of the results obtained from the ARDL regression analysis following the steps outlined in chapter three (3). With the data collected, the analysis provided insight into the long and short-run relationships between bilateral and multilateral ODA as well as the proxy for economic policy (Trade Openness), investment (FDI), and labour.

## **CHAPTER 5: CONCLUSION AND RECOMMENDATION**

### **5.1 Introduction**

This final chapter provides a summary of the study as well as the findings emanating from it as presented in the previous chapter. Chapter five (5) includes policy recommendations as well as suggestions for future research based on the conclusions drawn from the study findings.

### **5.2 Summary and conclusion of the Study**

This study aimed to evaluate whether ODA flows into the Zambian economy translate into economic growth and to establish whether the channel of ODA disbursements has had any effect on the level of impact on economic growth and development. The effectiveness of development assistance has been widely debated with several studies carried out to determine whether the provision of foreign aid accelerates economic development and growth in African countries. The ideology behind the provision of ODA is that the flows serve as an injection of capital into an economy that either boosts investment and thus, GDP growth. The empirical analysis of the separate impact of multilateral and bilateral ODA on economic growth in Zambia was modelled on the neoclassical growth model which is based on the premise of exogenous growth through investment and the improvement of economic efficiency which translates into economic growth.

The ARDL cointegration approach analysed the short and long-run relationship between multilateral and bilateral ODA, and GDP per capita which was selected as the variable to represent economic growth. Other variables that were identified as contributors to economic growth based on the selected growth model included foreign direct investment to represent investment (FDI), trade as a percentage of GDP to represent trade openness policy and the size of the labour force in relation to the entire population.

Furthermore, the bounds testing approach to cointegration coined by Pesaran & Shin (1997) was used to test for cointegration among the variables. The results of the bounds test presented in Chapter four (4) confirmed the existence of a long-run relationship between the selected variables. The findings from this study indicate that ODA generally has a negative relationship with economic growth in Zambia. The findings also showed that multilateral ODA and bilateral ODA have different impacts on GDP per capita in terms of coefficient value and statistical significance. Although the relationship was negative for both types of ODA, the long-run results showed that bilateral ODA had a smaller negative coefficient than multilateral ODA; however,

the coefficient was not statistically significant. Therefore, in the case of Zambia, it was concluded that generally, multilateral and bilateral ODA have been ineffective over the period studied in terms of the contribution to the growth of GDP per capita.

As a large portion of multilateral ODA was provided to Zambia between 1970 and 2016 in the form of structural adjustment programs (SAPs), the negative relationship findings of the regression model could be attributed to the negative effects of imposed stringent conditions that are attached to multilateral ODA. The stringent conditions attached to SAPs have been observed to affect growth negatively as indicated by Appolinario (2009) and Ram (2003). In addition It was observed that low-income African countries that have received structural adjustment loans generally exhibit negative or low growth rates and high inflation rates (Appolinario, 2009). Changes in economic policy that were adopted along with SAPs in Zambia included devaluation, the introduction of a flexible exchange rate system, increases in domestic prices for exports and reduced public expenditure (Loxley, 1990). The Devaluation policy adopted in particular affected the country's economic growth through manufacturing and copper industries due to the inflationary pressure resulting from the currency devaluation. The statistically insignificant long and short-term relationship between bilateral ODA and GDP per capita growth, despite the large volumes of bilateral ODA in relation to multilateral ODA, may be the result of the vulnerability to political influence that bilateral ODA has been noted to have. Historically, bilateral donors to Zambia have withheld ODA disbursements in protest of political decisions made in the country and this was evidenced between 1996 and 1998 where there was a decline in bilateral ODA to Zambia. In summation, erratic aid flows based on government/donor relationships, aid fungibility and corruption have been identified as some of the major hurdles to bilateral aid effectiveness in SSA (Appolinario, 2009).

Finally, the FDI variable was found to have a positive and significant long-run effect on GDP per capita in both models analysed. The FDI has been identified as one of the drivers of economic growth in developing economies like Zambia due to the technology and skills transfer that are attached to foreign direct investment. Labour, on the other hand, was found to have a significant positive effect on economic growth in the short-run; however, it was negative in the long-run. Labour contributes to economic growth through increased productivity in a country supported by the labour force. The effects on GDP per capita in the short run are positive; however, in the long-run, the growing labour force in comparison to GDP growth results in a negative relationship.

From the findings in this study, it is evident that ODA flows have been ineffective in contributing to GDP per capita growth. In addition, the study concludes that that the provided bilateral ODA differently impacts GDP per capita when compared to multilaterally ODA. As highlighted in the works of Biscaye et al., (2017), Headey, (2008), Minoiu & Reddy, (2009), Olanrele & Ibrahim, (2015), and Ram, (2003), a constraint of equality cannot be placed on all types of ODA when trying to establish its effectiveness in recipient countries. Generally, on review of previous studies conducted and taking into consideration the findings of this study, it can be noted that the relative effectiveness of the types of ODA may vary across recipients. Specifically, Multilateral aid flows to Zambia have not had the expected positive effect growth based on the growth models proposed by pro-foreign aid advocates owing to the disadvantages attached to the disbursement conditionalities of multilateral ODA. These may include increased taxes, free trade policies that may hamper domestic industry and eventually GDP growth and devaluation of exchange rates in an attempt to restore competitiveness. However, this may only increase import costs and translates into higher inflation.

The results regarding the relationship between bilateral ODA and GDP per capita were not robust enough to allow a conclusion to be drawn regarding the specific relationship. Further investigation into the relationship perhaps with the use of a different growth model may provide more conclusive evidence of the direction of the relationship between bilateral ODA and growth in Zambia.

### **5.3 Recommendations**

Generally, in order to improve effectiveness and achieve sustainable development by way of development assistance, there is a need to re-evaluate ODA modalities to ensure use for the intended purpose. Bilateral ODA has the potential to be more effective; however, this may require donors to pool funds which can be directed to specific development projects in the recipient countries to reduce fragmentation and improve management of the funds. An example is that of 2018, where the United Kingdom, Finland, and Sweden were forced to suspend ODA to Zambia due to the misappropriation of donor funds and alleged corruption. In conclusion, Bilateral donors can, therefore, take a less fragmented approach in their provision of development assistance to ensure that recipient countries manage granted funds more efficiently and corruption linked to bilateral ODA is reduced.

#### **5.4 Avenues for Future Research**

This study focused mainly on Zambia; therefore, there are opportunities to further investigate the different impacts of bilateral and multilateral ODA channels on economic growth in other African countries as well. Future research could be done with a greater sample size of countries receiving donor aid in order to draw a general inference about the contribution of each type of ODA to economic growth. In the case of Africa, there is also the opportunity to explore the effectiveness of development assistance before and after 1990 to establish whether indeed bilateral ODA effectiveness was affected by the cold war effect identified by Headey, (2008). The variable selected to represent economic policy in Zambia over the selected sample period was trade as a percentage of GDP which was reflective of trade openness in Zambia. For future research, in addition to trade openness, the variables representative of policy could include budget surplus and inflation which were not considered in this study. The three variables could be combined to define a policy index as done by Burnside & Dollar, (2000). Also, a study could be conducted to verify the relationship between bilateral ODA and its contribution to economic development in Zambia as the results from this study did not allow for inference regarding the relationship between the two variables due to the statistically insignificant coefficient results. Finally, future research could also be considered to compare the effects of foreign aid in its aggregate form versus the various components of total ODA to confirm that it indeed would not show a significant contribution to growth in its aggregate form as alluded to by authors who have identified the importance of not assuming uniform effectiveness for the various forms of ODA.

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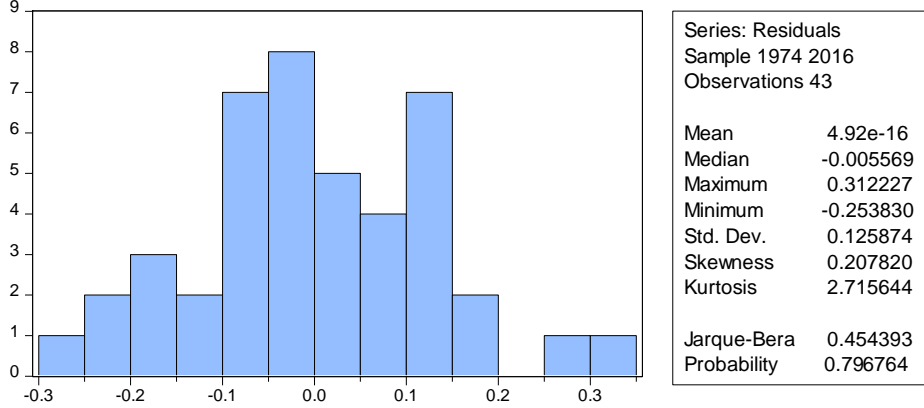
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## APPENDICES

### Appendix.1 Model 1 Diagnostic Test Results

Normality Test:



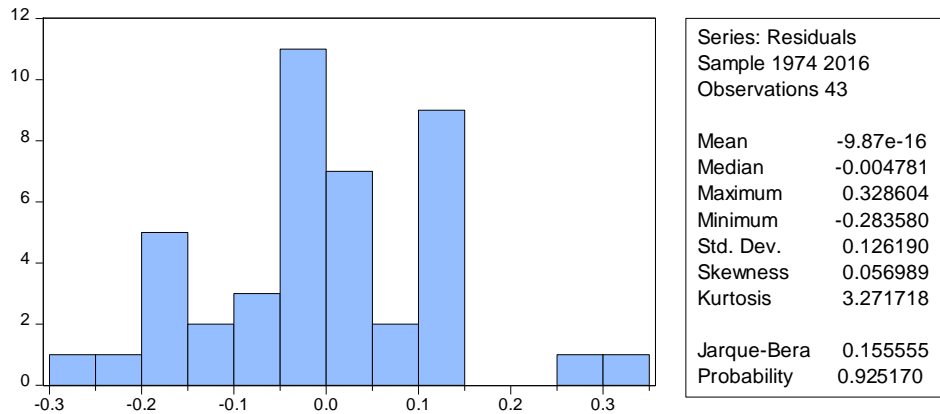
Breusch-Godfrey Serial Correlation LM Test:  
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.464462	Prob. F(2,28)	0.6332
Obs*R-squared	1.380755	Prob. Chi-Square(2)	0.5014

Heteroskedasticity Test: Breusch-Pagan-Godfrey  
Null hypothesis: Homoskedasticity

F-statistic	0.763049	Prob. F(12,30)	0.6815
Obs*R-squared	10.05535	Prob. Chi-Square(12)	0.6111
Scaled explained SS	4.198558	Prob. Chi-Square(12)	0.9796

### Appendix 2: Model 2 Diagnostic Test Results



Breusch-Godfrey Serial Correlation LM Test:  
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.033385	Prob. F(2,27)	0.9672
Obs*R-squared	0.106074	Prob. Chi-Square(2)	0.9483

Heteroskedasticity Test: Breusch-Pagan-Godfrey  
Null hypothesis: Homoskedasticity

F-statistic	0.898987	Prob. F(13,29)	0.5639
Obs*R-squared	12.35126	Prob. Chi-Square(13)	0.4991
Scaled explained SS	6.381090	Prob. Chi-Square(13)	0.9312

### Appendix 3: Unit Root Test Results

Null Hypothesis: **LGPPC has a unit root**

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.564950	0.7890
Test critical values:	1% level	-4.205004	
	5% level	-3.526609	
	10% level	-3.194611	

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

Null Hypothesis: **D(LGPPC) has a unit root**

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.522146	0.0045
Test critical values:	1% level	-4.211868	
	5% level	-3.529758	
	10% level	-3.196411	

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

Null Hypothesis: **LAIMD has a unit root**

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.908361	0.1695
Test critical values:		
1% level	-4.170583	
5% level	-3.510740	
10% level	-3.185512	

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

Null Hypothesis: **D(LAIDM) has a unit root**

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-10.05575	0.0000
Test critical values:		
1% level	-4.175640	
5% level	-3.513075	
10% level	-3.186854	

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

Null Hypothesis: **LAIDB has a unit root**

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.888647	0.0218
Test critical values:		
1% level	-4.205004	
5% level	-3.526609	
10% level	-3.194611	

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

Null Hypothesis: **FDI has a unit root**

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.176023	0.0000

Test critical values:	1% level	-4.175640
	5% level	-3.513075
	10% level	-3.186854

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

Null Hypothesis: **LABOUR has a unit root**

Exogenous: Constant, Linear Trend

Lag Length: 5 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.678485	0.0000
Test critical values:		
	1% level	-4.243644
	5% level	-3.544284
	10% level	-3.204699

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

Null Hypothesis: **TRADEOP has a unit root**

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.070417	0.1271
Test critical values:		
	1% level	-4.205004
	5% level	-3.526609
	10% level	-3.194611

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

Null Hypothesis: **D(TRADEOP) has a unit root**

Exogenous: Constant, Linear Trend

Lag Length: 1 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.161102	0.0000
Test critical values:		
	1% level	-4.219126
	5% level	-3.533083
	10% level	-3.198312

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

#### Appendix 4: ARDL Bounds Test Results (Model 1)

ARDL Bounds Test

Date: 05/01/20 Time: 02:40

Sample: 1970 2016

Included observations: 43

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	5.155930	4

Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.2	3.09
5%	2.56	3.49
1%	3.29	4.37

#### Appendix 5: ARDL Bounds Test Results (Model 2)

ARDL Bounds Test

Date: 05/01/20 Time: 02:49

Sample: 1970 2016

Included observations: 43

Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	4.760668	4

Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.2	3.09
5%	2.56	3.49
1%	3.29	4.37

## Appendix 6: ARDL Regression Results (Model 1)

Dependent Variable: LGDPPC  
 Method: ARDL  
 Date: 01/05/20 Time: 02:39  
 Sample (adjusted): 1974 2016  
 Included observations: 43 after adjustments  
 Dependent lags: 1 (Fixed)  
 Model selection method: Akaike info criterion (AIC)  
 Dynamic regressors (4 lags, partial automatic): @FL(LAIDM,1) FDI  
 LABOUR TRADEOP  
 Fixed regressors: C  
 Number of models evaluated: 125  
 Selected Model: ARDL(1, 4, 1, 1, 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LGDPPC(-1)	0.657259	0.095050	6.914908	0.0000
FDI	0.002243	0.012901	0.173904	0.8631
FDI(-1)	0.022658	0.013301	1.703526	0.0988
FDI(-2)	0.054330	0.016311	3.330780	0.0023
FDI(-3)	0.046970	0.017272	2.719496	0.0108
FDI(-4)	0.052191	0.016375	3.187307	0.0033
LABOUR	48.47797	30.65069	1.581628	0.1242
LABOUR(-1)	-81.99514	35.67427	-2.298439	0.0287
TRADEOP	-0.002685	0.003628	-0.740046	0.4650
TRADEOP(-1)	0.006858	0.003519	1.949009	0.0607
LAIDM	-0.080165	0.047657	-1.682126	0.1029
LAIDM(-1)	0.011611	0.042905	0.270619	0.7885
C	19.39396	4.458825	4.349568	0.0001
R-squared	0.949500	Mean dependent var	6.387939	
Adjusted R-squared	0.929301	S.D. dependent var	0.560137	
S.E. of regression	0.148937	Akaike info criterion	-0.725943	
Sum squared resid	0.665464	Schwarz criterion	-0.193487	
Log likelihood	28.60776	Hannan-Quinn criter.	-0.529589	
F-statistic	47.00539	Durbin-Watson stat	2.032397	
Prob(F-statistic)	0.000000			

\*Note: p-values and any subsequent tests do not account for model selection.

## Appendix 7: ARDL Regression Results (Model 2)

Dependent Variable: LGDPPC  
Method: ARDL  
Date: 01/05/20 Time: 02:48  
Sample (adjusted): 1974 2016  
Included observations: 43 after adjustments  
Dependent lags: 1 (Fixed)  
Model selection method: Akaike info criterion (AIC)  
Dynamic regressors (4 lags, partial automatic): @FL(LAIDB,1) FDI LABOUR  
TRADEOP  
Fixed regressors: C  
Number of models evaluated: 125  
Selected Model: ARDL(1, 4, 1, 2, 1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LGDPPC(-1)	0.673130	0.101585	6.626277	0.0000
FDI	0.005037	0.013263	0.379761	0.7069
FDI(-1)	0.028341	0.014823	1.911989	0.0658
FDI(-2)	0.038006	0.016325	2.328029	0.0271
FDI(-3)	0.043579	0.017959	2.426607	0.0217
FDI(-4)	0.042644	0.017134	2.488840	0.0188
LABOUR	35.61468	34.50098	1.032280	0.3105
LABOUR(-1)	-71.84924	40.84537	-1.759055	0.0891
TRADEOP	-0.001014	0.003816	-0.265675	0.7924
TRADEOP(-1)	0.003465	0.004282	0.809206	0.4250
TRADEOP(-2)	0.006864	0.003798	1.807386	0.0811
LAIDB	-0.029959	0.109484	-0.273634	0.7863
LAIDB(-1)	0.016226	0.093430	0.173670	0.8633
C	19.32943	5.552108	3.481458	0.0016
R-squared	0.949247	Mean dependent var	6.387939	
Adjusted R-squared	0.926495	S.D. dependent var	0.560137	
S.E. of regression	0.151863	Akaike info criterion	-0.674417	
Sum squared resid	0.668809	Schwarz criterion	-0.101003	
Log likelihood	28.49996	Hannan-Quinn criter.	-0.462959	
F-statistic	41.72232	Durbin-Watson stat	1.913301	
Prob(F-statistic)	0.000000			

\*Note: p-values and any subsequent tests do not account for model selection.