THE NEXUS BETWEEN FOREIGN DIRECT INVESTMENT AND BUDGET DEFICIT IN SADC REGION

by

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Submitted in fulfilment of the requirements for the degree of

MASTER OF COMMERCE

IN ECONOMICS

in the

FACULTY OF MANAGEMENT AND LAW

(School of Economics and Management)

at the

UNIVERSITY OF LIMPOPO

SUPERVISOR: Prof T. Ncanywa

2020

DECLARATION

I declare that "**THE NEXUS BETWEEN FOREIGN DIRECT INVESTMENT AND BUDGET DEFICIT IN SADC REGION "** is my own work and that all the sources used or quoted have been indicated and acknowledged by means of complete references.

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HLONWANE THABANG MOSES Date

DEDICATION

This dissertation is dedicated to my family members, predominantly my mother Raisebe Sarah Hlongwane.

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude and appreciation to all those who assisted me in completing this dissertation. So many people contributed to motivating, influencing, guiding, supporting and encouraging me. But owing to space constraints, I will mention a few.

Special appreciation goes to my supervisor, Prof T. Ncanywa, for her guidance and support. Her availability for comments, even at very late hours, was a big encouragement and inspiration.

I am grateful to my parent, Mrs Hlogwane for instilling discipline in me; my twin brother Hlongwane Thabo Amos for the limitless support and encouragement; and the rest of my family and friends for their love and kindness.

I am forever grateful to my pastors; Pastor Skele for building me up and shepherding me and my family with great love.

My profound appreciation goes to the Almighty God, who is my Rock and Strength. The Lord has lavished me with His grace and favour.

Notwithstanding the guidance and contribution from the aforementioned individuals, the responsibility for all the views and any shortcomings is entirely mine.

ABSTRACT

The remarkable increase in FDI flows to developing countries over the last decade has focused attention on whether this source of financing enhances overall development and growth in the economy. To attain foreign direct investment and sustainable economic growth of a country, balanced budget is not only important but necessary. The aim of the study was to examine the nexus between foreign direct investment (FDI) inflows and budget deficit in a panel of five Southern African Development Community (SADC) countries (Malawi, South Africa, Tanzania, Namibia, and Zambia).

The study employed the Panel Auto Regressive Distributed Lag (PARDL) model in examining the relationship between budget deficit and FDI. The panel unit root tests results showed different orders of integration (at levels and first-order) giving way to the use of PARDL. Co-integration test results confirmed a long-run relationship in the budget deficit FDI series. In the long run, there is a significant negative relationship between budget deficit and FDI. The speed of adjustment is 36%, implying that the system would converge faster to equilibrium. Furthermore, Granger causality test results indicated a bi-directional causal link on the interest rate – inflation and interest rate – FDI models. However, there is a unidirectional causality running from budget deficit to FDI; interest rate to the budget deficit and FDI to inflation. It is recommended that government should attract more foreign direct investment so as to minimise budget deficit and this could speed up the development of SADC countries.

Key Terms: Foreign direct investment, budget deficit, Autoregressive-Distributed Lag, panel data, Granger causality.

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FDI - Foreign direct investment

BD- Budget Deficit

INF- Inflation rate

INT- interest rate

WD- World Bank

SADC- South African development community

SARB- South African reserve bank

ARDL- Autoregressive Distributed Lag Model

LLC- Levin, Lin and Chu

IPS - I'm, Pesaran and Shin

RSA- Republic of South Africa

ECM - Error correctional model

USA- United State of America

GDP - Gross domestic product

EU - European Union

IMF- International monetary fund

ASEAN-Association of South Eastern Asian Nations

GEAR-Growth, Employment and Redistribution

IDZ-Industrial development zone

SEZ-Special Economic Zone

MIIF-Municipality infrastructure investment framework

NDP-National development plan

OLI- Ownership, location and international Model

VAR- Vector autoregressive model

OLS- Ordinary least square model

CHAPTER ONE

INTRODUCTION TO THE STUDY

1.1. Background to the study

For decades, the effects of budget deficit on foreign direct investment (FDI), trade, and unemployment in the domestic economy have long been a key subject of debate in the literature of economic development (Dritsakis & Stamatiou, 2015). As it has indeed been attracting the attention of researchers and policymakers in the last decades, one of the main objectives was to get robust evidence on the sign of this relationship. Dritsakis and Stamatiou (2015) believed that FDI inflows, together with exports, are the most vital in influencing the process of economic development and the elimination of the budget deficit. Many researchers are of the view that FDI contributes toward better economic performance and helps in better budget balance by increasing investible capital and technological spillovers (Nowak-Lehmann, Martínez-Zarzoso, Klasen, & Herzer, 2008; Rabaa & Younes, 2016; Istiqomah, Wibowo, Yunianti & Gunawan, 2019). This contribution was brought in because fast-growing economies have a tendency to acquire more FDI since foreign companies are naturally keen to invest in fast-growing economies. While today, the budget deficit has become an important concept in literature, it is generally assumed that it has a negative impact on the growth of the economy. In this context, various researchers have shown their own views regarding the subject, yet there is no consensus about this matter (Tae, Hepe, and Emrah, 2013). Hence, the primary determinant of this study is to investigate the impact of budget deficit on foreign direct investment in the SADC region over a period 1996 - 2017 using a panel data approach.

Both theoretical and empirical literature reveals foreign direct investment (FDI) as a major factor of capital flow for emerging markets, which often contributes to the growth of the economy. However, most researchers and policymakers correspond that the benefits of the foreign direct investment outweigh its cost on the host country (Solomon, 2018).
Ntembe and Sengupta (2016) stated that foreign direct investment typically means the significant influence of foreign investment to domestic investment. This is due to the fact that FDI is an act of acquiring assets (bonds, bank deposits, real estate, and equity shares) outside one's home country. On the other hand, Osoro (2016) stated that budget deficit

occurs when the revenue collected from taxation, social contributions, grants, recurrent appropriations in-aid, or other revenue sources are lower than the expenditures projected in the budget.

There are varies causes of budget deficits. The major being when the actual expenditures exceed actual revenues of the projected amount (Osoro, 2016). There are several studies that look for evidence on foreign direct investment and budget deficit in the SADC region. Amongst all of the studies, it was concluded that an increase in foreign direct investment by 5% leads to a reduction of 0.2% to 0.3% of the budget deficit. Stella (2016) conducted a study of the effects of budget deficit on economic growth in Kenya. The study found that the budget deficit has a negative impact on the economic growth of Kenya. A 1 percent increase in budget deficit decreased GDP growth by 0.102 percent. This result tends to follow the Neo-classical view that there is an inverse relationship between budget deficits and economic growth.

1.2. Statement of the Problem

A budget is a useful tool in setting a country`s developmental policies and as such a budget balance is very crucial for a country as it can be used as a macroeconomic policy instrument for stabilizing the economy. Fischer (1993) viewed budget balance as one of the most important macroeconomic factors that have an impact on economic growth (Natalia, 2018). Siegal (1979) refers to the magnitude of government fiscal surplus or deficit as probably one of the most important statistics used to measure the impact of government fiscal policy on the economy. A budget deficit occurs when government expenditure exceeds government revenue and when revenue exceeds from expenditure is called surplus budget. However, Investment, on the other hand, is seen as one of the most important variables in driving economic growth and development (Berbe, 2015). Hence, Africa, FDI inflows have been increasing due to African countries opening their economies to international trade and their ability to initiate political and economic reforms (Caroline, 2015). African countries create conditions that are favourable to attract foreign direct investment because of the positive relationship between growth and FDI. Recognising that FDI can contribute to economic growth and development, most SADC countries including South Africa are constantly working to attract it, and hence its demand has become highly competitive. As a common structure of developing countries, SADC countries suffer from capital which is essential for investment and this makes economies too dependent on the external sources.

Therefore, there is a need for developing countries to make the investment environment attractive to foreign investors.

However, it is an ideal depiction of every country, both advanced and emerging, to realise the equilibrium between government expenditure and government raised revenue. Hence, government expenditure on both goods and services and transfers is likely to exceed the available resource envelope or collected revenue. This is predominantly due to excessive reliance on government expenditure as a source of social security, improved standard of living conditions and expanded physical infrastructure. Therefore, the realization of budget stability remains a challenge more particularly in developing economies where government expenditure is regarded as an indispensable component of economic growth and development. According to Molefe and Maredza (2017), in most SADC countries and other emerging economies, high budget deficits are at the centre of macroeconomic adjustments due to the developing nature of their economies.

South Africa, like other SADC countries such as Malawi, Tanzania, Zambia and Namibia, has experienced budget deficits over several decades. The very same budget deficits have led to numerous economic challenges such as price volatilities, high-interest rates, stumpy economic performance, worsened credit ratings and uncontrollable debt. According to Murwirapachena, Maredza and Choga (2013), the SADC governments have since the 1980s embarked on enormous spending sprees in an attempt to accomplish Pareto efficiency. For instance, in South Africa, the 2019 total consolidated government expenditure was estimated at 651189 ZAR Million whilst the revenue raised only amounted to 118284 ZAR Million translating to a deficit of 532905 ZAR Million as affirmed by National Treasury (2019).

However, in spite of the yearly budget deficit being incurred by the governments of SADC countries like South Africa, there are yet some economic challenges that remain unsolved. These include high unemployment rate (which was reported at 27.6% in the first quarter of 2019 to 29% in the second quarter of the year by Statistics of South Africa) poorly positioned and insufficient infrastructural facilities, increasing unsettled public sector wage bill, insufficient revenue generation capacity as well as uneven service delivery. Such that nations with budget deficit may finance it either through borrowing or printing more money.

With the borrowing money option. However, governments sell bonds or treasury bills directly to the private capital markets. On the other hand, with printing more money option, higher inflation rate might occur which can harm the economy. This is a clear indication that the performance of the selected SADC countries in recent years fall short of expectations compared to peer countries such as Brazil, Turkey and India. Consequently, the motivation for this study is to examine the impact of foreign direct investment and some selected macroeconomic variables on-budget deficit in SADC.

1.3. Aim and Objectives of the study

The study aimed at examining the impact of foreign direct investment on budget deficit in the SADC region.

The following objectives will be used to reach the aim of the study;

- To investigate the impact of foreign direct investment on budget deficit.
- To assess if a long and short-run relationship exists between FDI and budget deficit in the SADC region; and
- To evaluate if there is a causal relationship between FDI and budget deficit in SADC.

1.4. Research Questions

- Does foreign direct investment have an impact on the budget deficit in SADC?
- Is there any short-run and long-run relationship between FDI and budget deficit in the SADC region?
- Is there any causality between FDI and budget deficit in SADC countries?

1.5. Significance of the study

As indicated, FDI inflows into the SADC region have increased considerably. However, despite the important role of FDI in the long run, and the increase in FDI inflows into SADC countries, in particular, there is a significant dearth of literature on the causal relationship between FDI and budget deficit. Most studies focus on the impact of budget deficit on FDI, but they do not investigate the direction of causality between the two variables or as well

as policies to attract FDI so as to stimulate economic development or and challenges faced by individual countries.

Hence, this study examines the nexus between foreign direct investment and budget deficit in the SADC region. Once foreign direct investment inflows are attracted, the budget deficit can get negatively affected. This study will help SADC countries in pursuit of the appropriate policy direction regarding the role of FDI in economic management. The results of this study could be useful for controlling what activates the attraction of FDI inflows in SADC countries. Academically, other researchers can benefit in helping them enhance knowledge on the budget deficit and FDI in SADC. Finally, this study will be useful for filling the gap in the literature by assessing the causal link between FDI and budget deficit and outlining several policies on how to attract foreign direct inflows to stimulate the development by encouraging investment in education, infrastructure, and training.

1.6. Ethical considerations

This study is mainly an econometric analysis utilizing secondary panel data obtained from online services (World Bank and South African Reserve Bank). Therefore, there was recognition of sources and data by referencing.

1.7. The organization of the study

This dissertation composes of six chapters; the structure of the study is as follows:

- Chapter 1 presents the introduction, statement of the problem, objectives, research questions, and significance of the study.
- Chapter 2 uses a case study approach to present an overview of the relationship between FDI and budget deficit.
- Chapter 3 reviews the theoretical and empirical literature on the nexus between foreign direct investment and budget deficit.
- Chapter 4 presents the empirical model specification and estimation techniques; which comprises panel unit roots, Co-integration and Granger causality tests.
- Chapter 5 presents the empirical results.
- Concluding remarks are given in chapter 6.

CHAPTER TWO

OVERVIEW OF FOREIGN DIRECT INVESTMENT AND BUDGET DEFICIT IN SADC COUNTRIES

2.1. Introduction

This section overviews budget deficit and foreign direct investment (FDI) in the five selected SADC countries (Malawi, Tanzania, South Africa, Namibia, and Zambia). The first section focuses on foreign direct investment. The second section deals with a budget deficit and the final section give trends of FDI and budget deficit in developing countries where these can be large and sustained.

2.2. Foreign direct investment (FDI)

According to Mahembe and Odhiambo (2014), foreign direct investment inflows are defined as international investments by an entity resident in one economy in the business of an enterprise resident in another economy that is made with the objective of obtaining a lasting interest which contributes to economic growth (United Nations & International Monetary Fund,1993). Although in theory, the host country's economy can benefit from FDI through capital accumulation, acquisition of new goods and foreign technology, and by enhancing a stock of knowledge in the host country via the transfer of skills (Mahembe, 2014; Elboiashi, 2011). However, there is a good number of common FDI challenges in the host country, that inhibit the propensity of the government to maximize the benefits of FDI. Moreover, FDI can also be categorized into five broad types, namely; horizontal, vertical, conglomerate, export-oriented investment, import-substituting, and government-initiated foreign direct investments.

2.3. Types of foreign direct investment

2.3.1. Horizontal foreign direct investment

Teka (2014) defined horizontal FDI as a means of undertaking for the determination of horizontal development to yield products that are roughly the same as the product produced domestically. It is called horizontal FDI because homogenous activities or goods and services have been reproduced by several plant firms in many countries (Marin,

Lorentowicz & Raubold, 2003). Moreover, Herger and McCorristo (2013) outlined horizontal FDI as the type of investment which involves repetition of production facilities that take place through countries in order to pursue the right of entry to marketplaces. Such type of FDI constitutes 70% of FDI more than that of vertical FDI. According to Protsenko (2004), horizontal forms of foreign direct investments suggest certain gains in the aspect of the existence of positive trade charges and firm-level scale economies. The main purpose of the horizontal FDI is to protect the economy from the transportation costs or charges and to avoid access to foreign markets for goods and services that can also be served domestically. Hence, horizontal FDI exists transportation costs make it harder to attend foreign markets with exports. Therefore, meanwhile, the foreign marketplaces will be aided by exports, the occurrence of transportation charges is thereby important (Teka, 2014).

According to Safet, Borislav and Bojana (2012), horizontal forms of foreign direct investments have progressed over numerous procedures which include; export duopoly, multinational monopoly, and multinational duopoly. Export duopoly is a type of oligopoly where two countries have dominant or exclusive control over a market. For example, assume that there are two economies, a home, and a foreign economy and that each economy has one firm that yields a differentiated good. The two firms both export to a third-country market (Collie & Le, 2010). Multinational monopoly is regarded as the presence of a monopoly that is possessed by residents of numerous nations in which it can disturb income redistribution guidelines within a single country (Hamilton & Slutsky, 2017).

In addition, amongst comparable nations or economies, the models of horizontal FDI predicts that worldwide activities arise. In general, based on the assumption of the presence of trade charges and economies of scale at plant and firm level, the horizontal FDI models forecast that investment flows can rise amongst comparable nations or countries (Mahembe, 2014).

2.3.2. Vertical foreign direct investment

Osnago, Rocha, and Ruta (2015) defined vertical FDI as the type of investment that includes disintegrating phases during the product development in order to get the right to entry towards moderately factor inputs at a lower price. However, there are two types of vertical foreign direct investment; backward vertical FDI and forward vertical FDI. The backward vertical FDI refers to investing in the company that provides to the domestic firm. On the other hand, forward FDI, by contrast, refers thus to Vertical FDI often take place

when a global agrees to obtain a process that one way or another accomplishes the protagonist of a trader (backward vertical FDI) or the protagonist of a distributor (forward vertical FDI). Moreover, vertical FDI occurs when firms in a developed economy pull down their cost of production by displacing the invention development to low-wage economies. These firms are often vertical MNE's that are grouped in one country with the aim of producing in another country (Osnago et al., 2015).

According to Santis, Anderton and Hijzen (2004), it is so-called vertical FDI due to the fact that production levels from (dissimilar economies) various countries differ from one another. Aizenman and Marion (2004) outlined that FDI that flows into developed economies is predominantly horizontal, while FDI that flows into developing economies has a somewhat bigger vertical factor. The elementary knowledge regarding vertical FDI is that if the values of a particular level of production are often down in respect of prices in a country other than investor's country, the invention sequence becomes distributed for future profits (Asafo-Adjei, 2007).

2.3.3. Conglomerate foreign direct investment

Conglomerate foreign direct investment encompasses both the vertical and horizontal FDI. According to Subhanij and Annonjarn (2016), conglomerate FDI occurs across all countries, in agreement with firms that neither shares the same industries or firms that are vertically-related.

2.3.4. Export-oriented investment

Reuber (1973) described export-oriented foreign direct investment as a form of investment that redirects a wide range of thought such as the aspiration to improve secondary and more expanded bases of supply by way of attaining lower-cost goods and services to be recycled either as inputs or for sale elsewhere. According to Adlung (2016), export-oriented foreign direct investment is frequently inspired by the firm's aspiration to pursue new sources of inputs such as raw material, intermediary and finished products. However, an example of this type of investment can be classified under the secondary sector, in which raw materials are transformed into finished products or output. Usually, regarding this type of investment, foreign investors are mainly attracted to removing products from the host country and selling them abroad by means of recognized market channels (Erdal & Tatoglu, 2002).

By creating such investments, the key emphases are on the desires of a specific market which is mainly large or entirely outside the host country, while on the other hand, firms at times also create a supporting infrastructure such as housing, hospitals, and schools. (Reuber, 1973). With regard to the study by Ahmad, Alam, Butt, and Haroon (2003), this type of investment is geared in the direction of the production based on the component parts. Such that, immediately after the manufacturing process the components are typically transferred abroad for transformation into finished products. Reuber (1973) specified that this type of investment is rarely found manufacturing finished goods for sale right to consumers in a foreign country. In addition, this confirms the fact that this investment aimed to benefit from a host country in the form of a lower-cost location. Hence, Ahma et al., (2003) correctly put it that, this type of investment primarily become highly cost-effective or worthwhile even in the short run.

In terms of growth, a host country has to discover the most operative means of making the optimal choice of locations to attract export-oriented FDI and make sure that the investment turns into development gains. Thus, this can help to improve a host country's production and export competitiveness (Chen & Chen, 1998).

2.3.5. Import-substituting FDI

Import substituting FDI was described by Teka (2014) as a decrease in the level of export by the investing country due to an increase in the production of goods and services that were previously imported by the host country. Furthermore, this type of FDI is usually determined by the size of barriers to entry, market, and transportation costs in the host country (Teka, 2014).

2.3.6. Government initiated FDI

The government initiated FDI involves government intervention to attract a lot of foreign direct investment in order to reduce the country's balance of payment deficit (Okuda,1994). The government can obtain this by offering incentives towards foreign investors in order to increase foreign investments into the host country.

2.4. Review of foreign direct investment and budget deficit dynamics in SADC countries: Case studies

This section debates trends of the main socio-economic problems, places of interest of major incidences, which might have impacted the country's budget deficit or foreign direct investments in the SADC region.

2.4.1 Malawi

Malawi achieved independence from the United Kingdom in 1964 and was ruled as a one-party state. According to Babji and Kang (2012), Malawi is part of some developing countries that are struggling with public debt in part because tax revenue is not a sustainable source of government revenue. Furthermore, Malawi is a low-income country, in the sense that its economy is highly dependent on agriculture, which represented 28.33 percent of GDP in 2011 (Nsiku, 2013). In other words, the country's major source and a significant driver of growth in Malawi is the agriculture sector through regional exports and imports (Mahembe, 2014). However, FDI inflows in Malawi have been on the decline apart from a large investment in a rail line in 2011 by a Brazilian company and Vale Logistics Limited. Malawi has not been performing well in attracting foreign direct investment as compared to its neighbours including Zambia, Mozambique, and Tanzania (Morisset, 1999). The Malawian government, like other governments in developed and developing countries around the world, uses a variety of economic incentives or policies to attract and retain foreign direct investments (Mahembe, 2014).

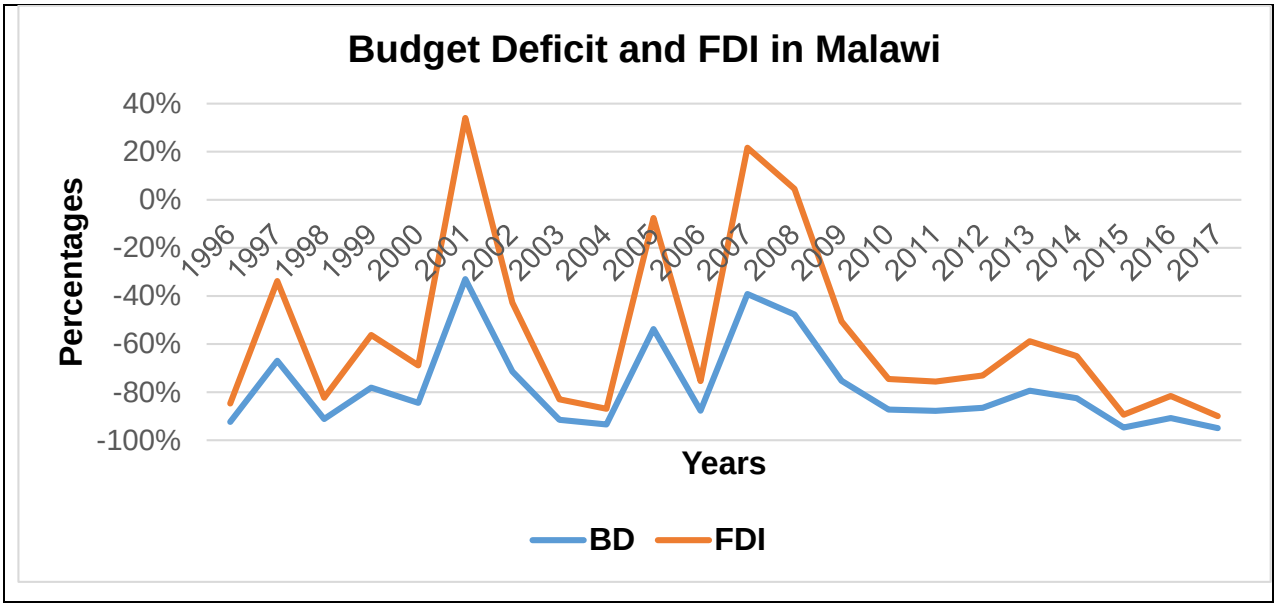
The researchers were interested in finding out the policies which could be used by the government of Malawi to maximizing the benefits of FDI to the local economy. The interest here was to find out how can the host country maximize FDI and feel the benefits of it according to national strategic plans. The findings based of literature knowledge and the participants' specifications revealed the following policies Nsiku (2013); Mahembe et al., (2014): Firstly, Pre-Reform Period; According to Nsiku (2013), the government was actively involved in a macroeconomic policy that aimed at economic stability: low and stable inflation, low and stable interest rates while the exchange rate remained stable. It is well known that in Malawi, investment incentives are mainly fiscal since government revenue foregone through tax breaks and concessions. Secondly, the Reform Period; during the period of 1981 to 1994, the government of Malawi focused on the macroeconomic policies of privatization, reorganization, and freedom. The Malawian government engaged in a

mutual trade agreement with South Africa in 1991 and unlocked the FDI inflows through privatization of state-owned enterprises, liberalization of entry into the manufacturing industry. Thirdly, Post-Reform Period; As from 1995 until 2017, policy refinements exist towards Malawian growth. This is due to;

- Continued implementation of the 1996 national privatization program (NPP) until 2001.
- the government of Malawi decided to strengthen the regional integration and trade openness within regional blocs, and;
- Since 1995, the Malawian government has introduced the export processing zones (EPZ) schemes.

Currently, according to Malawi Government (1998), the Malawian growth strategy vision 2020 has placed the goal of Malawi becoming a self-reliant and technologically driven middle-income country by 2020. Nsiku (2013) and Mahembe (2014) correctly put it that despite several economic reforms that the Malawian economy implemented, the economic performance did not meaningfully improve. Hence, Figure 1 shows the BD and FDI trends for Malawi from 1996 until 2017.

Figure 2. 1 Budget deficit and FDI trends in Malawi (1996 – 2017)



Source: author's own computation using data from the World Bank and SARB.

After its independence in 1964, the economy is projected to reach 4.4% of economic growth in 2019. This is due to the adoption of various policies by the government to promote a good harvest overall, despite the impact Cyclone Idai. Furthermore, solid agricultural growth is likely to support agro-processing and households' disposable incomes, which should, in turn, drive the service sector. Between 1998 and 1999; 2009 and 2017, however, the economy`s foreign direct investment inflows declined due to inappropriate agricultural policies, inadequate credit, and poor international terms of trade which led FDI inflows to drop to -80 per cent (Economic Survey, 1991). Lack of FDI incentives and foreign exchange controls made the domestic environment for investment even less attractive. From 2009 to 2017, Malawi had its worst declined in FDI inflows since independence. Growth stagnated, and agricultural and infrastructure production shrivelled. On the other hand, from 1996 to 2001 budget deficit in Malawi was very high. The higher than anticipated deficit is due to lower revenues and grants and higher recurrent expenditure, the latter due to higher than budgeted interest payments, election-related spending, and Cyclone Idai disaster. The FY2018/19 government budget deficit is expected to stand at 6.4% of gross domestic product (GDP), higher than budgeted (3.8% of GDP) in Malawi (Stella, 2011).

2.4.2. Tanzania

According to Nakale, Sikand and Mabuku (2015), Tanzania is recorded as the slowest economy based on its growth in recent years, registering an estimated growth of 1.1 percent for FDI in 2016 due to weak performance by the secondary, tertiary and primary industries. The primary and secondary industries contracted by 2.0 and 7.8 percent respectively while tertiary industries recorded a slow growth of 3.9 percent. During 2016. The first, second and third quarters registered a growth of 4.1 percent, a decline of 0.4 percent and 0.3 percent respectively. However, Kamwi, Kaetsch, Graz, Chirwa, and Manda (2017) indicated that the economy contracted by 1.7, 0.7 and 1.9 percent in the first, second and third quarters of 2017 respectively. Overall, the economy is thus estimated to have contracted by 0.4 percent in 2017 attributable to weak performance. This emphasized the importance of foreign direct investment in the Namibian economy.

Although, foreign direct investments are a challenge to attract in many emerging countries, in particular, Tanzania. Despite the amount of FDI that Tanzania has been receiving and its political stability since the economy gained its independence from South Africa in 1990, the exact impact of these capital flows on the country's economic performance is still opened to speculation (Ogbokor, 2016). As a result, over the past 24 years, FDI inflows as a share of GDP grew at 9.0 percent in 2008 (highest). Since 2008, the country has been experiencing substantial declines in its inflows (Dembo & Nyambe, 2016). The government of Namibia should redefine its policies to attract FDI to stimulates development by increasing investment in education, training, and infrastructure (Bekhet & Al-Smadi, 2015).

On the other hand, according to Mid-term budget review revenue, income and expenditure (2017/2018 and 2019/2010), On the expenditure side, the total expenditure for 2017/18 is estimated at 38.4 percent of GDP. Total expenditure as a ratio of GDP is expected to decline to 35.2 percent and further to 32.7 percent in 2018/19 and 2019/20 respectively. Besides, the developments in respect of expenditure and revenue performance led to an improvement of the budget balance as a ratio of GDP which improved from -6.9 percent in 2016/17 to -5.4 percent in 2017/18. That is at -5.4 percent to GDP level, the budget deficit remains the threat to the Namibian economy (Republic of Namibia, 2018; and Sakaria, 2019).

It was also part of this study's concern to find out what could be the policies to maximize FDI benefits, so as to enhance the development of the Tanzanian economy. Although the

researchers could not exhaust all the possibilities of suggested policies, the literature review helped to identify the following (Marenga, 2017).

At the strategic level;

Policymakers should ground investment policy on a broad road map for economic growth and sustainable development. In other words, they should define the roles of public, private, domestic and particularly FDI in development strategy. However, at this level, it is also important to develop policies to harness investment for productivity capacity building and to enhance international competitiveness, with critical elements such as human resources, infrastructure, and skills development.

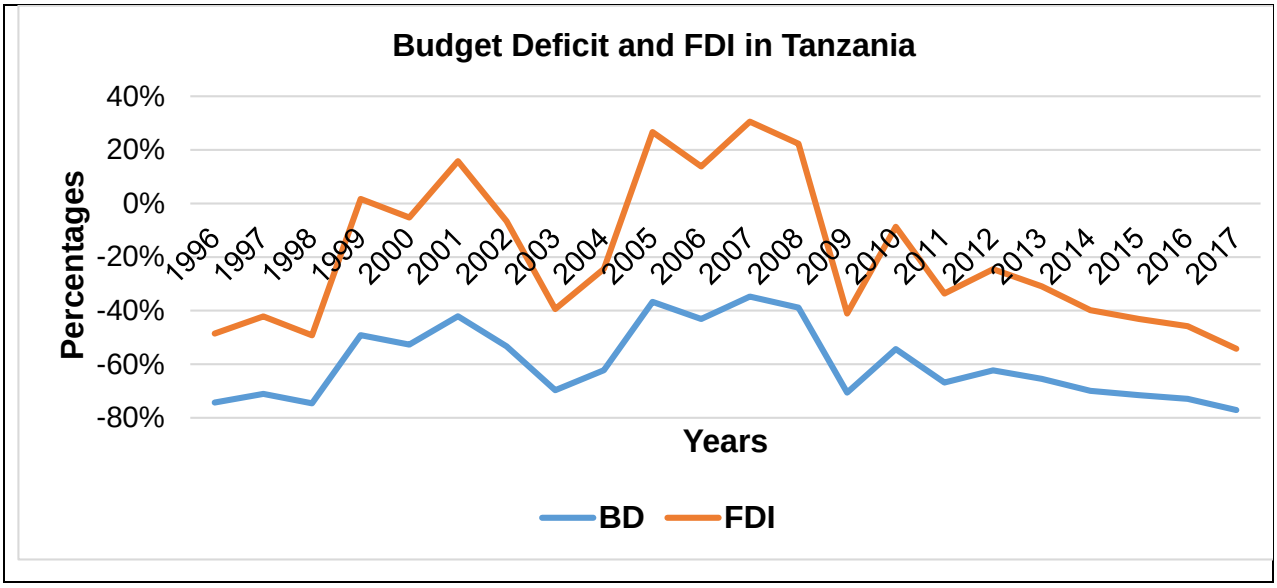
At the normative level;

Through the setting of rules and regulations, policymakers can promote and regulate investment that is geared towards sustainable development goals. Positive development impacts of FDI do not always materialize automatically and FDI can have negative side effects. Reaping the benefits from developments requires regulations covering policy areas beyond investment policies such as trade, competition, taxation, and intellectual property.

At the administrative level,

Through appropriate implementation and institutional mechanisms, policymakers can ensure the continued relevance and effectiveness of investment policies. Measuring policy effectiveness is a critical aspect of investment policymaking. the investment policy should be based on a set of explicitly formulated policy objectives with clear priorities and time frames. A study of foreign direct investment in Namibia ascertained that the presence of other foreign companies in the country will attract other foreign firms to invest (Wilkinson, and Brouthers, 2000). Contrary to prior studies, Blonigen and Davies (2005) suggested that tax is an insignificant policy of foreign direct investment.

Figure 2. 2 Budget deficit and FDI trends in Tanzania (1996 – 2017).



Source: author's own computation using data from the World Bank and SARB.

The budget deficit or budget surplus is one of the most imperative macroeconomic influence that has an impact on economic growth and development (Eminer, 2015). Figure 2.2 shows the trends of the budget deficit and foreign direct investment inflows in Tanzania between 1996-2017. As it is clear from the figure the growth of foreign direct investment in the economy can be summarized with an unstable path. Between 1996-2017, the government of Malawi's budget expenditures has been always higher than budget revenues. But FDI growth rates are more unstable during the same period. In other words, keeping all other things constant, as budget deficit decline, foreign direct investment inflows increases, ceteris paribus (Hussain & Haque, 2016).

2.4.3. South Africa

South Africa's foreign direct investment was estimated to increase by 26301 ZAR billion in the second quarter of 2019 (Brown, 2019). Brown (2019) recommended the government of South Africa that, regardless of its recent credit ratings downgrades, and political risks, the country has made a notable recovery in foreign direct investment (FDI) inflows, foreign direct investment in South Africa averaged 5709.91 ZAR Billion from 1985 until 2019, reaching an all-time high of 52712 ZAR billion in the second quarter of 2001 and a record low of -13910 ZAR billion in the first quarter of 2015 (World Bank, 2019). The country is

currently ranked as an upper-middle-income economy with a government budget deficit equal to 4.40 percent of the country's gross domestic product in 2018 (World Bank, 2019). Policies to maximize foreign direct investment benefits and reduce the budget deficit in South Africa.

2.4.3.1. Public institutions and access to credit

The South African government, in an effort to reposition itself in the world economy, established the Industrial Development Zones (IDZ) program to attract FDI and export of value-added commodities (Department of trade and industry, 2016). In 2007, the policy reviews the new Special Economic Zone (SEZ) Program. The new SEZ Policy provides a clear framework for the development, operations, and management of SEZ's, including addressing challenges of the current IDZ Program (DTI, 2016).

According to Mahembe (2014), South Africa has a number of Bilateral Trade Agreements (BITS) set up to foster and encourage FDI, great budget balance and trade with selected countries, and give some certainty and protection to future relationships. The are several reasons for such circumstance;

- To create favourable conditions for investments and a predictable climate.
- To ensure that investments can only be nationalized or expropriated for national purposes.
- Encourage FDI through clear rules and harmonization.
- Give certainty by being legally binding on S.A.

2.4.3.2. Infrastructure and access to electricity

To create a conducive environment to attract investment, South Africa has to plug its infrastructure investment gap and address economic and population growth between now and 2040 by investing $464 billion (R6 trillion) by 2040 in the water and electricity sectors.

The 2012 national infrastructure plan indicated that the expansion of the infrastructure is also being recognized as an opportunity to attract FDI and facilitate resources effectively (Palmer, Graham, Swilling, Robinson, Eales, Fisher-Jeffes, Kasner & Skeen, 2016). The need for future infrastructure provision was provided by the municipality infrastructure investment framework (MIIF) undertaken in 2010 (Palmer et al., 2016). Thus the quality of

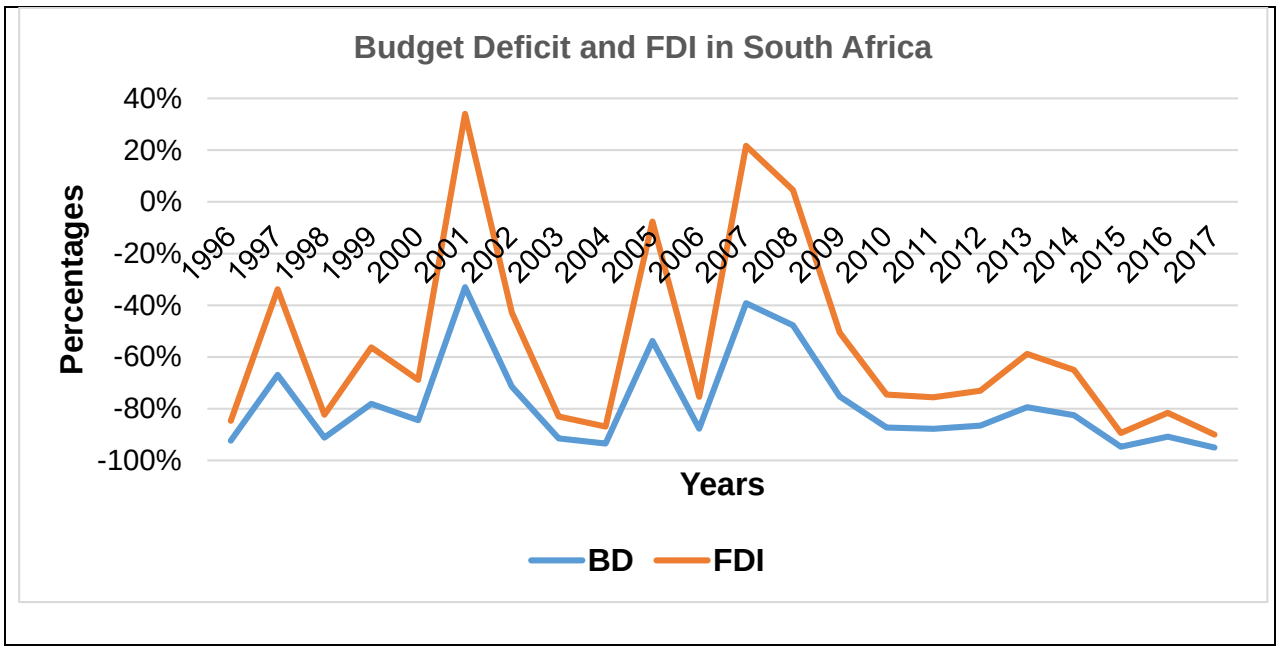
road networks linking South Africa and its major country partner, Lesotho needs to be improved (Munongo, 2017).

2.4.3.3. Macroeconomic policies

South Africa's former trade partner is Lesotho, whereby South Africa supplies around 80 percent of goods and services imported and Lesotho exports a quarter of its exports to South Africa (IMF, 2012). The economy is based on the gold mining industry which constitutes the biggest FDI attraction (Munongo, 2017).

The South African macro-economy started to perform well after 1996 when the government introduced a macroeconomic policy framework called the Growth, Employment and Redistribution (GEAR) strategy to stimulate faster economic growth. The policy encompassed most of the social objectives of the RDP but was also aimed at reducing fiscal deficits, lowering inflation, maintaining exchange rate stability, decreasing barriers to trade and liberalizing capital flows. Under GEAR policy, fiscal deficit, inflation, and government consumption targets were all slightly met, reporting figures of 2.2%, 5.4%, and 18% respectively by the end of 2000, bringing about greater macroeconomic stability, better reporting and increased accountability (Khamfula & Draft, 2004).

Figure 2. 3 Budget deficit and FDI trends in South Africa (1996 – 2017).



Source: author's own computation using data from the World Bank and SARB.

Based on figure 2.2, the highest FDI inflows recorded by South Africa was 38 per cent and 22 per cent in 2001 and 2007 respectively. This was the same period South Africa recorded its first-time budget deficit of 38 per cent and 40 per cent correspondingly. The budget deficits were mainly due to the fact that the main source for the government revenue is a tax but its volume is low as compared to its expenditure (Hassain & Ahmand, 2015). In other words, the South African government actually spent less than it earned. The succulent plums quickly shrivelled under the strain of various factors, including the 2008–2009 global financial crisis. The economy floundered in 2008/09, particularly 2010 sliding into recession for three consecutive quarters. Government revenue fell from 2008 until 2012, mainly underpinned by a fall in tax collected from businesses. Revenue bounced back in 2013, but not enough to lift government out of the red. Since 2007/08, the government has consistently spent more than it earns. The deficit in 2016/17, for example, amounted to R156 billion. It should be noted that a budget deficit is not uncommon across the world and should not automatically be seen in a negative light. Countries generally borrow money to cover financial deficits so that they can provide services to their citizens.

2.4.4. Zambia

On 24 October 1964 Northern Rhodesia (now known as Zambia) gained independence from Britain. This independency came from the country's first president "Kenneth Kaunda" who proclaimed one-party rule at independence (Lynch & Crawford, 2011.). Zambia was rated among the poorest countries in the world with a budget deficit of only 7.50 percent of the country's gross domestic product in 2018.

By 1998 government budget in Zambia averaged to -2.78 percent of a gross domestic product until 2018, reaching an all-time high of 18.30 percent of GDP in 2006 and a record low of -10.50 percent of GDP in 2016 (World Bank, 2018). According to the World Bank (2012) rankings, Botswana is classified as an upper-middle-income country, due to a higher level of foreign direct investment inflows. Foreign Direct Investment in Zambia increased by 426.30 Million in the second quarter of 2019.

According to Duce and Espana (2003), some very general trends of foreign direct investment can be found from various stages: first, even if FDI flows to emerging countries have grown, the bulk of them continue to be directed to industrial countries. Second, the large reduction in FDI flows to emerging countries in the UNCTAD statistics is much milder

in the IMF statistics and is not perceived in the stock data. However, in 1998 FDI in Zambia averaged to 210.07 Million until 2019, reaching an all-time high of 1335.70 Million in the third quarter of 2012 (World Bank, 2018).

The researchers were also interested in finding out the policies which could be allowing the government of Namibia to maximize the benefits of FDI to the local economy. The interest here was to find out why sometime the host country may not feel the benefits of the FDI according to national strategic plans.

2.4.4.1. Global Situation

The state of the supply of foreign direct investment is such that it is primarily attractive in developed countries or high-income economies. For example, according to World Bank (2018) in 1999, the value of foreign direct investment quoted in US Million Dollars in high-income countries was about 727,130 compared to low-income countries with only 9,750.

It should be mentioned also that the distribution of FDI is unequal among low-income countries, particularly in Zambia. It is also the case that even within Africa, the distribution of FDI is uneven, for example, it ranges in value from 1,376 in South Africa to 40 in Cameroon. This situation raises the question" Why should there be so much emphasis on FDI as a way of fostering development, particularly on the part of those countries that have the least share of FDI?'

2.4.4.2. Experience of Zambia

Some other low-income countries have not put in place policies such as mentioned above that attract FDI inflows Or could there be other reasons that might help policymakers to find an explanation for this situation? To answer fully the above question requires in-depth studies. However, the researchers tried to provide some insights by looking at Zambia's experience.

2.4.4.3. Specific Incentives

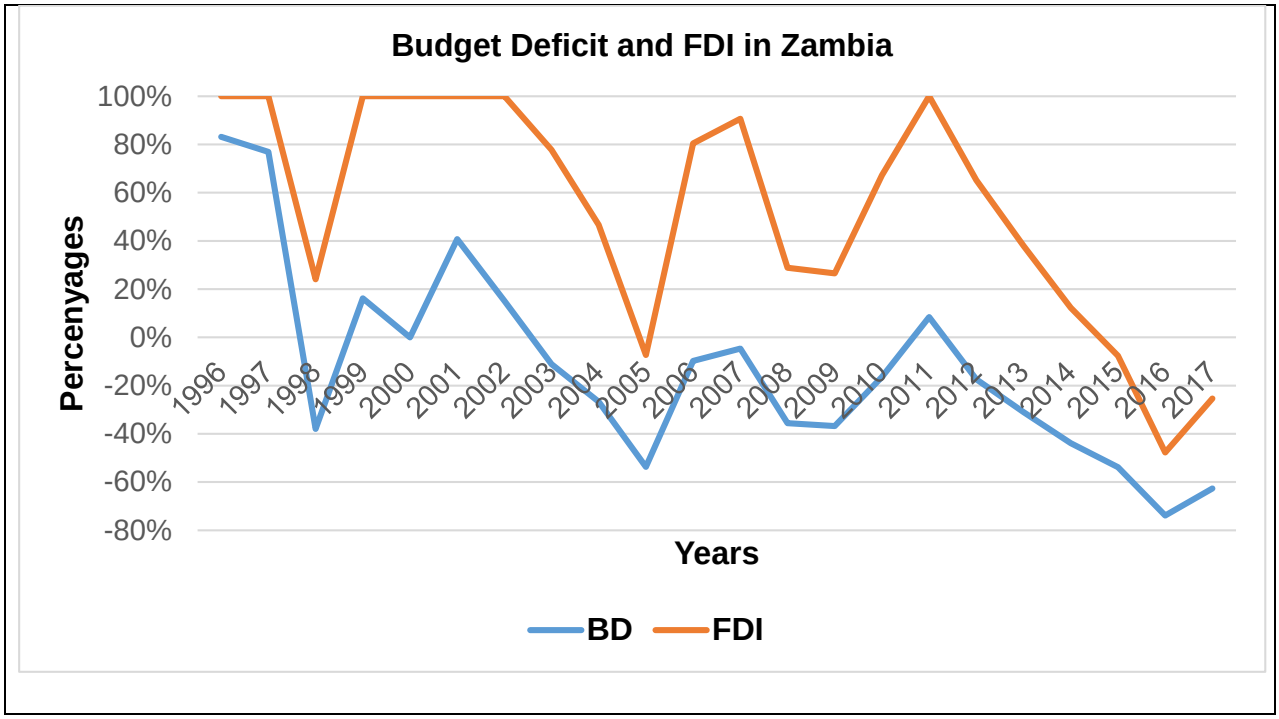
One undeniable fact is that Zambia has not only structurally adjusted its economy as shown above over the past decade, but has also tried to make itself an attractive destination for foreign direct investment by improving the standards of treatment given to foreign firms.

Key to this has been the Zambian Investment Centre played an important role in this by means of making itself a" one-stop-shop."

Other efforts linked to the Investment Centre have involved, for example, investment guarantees under which the Investment Act assures investors that property rights shall be respected and that no investment of any description can be expropriated (UNCTAD, 2018). Have these incentives made a difference in attracting FDI to Zambia? To be honest, it has been difficult to discover exactly what the levels of FDI inflows have been to Zambia, especially with the view to looking at trends over a certain period of time. At the time of gathering information for my research, *only investment pledges were available. Of course, we do not know whether these promises to invest may translate into actual investments or not. This is an area that needs further detailed research.*

According to World Bank (2018), in 1999, the value of FDI in Zambia was 163 Million, compared to Mozambique's 384 Million and Tanzania's 183 Million. Although this does not give a comprehensive picture of the situation over the past years. However, it can be concluded that Mozambique and Tanzania are relatively ahead in attracting FDI as compared to Zambia.

Figure 2. 4 Budget deficit and FDI trends in Zambia (1996 – 2017)



-Source: author's own computation using data from the World Bank and SARB.

According to the World Bank (2010), the increase in Zambian budget surplus and the economic growth from 1996 to 1997 were major factors that exacerbated these twin macroeconomic. Berbe (2015) correctly puts it that "Growth in demand must be accompanied by the same increase on the supply side". Otherwise, the economy will suffer from a supply-demand gap, which creates an opportunity for inflation and demand in imports to meet domestic demand thereby leading to the balance of trade deficit (Berbe, 2015). From figure 2.4 it is clear that between 1996 and 2017 the relationship between foreign direct investment and budget deficit in Zambia is negative. That is, as the economy experience budget deficit, foreign direct investment inflows decline and vice versa. It clearly shows that budget surplus drives foreign direct investment in Zambia. Budget surplus means the government of Zambia is collecting more than it is spending.

2.4.5. Namibia

According to Mahembe (2014), Namibia has been considered as one of the upper-middle-income countries that have experienced significant successes since it gained independence from South Africa in 1990. However, it should be noted that these originated from sound economic management and good governance (Mahembe, 2014; World Bank, 2018). Its government budget deficit equal to 4.40 percent of the country's gross domestic product in 2018. Hence, the government budget in Namibia averaged -2.87 percent of GDP from 2004 until 2018 (World Bank, 2018). The Namibian economy has a strong relationship with South Africa through trade, investment, and common monetary policies.

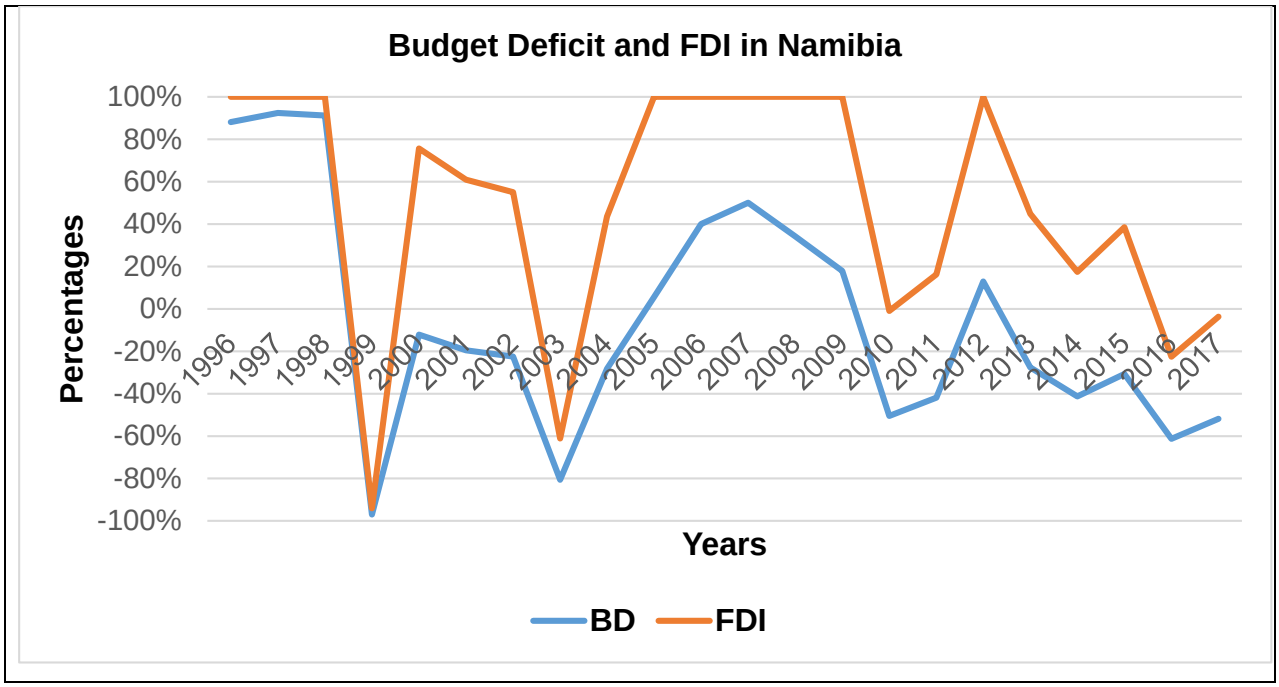
On the other hand, foreign direct investment in Namibia increased by 1829 NAD Million in the first quarter of 2019 (World Bank, 2018). Investor's objective in bringing direct investment is to reap profits (UNCTAD, 2012). There is a significant trend with a flow of foreign direct investment in recent years according to UNCTAD; there are two main ones. First, the amount of foreign direct investment is decreasing in developed countries and moving to develop countries contributing to its increase. As UNCTAD data shows (UNCTAD, 2012), China is now cited as a favourite destination country for investments. The government of Namibia outlined several policies to attract FDI as the major source of economic development. the Namibian Vision 2030, which states that by the year 2030 outlined the country's economic policies and strategic goals during 2030, Namibia should become a "prosperous and industrialized" nation (Government of Namibia, 2018; Mahembe, 2014). Below is a brief discussion of some of the major policies that have been enacted.

According to the government National Development Plans (NDPs), the country's major macro-economic policies follow a five-year planning cycle. The first NDP (NDP1) was adopted in 1995, which focused on the reduction of a budget deficit, reducing poverty creation of employment, increases of technology, and enhancing economic growth (Government of Namibia, 2017).

However, the NDP2 examined the area of increasing the part of employment from 6.4% in 2000 to 20% in 2006 in the manufacturing sector (Government of the Republic of Namibia, 2018). While on the other hand, the NDP3, which was developed in 2008, outlined the importance of improving growth rates, reducing budget deficit against deteriorating unemployment (Government of Namibia, 2017; Mahembe, 2014).

Attracting more foreign investors, the Government of Namibia promulgated the foreign investment act in 1990, which is well-known as the Namibian Investment Centre (NIC). The NIC is accountable for the advancement and enablement of foreign investment in the host country. Secondly, the government recognized incentives called an Export Processing Zone (EPZ) to attract more FDI through the Export Processing Zone Act of 1995 (Rosendahl, 2010; Mahembe, 2014).

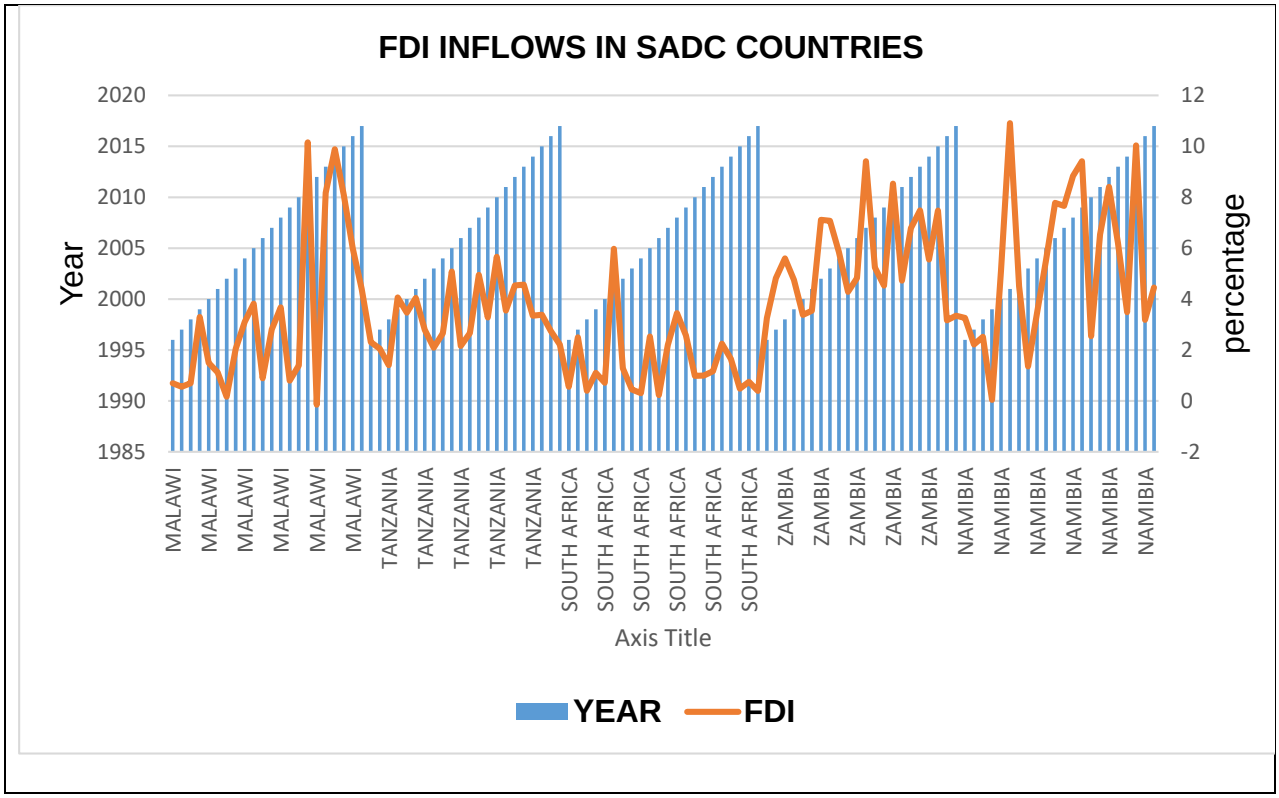
Figure 2. 5 Budget deficit and FDI in Namibia (1996 – 2017)



Source: Author's own computation using data from the World Bank and SARB.

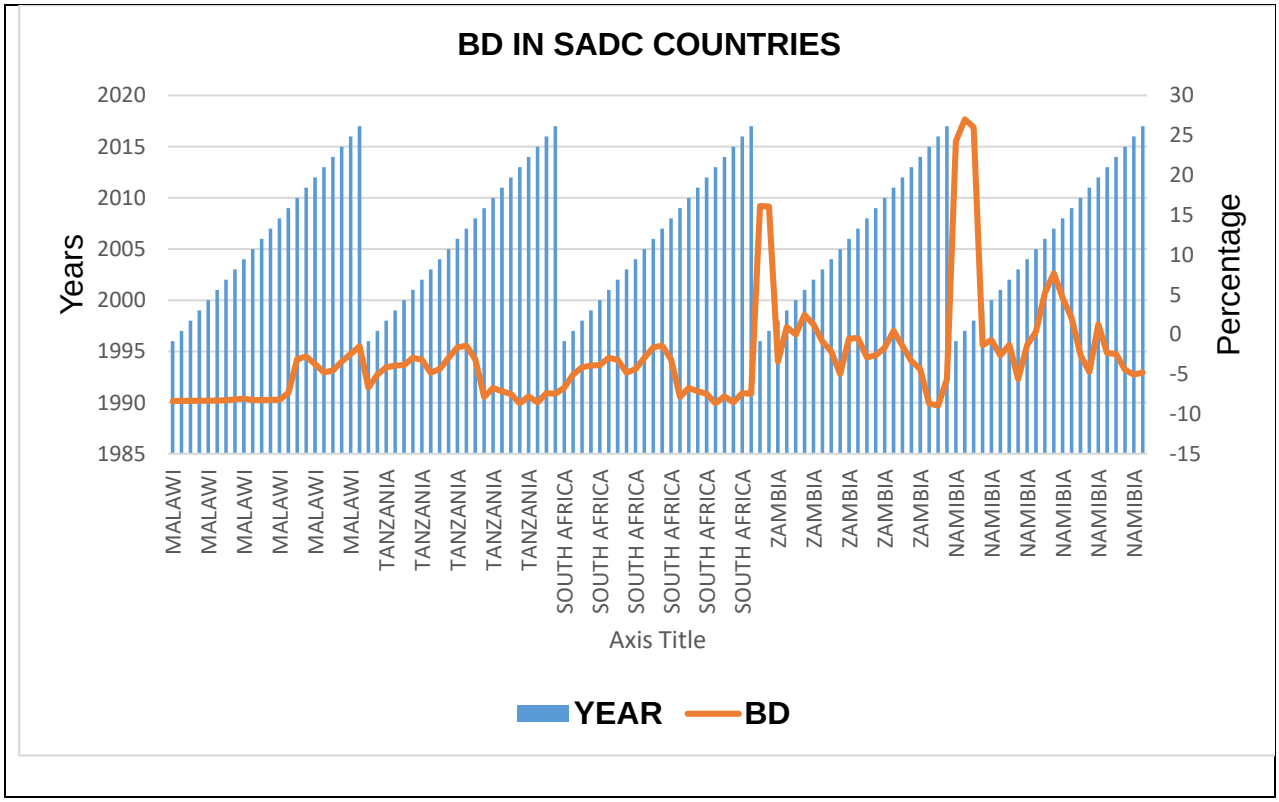
As exemplified by the foreign direct investment inflows trends in Figure 2.5, the country enjoyed the growth of an economy in the years 1996 - 1998, when the economy reaches its peak of budget surplus during 1997 by cumulative. However, the relationship between FDI and budget deficit in Namibia implies that when government budget surplus increases the more foreign direct investment flows in the Namibian country increases. Figure 5 shows that from 1998 to 1999 Namibian country experienced lower FDI inflows because the country experienced a budget deficit. However, as from 1999 until 2002, the country experienced a higher rate of FDI inflows along with a decline budget deficit. This is because the government of Namibia collect more than what its spend. It also invests too much on productive infrastructure, agriculture, human resources as these speed up the development of the country, and other sectors the government spend on, in order to attract more FDI.

Figure 2. 6 **Figure 2.6 FDI INFLOWS IN SADC COUNTRIES (1996 – 2017)**



Based on figure 2.6, a country with the highest FDI growth rate is Namibia with 11 per cent in 2017, followed by Zambia and Malawi with 8.9 per cent and 10.5 per cent in 2014 and 2016. The FDI inflows mainly due to the high size of inflow of capital in Namibia and Malawi. These countries have been putting efforts to attract foreign investors. In short, foreign direct investment means the direct investment of a country to another in the production sector. Foreign direct investment produces a positive impact on the economic growth of the host country as it raises productivity as well as economies of scale. Although South Africa and Tanzania also have a positive FDI inflow towards their economies during the entire period. However, if Tanzania, South Africa, Malawi, Zambia, and Namibia wants FDI to contribute be a significant contributor to economic growth then governments of these countries should focus on improving infrastructure and capital inflows. SADC countries should provide facilities and incentives to foreign investors for the promotion of FDI**.**

Figure 2. 7 Budget Deficit IN SADC COUNTRIES (1996 – 2017)



Based on figure 2.7, the highest budget surplus growth rate recorded by Namibia was 26 per cent and 25 per cent in 1995 and 1996 respectively. This was the same period Zambia's had a first budget surplus of 16 per cent correspondingly. The budget surpluses were mainly due to large savings form debt servicing cost and under-spending by government departments. But both countries (Namibia and Zambia) experienced a continuous deficit since 1998 until 2017, this is due to the governments collecting less than it spends. While on the other hand countries like Malawi, Tanzania, and South Africa discovered a budget deficit during the study period. These countries continue with a budget deficit since the main source of income for their government is a tax but its volume is low as compared to its expenditures. Therefore, the governments of these countries need financial planning known as a budget. Budget can be balance, deficit or surplus (Ahmad, 2015).

2.4. Chapter Summary

This chapter reviewed foreign direct investment and budget deficit dynamics in SADC countries: Case studies. It starts by defining foreign direct investment and budget deficit, followed by the types of FDI. The major findings of this chapter are that there is an inverse relationship between foreign direct investment and budget deficit in all selected SADC countries. As shown in figure 2.1 to 2.5, holding all other things constant, as foreign direct investment increases, budget deficit falls, ceteris paribus. Furthermore, as a common structure of developing countries, particularly SADC countries suffer from a budget deficit which is a threat towards foreign investors and this makes the development and economic growth for SADC countries to below. However, recognising that FDI can contribute to economic growth and development, SADC countries should constantly work on attracting it. Therefore, there is a need for SADC countries to make the investment environment attractive to foreign investors. This chapter outlined conditions that are favourable to attract foreign direct investment because of the negative relationship between budget deficit and FDI.

CHAPTER THREE

LITERATURE REVIEW

3.1. Introduction

This chapter aimed to present the theoretical and empirical literature review on foreign direct investment (FDI) and budget deficit nexus in the SADC region from 1996 to 2017. The chapter conducted an overview of both theoretical and empirical literature and ends with a chapter summary. It starts by section 3.1 that have discussed theories of both budget deficit and FDI respectively, followed by section 3.2 that contained empirical literature on foreign direct investment, budget deficit and macroeconomic variables and lastly, section 3.3 that examined a chapter summary.

3.2. FDI and budget deficit: Theoretical literature review

This section reviewed some theories regarding the relationship between budget deficit and FDI. Firstly, various schools of thought were identified which form part of the theories of a budget deficit. Secondly, theories on the subject of foreign direct investment were reviewed.

3.2.1. Theories of a budget deficit

There are mainly three major schools of thought on a budget deficit that are extremely debatable. These include**;** Neoclassical, Keynesian, and Ricardian's.

3.2.1.1. Neoclassical school of thought

The theory of Solow and Swan (1956) propounded that people have a limited lifetime, generations overlap, and lastly, in all periods there is a balance on the market (Dimand & Spencer, 2009). However, economists, policymakers and scholars such as Istiqomah, Wibowo, Yunianti and Gunawan (2019); Johanse (1988) somewhat questioned that 'what effects do deficits have on the economy'? There are different views based on this question. The neo-classical viewed budget deficit has a negative impact on economic growth. That is, budget deficits have the effect of increasing current consumption by government or consumers, but this is counterbalanced by a fall in investment (Parry, Walls & Harrington, 2007).

Bernhein (1989) is of the view that budget deficits increase the overall consumption or spending by shifting the taxes to future generations. Under this theory, the production created its demand which supports Say's Law of markets. This implies that once the economic resources are fully employed, a reduction in savings may occur due to an increase in consumption. Through its definition, as the level of consumption increases, the level of savings decline. A decline in savings lead to an increase in interest rates, which then leads to a reduction in investment. The occurrence by which budget deficit raises interest rates and drain investment is called crowding out (Parry, Walls & Harrington, 2007). Additionally, one of the axioms of the neoclassical school of thought is the imposition of equilibrium. Thus, to bring equilibrium in capital markets, the interest rate must be increased. By doing so, private capital accumulation should be crowded out by everlasting fiscal deficit. Dritsakis and Stamatiou (2016) suggested that any increase in public expenditures, due to full employment of the economy's capacity and its resources (for example, labour) to produce goods and services, will lead to a reduction of the same amount of private spending.

3.2.1.2. Keynesian school of thought

The theory was advanced by British Economist, John Maynard Keynes (1883–1946), who is viewed as the greatest political economist. The Keynesian macroeconomic theory indicated that budget deficit should be regarded as a means of uplifting the economic status. From Keynesian's point of view, the budget deficit is regarded as negatively related to the unemployment rate, while on the other hand, there is a positive relationship between budget deficit, foreign direct investment and economic growth (Ahmad, 2013). The Keynesian school proceeds chronologically to neoclassical in two fundamental conducts; first, it allows for the possibility that not all economic resources are fully employed. Second, it presumes the existence of a large number of liquidity constrained individuals. However, the second assumption implies that any change in the aggregate consumption depends on a change in disposable income (Berheim, 1989).

Moreover, Eisner (1989) is of the view that this school of thought is the standard theory of budget deficit that households respond towards an increase in current disposable income. This increase in current disposable income, however, may lead to an increase in demand,

which in turn declines the desired national savings. National savings are the sum of the private savings (the after-tax income that households save rather than consume) and public savings (the tax revenue that the government saves rather than spends). Further, this theory recommends that to finance government spending through budget deficit could lower the domestic investments in a country due to the reduction in national savings and increases foreign borrowing. As a result, this reduces the production of domestic firms and destroy the national income in the future. Thus, deficits may essentially encourage aggregate saving and investment, regardless of an increase in interest rates. Besides, a lower interest rate can also chase away the domestic investment, thereby establishing a connection between budget deficit and interest rate (Fischer & Easterly, 1990).

Consumption also contributes towards the gross domestic product of an economy, thus for the government to borrow money in order to finance tax, may stimulate consumer spending. Economists and policymakers have agreed that an increase in consumption may affect the economy in both the short run and the long run. That is, in the short run, an increase in consumer spending may lead to an increase in the production level and a higher level of goods and services demanded, which leads to an increase in employment. Eisner (1989) support the first assumption of the Keynes model.

In Eisner's view, increased consumption is supplied from otherwise unutilized resources because at any given rate of interest, and increased aggregate demand enhances the profitability of private investments, and leads to a higher level of investment. Considering this fact, the national income or gross domestic product increases. Although, in the long run, the tax cut will lead to smaller national savings that would create a greater foreign debt. Therefore, this may result in lower domestic output, and the nation will then owe foreigners a bigger share of that output (Ball & Mankiw, 1995).

3.2.1.3. Ricardian school of thought

The third school of thought on-budget deficit is known as the Ricardian school of thought. Ricardian economics are the economic theories of David Ricardo, an English political Economist born in 1772, but was finally completed by Robert Barcoo. David Ricardo argued that the relationship between budget deficit and interest rate is not yet being shared generally. That is, there is a neutral relation between budget deficit, foreign direct

investment and economic growth (Ahmad, 2013). According to Ricardo budget deficits would not lead to an increase in aggregate demand (Eminer, 2015). These group of the school of thought believes that the argument of Keynesian economies is not correct. Ricardian's view is that even though recent disposable income increases due to a debt-financed tax cut, it also implies that the government will have to raise bonds and taxes in the future to pay off the debt and accumulated interest. According to this perspective, Ricardo believes that a reduced taxes bargains an impermanent income (revenue) for the individual at the present time, which implies that people found out by experience that increased government bond (Arjomand, Emami & Salimi, 2016). The theory suggested that the tax cut has no impact on consumption, thus allowing consumers to save more and be able to pay for liabilities in the near future. In this case, any reduction in current tax must be steady with increase in future taxes since the decrease in taxes may not lead to permanent revenue, households save temporary income with no change to pay the future tax liabilities, in term of savings, caused by current tax cuts (Arjoman et al., 2016).

Several scholars and policymakers (for example, Ahmad, 2010; Arjomand, Emami & Salimi, 2016) are of the view that this type of school of thought argues that tax cut leads to the budget deficit which turns to reduce both public revenue and savings. Though, budget deficit may be financed currently or at a later stage, with a total present value of receipts being equal to the total present value of expenditure. According to Barro (1989), tax cuts arising from deficit-financed may lead to higher future taxes, a decrease in public savings and an increase in private savings which are equivalent to the value of the initial cut. This can be caused by government constraint, which equates total revenues (taxation and borrowing) to total expenditure (interest payment and infrastructure) of the government.
Budget deficit policy implies that the tax cut has no significant impact on consumption as well as savings (Hastings, Bailey, Bramley, Gannon & Watkins, 2015). Saleh and Harvie (2005) are of the view that the implication of Ricardian equivalence is that debt-financed tax cut does not affect consumption and households save additional income to finance the future tax liability that the tax cut implies.

3.2.2. Theories of foreign direct investment

Theories of FDI may be classified under the following headings; Production cycle theory of Vernon, Theory of exchange rates on imperfect capital markets, Internalisation theory, and Eclectic paradigm of dunning theory.

3.2.2.1. Production Life-Cycle Theory

Production life-cycle theory is an economic theory that was propounded by the economist Vernon (1966). The theory was used to explain certain types of foreign direct investment made by U.S. companies after a world war in the manufacturing sector (Vintila, 2010). However, in the manufacturing sector, products often enter and exit the market. According to Vernon, each product has its own length of a product life cycle that starts with its expansion and ends with its weakening. Vernon outlined four stages in a product's life cycle as introduction, growth, maturity, and decline. Furthermore, Vernon outlined that transnational companies first produce an innovative product for the local market and it will become advantageous in possessing the new technology. The first stage implies that once a country has developed the product successfully, it may introduce it internationally. In other words, developed countries like the U.S. and China may create new products for domestic consumers, but also serve foreign markets based on the surplus so as to keep the sales going. While the product grasps new technology and is sold if not exported, it passes to the next stage which is growth.

In this product life stage, the product is in demand, which results in higher profit and lower production costs, ceteris paribus. At this stage, the product becomes more popular, which implies that competitors will sell the market at a lower price to attract many customers.
In the third stage, which is the maturity life cycle stage the competition is extremely high. Therefore, the country that introduces the product will have to protect itself to remain stable as the leader by lowering the price of the product. The promotion costs are very high because consumers are looking for a unique product rather than the old one.

Finally, as a new product will be introduced, the old product becomes unpopular and no longer in demand. Therefore, its sales decline due to innovation. According to Frenkel, Funke and Stadtmann (2004), at this stage of the production cycle, the new product

matures and loses its uniqueness, thus competition from rival firms will become intense. Therefore, producers will start to look for lower-cost foreign destinations.

The theory revealed FDI as a defensive mechanism to preserve a firm's position in the market (Moosa, 2002).

Figure 3. 1 International Production life cycle – Raymond Vernon, 1966.

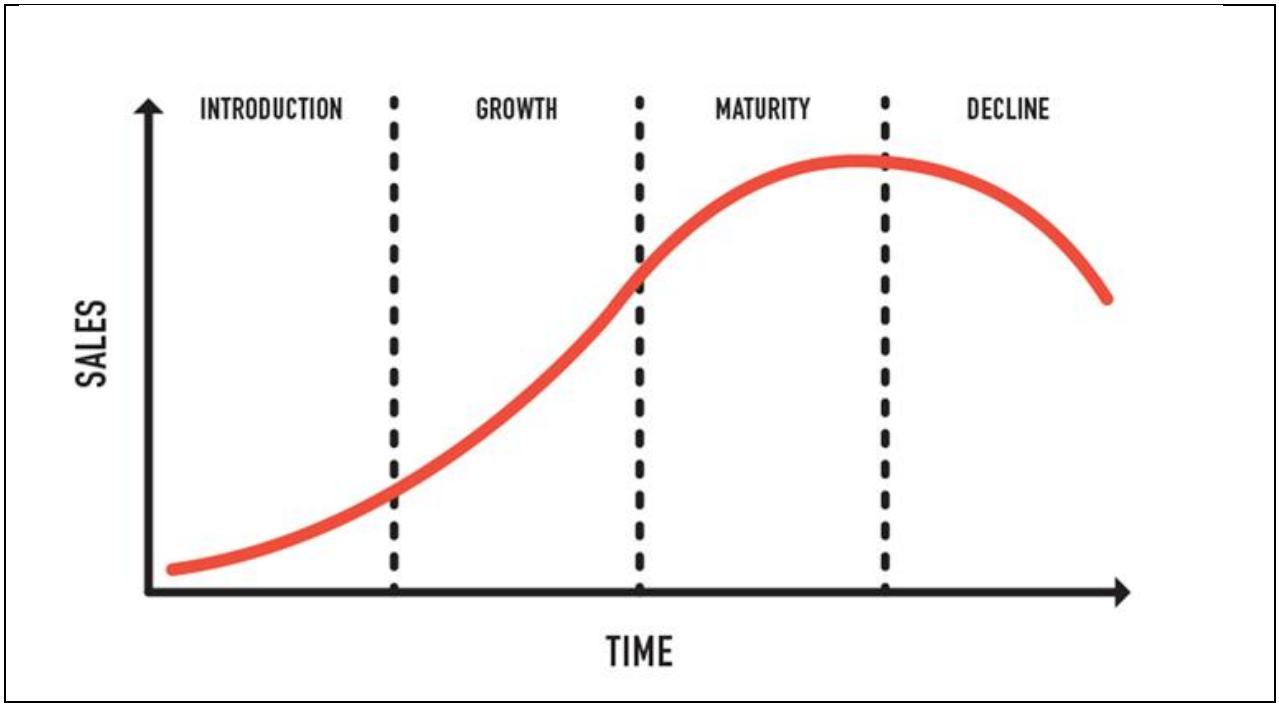


Figure 6 shows the stages that the product goes through when it enters and exits the market.

3.2.2.2. Theory of Exchange Rates on Imperfect Capital Markets.

From the perspective of international trade, this theory is sometimes referred to as the "currency area theory or Capital Market Theory".It is considered as one of the most primitive theories which clarified the FDI. Capital market theory followed modern portfolio theory by Markowitz's portfolio (Rubinsteinein, 2002), an American economist, and a recipient of the 1989 John von Neumann Theory Prize and the 1990 Nobel Memorial Prize in Economic Sciences. The Capital Market theory is a positive theory in that it hypothesis how investors do behave, rather than how investors should behave, as in the case of

Modem Portfolio Theory (MPT). Based on the work of Makoni (2017), it is assumed that foreign investment, in general, arose as a result of capital market imperfections. Solocha, Soskin, and Kasoff (1989) analysed the influence of currency as a factor of FDI initiatives. Moreover, countries with stronger currency have lower FDI attraction ability as compared to countries with a weaker currency. In support of Solocha et al., (1989), the study of Vintila (2010) concluded that currency risk rate theory cannot explain simultaneous foreign direct investment between countries with different currencies.

3.2.2.3. Internalization Theory

This is another theory that tried to explain the concept of foreign direct investment. Early international trade theory was first developed by Adam Smith in 1776. Penghuy (2011) provided additional clarification of FDI by driving the importance of transitional participation and expertise. According to Li and Yao (2010), the focus of the international investment theory was shifted from country-specific towards industry-level and firm-level determinants of FDI. Their theory came to be known as internalization theory.

Based on the theory of international trade, in 1776, Adam Smith argued that, when a trade occurs between two countries, both country A and country B will benefit from trade if each country focuses on producing a product that it has an absolute advantage in. In addition, a country is said to have an absolute advantage on a certain product if it produces that product at a lower cost than the other (Morgan & Katsikeas, 1997).

However, the study by Ruffin (2002) outlined on David Ricardo's discovery of comparative advantage that a country may still gain from trade even if such country experience absolute disadvantage or advantage in both goods. The idea behind Ricardo’s argument was to measure the opportunity cost of producing one product in country A relatively to country B. According to Ruffin (2005), country A will have a comparative advantage on goods that it produces at a lower opportunity cost than country B. Ricardo (1817) is of view that by doing so, national industry productivity will increase, and each country will export goods that they produce at a lower opportunity cost than the other and import those they produce at a higher opportunity cost (Lewis, 1982).

Concerning the development of international trade, Lenin (1977) applied economic theory to explain free competition as the main major of trade liberalization and capitalism (Yang, 2009). Maengando, Angshed and Fluck (2019) are of the view that for-profit maximization, private companies should adopt a strategy of helping foreign markets by means of selling goods or domestic production abroad as a direct investment. In their study, Kyrkilis and Pantelidis (2003) suggested that firms that are unable to compete efficiently in a home country, prompt them to invest in foreign markets, simply because of components such as labour, resources, and market orientation (Morgan & Katsikeas, 1997; Maengando, Angshed & Fluck, 2019). Besides that, Hymer (1960) stated that firms have several different strategies to operate internationally. Furthermore, the main idea behind Hymer's theory was to provide a detailed explanation about foreign direct investment decisions made by domestic firms since such investment may carry a high level of risk and charges with regard to barriers such as economic, and cultural (Lim, 2001).

The internalization theory of the multinational enterprise is a significant intellectual legacy of Ronald Coarse. This means that the internalization theory of foreign direct investment is established by associating gains from foreign direct investment (FDI) and non-FDI modes of expansion. Dunning and Buckley (1977) employed the internalization theory as a factor of his eclectic paradigm or OLI model. However, Dunning (1993) claims that international theory explains the part of FDI inflows only.

3.2.2.4. Eclectic Paradigm of Dunning

This is probably the best – known theory of FDI to researchers and policymakers alike. The eclectic paradigm, also known as the OLI Model or OLI Framework was developed by professor Dunning in 1979. According to this theory, in order for the firm to engage in its foreign production, it must simultaneously fulfil OLI paradigm conditions, which presents why (Ownership advantage), where (Location advantage) and how (internalization advantage) (Buckley & Casson, 2010). Firstly, the firm must have a greater competitive advantage in investing amongst other firms ('O' ownership advantage). Hence, for a firm to become multinational, Dunning claimed that it must be in possession of ownership advantages. These ownership advantages are the possessions, competences or the specific remunerations of the firm. This refers to both tangible and intangible assets

(trademarks, information, and technology as well as patents), which would result in either higher incomes or lower production costs for the firm (Denisia, 2010; Dunning, 1973, 1977, 1980).

Secondly, once the first condition is fulfilled, a firm must have location advantages. In other words, it must possess the ownership advantages which may enable it to use them for itself (internalization), instead of selling or renting them to foreign firms (externalization). Countries differ in terms of location advantages. Therefore, the specific advantages of each country can be divided into three categories namely; political advantages, economic benefits, and social advantages (Vintila, 2010). Finally, the last condition is represented by "I" from Internalisation. It possesses a framework for assessing different ways in which the company can organize creation and exploitation for their competencies. Supposing that the preceding conditions are both met, it must be profitable for the firm to make use of these advantages by considering other factors its origin country (Dunning, 1973,1980; Patricia, 2015; and Hymer, 1976).

According to Vintila (2010), the eclectic paradigm of Dunning's theory showed that OLI parameters are not the same in different companies. Furthermore, Dunning (1993) outlined four types of investment motivations of FDI, namely; resource-seeking, market-seeking, efficiency-seeking, and strategic asset-seeking. These motivations are all built upon the OLI paradigm explained above cultural (Gostas, Escobar & Fanbasten, 2016).

3.3. Empirical review on the causality between FDI and budget deficit.

The investigation of the relationship and link between FDI and budget deficit has been the subject of numerous empirical studies with most of them studying macroeconomic variables relationship with a budget deficit. Empirical works of literature on FDI and budget deficit nexus are summarized below by their methodologies, nature of data, findings, and conclusions arrived at by other researchers and scholars. The arrangement is divided into three categories; time series, cross-sectional, and panel data studies, respectively.

3.3.1. The impact of foreign direct investment on-budget deficit

The effect of foreign direct investment on the budget deficit and economic growth is a controversial and long-standing topic in empirical research and towards policy-making (Majeed & Najid, 2015). Hence, on the relationship between FDI, budget deficit and other related macro-economic variables in general, a wide range of empirical studies have been carried out by different authors and obtained various results (see; Qaiser, Abbas, Nasir, Ullah & Muhammad, 2011; Sandalcilar & Altiner, 2012; Alfaro, Chanda, Kalemli-Ozcan & Sayek, 2004).

In demonstrating the above, Kesavarajah (2017) examined the effects of fiscal deficit on economic growth for five South Asian countries, namely Bangladesh, India, Nepal, Pakistan, and Sri Lanka. He used annual data for the period of 1980 – 2014 and employed Vector Auto-regression (VAR) for his analysis. He found that fiscal deficit has a negative impact on economic growth in the selected South Asian countries except for Nepal, which confirmed the positive impact on economic growth. He suggested a balanced budget for the economic growth of the selected South Asian countries except for Nepal. Fatima, Ahmed and Rehman (2012) also found a negative relation between budget deficit and economic growth in Malaysia. However, the authors concluded that some policies are suggested for the government to avoid certain levels of the budget deficit to achieve the desired level of growth. Likewise, Eminer (2015), with the help of a presentation of unit root tests, autoregressive distributed lag approach (ARDL) and using time series secondary data of budget deficit and output growth in North Cyprus for the period of 28 years (1983-2010), found out that budget deficit is negatively associated with per capita growth in Pakistan. Furthermore, the study showed that this negative relationship occurs because the government's resources are not enough to meet its expenses in the long run.

Saleh and Harvie (2005) also found no relation between budget deficit and economic growth in Pakistan, while Hussain and Haque (2017) concluded by saying that there is no definitive conclusion as to whether fiscal deficit helps or hinders economic growth for any country. Hussain and Haque (2017) suggested that fiscal deficit leads to the economic growth of a country, which cannot be achieved only through domestic savings, not enough for investment. Rahman (2012) used the ARDL approach to analyse the long-run relationship between budget deficit and economic growth in Malaysia. By using quarterly

data from 2000 to 2011, she found that there is no long-run relationship between budget deficit and economic growth of Malaysia, consistent with the Ricardian equivalence hypothesis. She further suggested that a shock in the Malaysian economy can be controlled if the government implements the changes in GDP and productive expenditures to converge the economy to its equilibrium.

In support of the above, Nayab (2015) found that gross domestic product (GDP) causes investments, and investment cause a deficit in Pakistan. The results also supported the Keynesian view concerning budget deficit, that budget deficit has a positive impact on the growth. Ghali (1997) found no consistent evidence that government spending can increase Saudi Arabia's per capita output growth. He suggested that a fiscal policy aiming the control of the budget deficit in Saudi Arabia has to consider shrinking the size of the government and limiting its role in the economy. Molefe and Maredaza (2017) found a negative relationship between budget deficit and economic growth in South Africa. The authors concluded that higher levels of budget deficit have detrimental effects on the growth of the South African economy. Dao (2013) found a negative but insignificant relationship between budget deficit and economic growth in Vietnam, which corresponds to the Ricardian equivalence theory of no relationship between these two variables. He recommended that the government should be really cautious in every spending decision in order to promote public investments' efficiency, thus contribute to foster economic growth. Furthermore, he found that the differences in classifying budget deficit create different short-run Granger causality among the variables.

This results agree with Rahman's paper (2012) for Malaysia and is relevant to macroeconomic theories. Keho (2010) used the Granger causality test developed by Toda and Yamamoto (1995) to examine the causal relationship between budget deficit and economic growth in the member countries of the West African Economic and Monetary Union. His findings showed mixed results. That is, in three cases, no causality was found between budget deficit and growth. However, in the remaining four countries, deficits have adverse effects on economic growth. Risti, Nicolaescu, and Tagaduan (1989) used ordinary least squares estimation, vector error correction model, and granger causality test. Their findings suggested that positive economic growth generates additional public resources and eliminate the threat of budget deficit.

Ghosh Roy and Van den Berg (2009) conducted research on how to budget deficit affects economic growth in the U.S. for the time period of 1973 to 2004. They applied a simultaneous equation and found ambiguous results. The authors concluded that budget deficits slow economic growth while on the other hand, twin current account deficit increases economic growth, ceteris paribus. Van and Sudhipongpracha (2015) explored the relationship between government budget deficit and economic growth for Vietnam's Economic Miracle. The findings demonstrate that in the case of Vietnam, government deficits had no direct effects on the country's economic productivity between 1989 and 2011. Furthermore, they discovered that foreign direct investment (FDI) played an important role in Vietnam's economic productivity over the same period, while real interest rates adversely affect growth. However, they suggested that rather than an expansion of the public sector through government spending deficit, Vietnam requires administrative and regulatory reforms to expand its growth.

Reviewing existing literature with regards to the relationship between budget deficits, foreign direct investment and economic growth remain a vast challenge. However, the result of Fatima, Ahmed and Rehman (2012); Kesavarajah (2017); Dao (2013) contradicts with that of fewer researchers including, Thirunavukkarasu and Achchuthan (2013); Murwirapachena, Maredza and Choga (2013), as well as Ramzan, Saleem and Butt, (2013), who found a positive relationship between budget deficit and economic growth in Kenya. Both researchers suggested that fiscal deficit can increase economic growth as the resources are expended towards providing infrastructure, education, and health.

Nayab (2015) also found that the budget deficit has a positive impact on economic growth in Pakistan. The results showed that GDP causes investment and this causes a deficit. However, a budget deficit does not cause GDP growth. The results of this study also support the Keynesian view about the budget deficit. In support, Martin, Igor, and Zuzana (2015) also examined the impact of the deficit creation on the economic growth: an empirical analysis for EU 14 countries. Their findings suggested that deficit decreasing by the changes in debt service has the strongest positive effect among all estimates. The results further revealed that every expenditure cut other than the public investment is recommended.

Al-Qudah and Jaradat (2018) investigated the impact of economic growth and external debt on-budget deficit in Jordan for the period (1993-2017). They used the unit root test, autoregressive distributive lag (ARDL) approach and bound test to determine the relationship. They found that the budget deficit lags (1,2) have a positive and significant impact on the current budget deficit while external debt lags (2, 3) have a negative significant impact on the budget deficit in Jordan. Samirkaş (2014) used the VAR model in their study to analyse the effects of budget deficits on current account deficit, inflation and economic growth in Turkey. The result showed that a casual correlation was found between budget deficits and interest rates and the direction of such correlation was from interest rate toward budget deficits.

Numerous research studies have been conducted to verify the impact of FDI on Economic Growth in different countries. All studies done have come with different results thereof. Tsaurai and Odhiambo (2012) examined the dynamic causal relationship between foreign direct investment (FDI) and economic growth in Zimbabwe. By using the modern time-series techniques and ARDL-bounds testing approach they found that there is a distinct causal flow from economic growth to FDI in Zimbabwe. They recommended that Zimbabwe should pursue pro-growth strategies, in order to promote foreign direct investment. In the case of Pakistan, Iqbal, Ahmad, Haider and Anwar (2014) found a positive relationship between FDI and GDP in Pakistan. They concluded that FDI impact may be situation and culture related. So, the extent of FDI economic benefits cannot be predicted. Ayanwale (2007) found that FDI in Nigeria contributes positively to economic growth. He suggested that the determinants of FDI in Nigeria are market size, infrastructure development, and stable macroeconomic policy. Openness to trade and available human capital, however, are not FDI inducing.

Seyoum, Wu and Lin (2015) examined the Granger causal link between foreign direct investment (FDI) and economic growth for 23 African countries. They found a two-way Granger causality link between FDI and economic growth. Furthermore, they observed unidirectional causality from FDI to GDP growth in Egypt, Gabon, and Mauritania, and from GDP growth to FDI in Coˆted'Ivoire, Kenya, South Africa, and Zambia. Chakraborty and Nunnenkamp (2008) found that FDI in the services sector appears to have promoted growth in the manufacturing sector through cross-sector spillovers. Dwivedi and Badge (2013) tried to find how FDI inflow affects gross domestic product (GDP) especially in the

service sector in India. They applied a statistical model over the period of 2000 – 2012. Their analysis has revealed that foreign direct investment has a positive and significant impact on GDP.

Ahmad (2013) found bi-directional causal links from FDI to gross domestic product and also from gross domestic product to budget deficit. The analysis showed that FDI has a positive effect on economic growth in Pakistan. His study was based on co-integration tests and Granger causality analysis over the period of 1971 - 2007. In his study, Anitha (2015) examined the relationship between FDI and economic growth in India for a period of five years from 2010 to 2014 using an autoregressive integrated moving average (ARIMA) forecasting technique. The result recommended remedial measures to increase the flow of FDI in India with that of other developing nations in the world. In support of the above, Basu, Chakraborty and Reagle (2003) found a long-run co-integrating relationship between FDI and economic growth after allowing for heterogeneous country effects. Further, the results showed a bidirectional causality between economic growth and FDI, implying that, FDI has driven economic growth and economic growth has driven FDI.

Emphasizing the view of Chakraborty and Reagle (2003); Chakraborty and Mukherjee (2012) found a unidirectional causality from India's economic growth to FDI and from FDI to domestic investment raises important policy implications. They suggested that higher FDI inflow in India in recent periods can be argued to be facilitated by the relatively stable GDP growth rate, which in turn acted as a major boost towards a sustainable high domestic investment. Ray (2012) investigated the role of foreign direct investment (FDI) in India's economic development from 1990 to 2010. He used the granger causality test, which revealed the presence of unidirectional causality that runs from economic growth to foreign direct investment. The study found the existence of a long-run relationship between the variables. In support, Abbes, Mostefa, Seghir and Zakarya (2015) used co-integration and panel Granger causality tests to analyze the relationship between foreign direct investment and economic growth in 65 countries. The authors have discovered unidirectional causality from FDI to economic growth, which could be a good tool to prioritize the allocation of resources across sectors to promote foreign direct investment. By using the VAR impulse responses and the granger causality test, Almfraji, Almsafir and Yao (2014) found that the FDI inflows and the economic growth in Qatar interact with each other in a relatively long term. The study used time-series data selected from 1990 to 2010.

Khaliq and Noy (2007) investigated the impact of foreign direct investment (FDI) on economic growth using detailed sectoral data for FDI inflows to Indonesia over the period 1997-2006. They found that the composition of FDI matters for its effect on economic growth with very few sectors showing a positive impact of FDI. Nasreenn and Anwar (2014) examined the role of local financial markets by attempting to find any causality between foreign direct investment (FDI) and economic growth in Pakistan. The study used Johansen and Juselius co-integration technique and Toda-Yamamoto causality analysis for the period 1973 - 2011. The evidence obtained suggested that FDI has a positive impact on growth and concluded that FDI can play a contributing role in promoting economic growth in Pakistan. Moreover, another study was done by Keshava (2008) on the effect of FDI on India and the Chinese economy: The objective for the study was to estimate the effect of FDI on economic growth during the period 1970 to 2002. They found that a 1 percent increase in FDI leads to an increase in GDP by all most 0.5 percent. Yet again a 1% increase in FDI brings about an increase in GDP by 0.12 percent. Louzi and Abadi (2011) foreign direct investment inflows do not exert an independent influence on economic growth in Jordan. They further concluded that the government of Jordan should attract FDI for development, and an appropriate policy mix is necessary to be taken in the future.

Sundari (2012) examined causality between foreign direct investment and economic growth in India for the years 1995 to 2013. They employed a Granger causality test to estimate the long-run equilibrium relationship among the variables. The Granger causality test revealed a unidirectional causality from GDP to FDI, which indicates that there was a significant causality from GDP to FDI in India. While Cicak and Soric (2015) analyzed the interrelationship of FDI and GDP in European Transition Countries using Granger causality. They found that FDI Granger causes GDP growth in most countries. Moudatsou and Kyrkilis (2011) investigated the causal-order between inward FDI and economic growth using a panel data set for two different Economic Associations that is EU (European Union) and ASEAN (Association of South Eastern Asian Nations) over the period 1970-2003. Based on the research conducted, regarding the EU countries the results support the hypothesis of GDP -FDI causality (growth driven FDI) in the panel. On the other hand, concerning the ASEAN, there is a two-way causality between GDP per capita and FDI like

the cases of Indonesia and Thailand. In the cases of Singapore and the Philippines, however, FDI is motivated by the host country's GDP growth.

Zeren and Ari (2013) investigated the causality relationship between trade openness and economic growth for the G7 countries between 1970 and 2011 using the Granger non-causality test in heterogeneous panels. The empirical results showed that there is a bidirectional causality relationship. Thus, as openness increases, growth increases in the G7 countries and, subsequently, the increase in growth increases openness. Moreover, Alkhasawneh (2013) examined the study on" The Granger Causality Relationship between Foreign Direct Investment (FDI) and Economic Development in the State of Qatar". The main objective of the study was to investigate the causality relationship between the inflows of foreign direct investment and economic development in the State of Qatar during the period 1970 - 2010. The causality test indicated that there is a bidirectional causality from FDI to economic growth. Ahmed and Rahman (2017) investigated the relationship between budget deficits and different macroeconomic indicators in Bangladesh. The results showed that GDP, sector-wise shares of the industry in GDP, investments and savings have a significant relationship with a budget deficit, but exchange rate fluctuation is not influenced significantly by the budget deficit.

Maitah and Hodrab (2015) strongly opposed the proposition of the existence of the positive relationship between FDI and economic growth in Palestinian. They argued that FDI has a negative impact on the Palestinian's economic growth. Oladipo and Akinbobola (2011) applied the Granger causality pairwise test on the dataset of Nigeria for the time period of 1970 to 2005. The study concluded that there was no causal relationship from inflation to the budget deficit. However, the causal relationship from a budget deficit to inflation was significant.

Erkam and Çetinkaya (2014) studied budget deficit and inflation data of Turkey and questioned the causality between the budget deficit and inflation for two sub-periods namely, (1987:M1-2003: M6) and (2005:M1-2013: M6). In this study, the researchers employed Granger-causality tests to explain the causality relationship between budget deficit and inflation. The results suggested that a positive significant causality running from budget deficits to the inflation rate during the high inflation period (1987:M1-2003: M6). However, this causal relationship disappears during the low inflation in a period (2005:M1-

2013: M6). Ehinomen and Ugwu (2017) examined the relationship between budget deficit, inflation and money supply growth in Nigeria. In their study, the 1970 – 2014 period was analyzed using Vector Auto-regression (VAR) specification and Johansen co-integration test procedure. The analysis suggested that inflation has a positive sign, while M1growth has a negative sign. Moreover, the response of deficit to M1growth indicates a negative shock with no significant effect and continued with the sign to positive shock at a later horizon. In addition to Ehinomen and Ugwu (2017), recent research carried out by Saeidi and Valizadeh (1995), has clearly classified that budget deficit has a meaningful effect on inflation and unemployment in Iran's economy. The study used OLS, and LS square minimum methods based on Iran's Economy for the time period 1979 to 2006. Garcia and Ramajo (2004) investigated the link between budget deficit and interest rates for the Spanish economy using annual data for the period 1964 - 2000. The study employed the model of demand and supply of total savings. The analysis suggested that budget deficits does not appear to increase long-run nominal interest rates during the sample period.

In the context of Pakistan, Mukhtar and Zakaria (2008) found that budget deficits do not have a significant effect on nominal interest rates, on the other hand, the budget deficit to economic growth ratio has a significant positive impact on nominal interest rates. These findings, however, imply the presence of the Ricardian, which says there is a neutral relation between budget deficit and economic growth. Mukhtar and Zakaria (2008) are of the view that Ricardian deficit neutrality exists in Pakistan since the budget deficit-GDP ratio has a significant positive impact on nominal interest rates. The study used Granger causality tests on the dataset of Pakistan for the time period of 1960 to 2005.

Table 3. 1 Summary of the above Literature on Budget Deficit and FDI

AUTHOR(S)	COUNTRY(S) COVERED	PERIOD	METHODOLOGY	RESULT
Ravinthirakumaran and Kesavarajah	Five selected South Asian countries	1980 - 2014	Vector Autoregression (VAR), co-integration analysis, error correction modelling and Granger causality test	A negative relationship between fiscal deficit and economic growth in all selected countries except Nepal.
Fatima, Ahmed, and Rehman	Pakistan	1978-2009	Regression analysis	The negative impact of budget deficit on economic growth
Atrayee and Hendrik	United State	1973-2004	Simultaneous equation	The ambiguous relationship between budget deficits and economic growth.
Kunofiwa and Nicholas	Zimbabwe	1980-2010	ARDL-bounds testing approach	Zimbabwe should pursue pro-growth strategies, in order to promote

				foreign direct investment.
Hussain and Ahmad	Pakistan	1971-2007	Co-integration tests and Granger causality analysis	FDI has a positive effect on economic growth in Pakistan.
Ramar and Masoor		1995-2011	Least square method	FDI has a negative impact on the Palestinian's economic growth.
Basem and Abeer	Jordan	1990-2009	Co-integration and error correction mechanism	FDI inflows do not exert an independent influence on economic growth.
Nur Hayati	Malaysia	2000-2011	Autoregressive distributed lag (ARDL) approach	Is no long-run relationship between budget deficit and economic growth
Humera	Pakistan	1976 - 2007	Cointegration technique, VAR Granger Causality test, and vector error correction model	The budget deficit has a Positive Impact on the growth
Keho	Six countries of the West	1980 - 2005	Granger causality test	No causality between

	African Economic and Monetary Union			budget deficit and economic growth in three countries.
Molefe and Maredaza	South Africa	1985 - 2015	Vector Error Correction Modelling (VECM)	Budget deficit and economic growth are inversely related.
Fehiman	North Cyprus	1983 - 2010	Autoregressive Distributed Lag approach (ARDL)	The budget deficit is negatively associated with per capita growth.
Samia and Sofia	Pakistan	1973 - 2011	Johansen and Juselius co-integration technique and Toda-Yamamoto causality analysis	A positive effect of FDI on growth
Oladipo and Akinbobola	Nigeria	1970 - 2005	Granger Causality pairwise test	No causal relationship from inflation to a budget deficit, while the causal relationship from budget deficit to inflation was significant.

Serkan and Murat	Turkey	(1987:M1-2003: M6) and (2005:M1-2013: M6).	Granger Causality test	Positive significant causality from budget deficits to the inflation rate during the period (1987:M1-2003: M6). However, this causal relationship disappears during the period (2005:M1-2013: M6).
Parviz and Younes	Iran	1979 - 2006	OLS and LS square minimum methods	The budget deficit has a meaningful effect on inflation and unemployment in Iran economy
Christopher and Ephraim	Nigeria	1970 - 2014	Vector Autoregression (VAR) specification and Johansen cointegration test	Inflation has a positive sign while M1growth has a negative sign
Tahir and Muhammad	Pakistan	1960 - 2005	Granger causality test	The budget deficit-GDP

				ratio has a significant positive impact on nominal interest rates.
Agustin and Julian	Spanish	1964 - 2000	Demand and supply of total savings	Budget deficits did not appear to raise long-run nominal interest rates

3.3.2. The long and short-run relationship between FDI and budget deficit in the SADC region.

Alfaro, Chanda, Ozcan and Sayek (2004) analyzed the impact of FDI on economic growth for developed countries. According to their analysis, it was found that countries with well-developed financial markets gain significantly from FDI, due to (a) holding the extent of foreign presence constant, financially well-developed economies experience growth rates; (b) Higher additional growth in financially developed economies compared to those observed in financially under-developed ones occurs due to an increases in the share of FDI, and (c) As for the effect of FDI on economic growth, other local conditions such as market structure and human capital are also important. Amritkant and Amba (2017) investigated the relationship between FDI, employment and economic growth of the BRICS nations. The study was conducted for the period of 2000 to 2015. The authors had applied the correlation impact of FDI on the growth rate. In their research, it was found that FDI has a positive impact on the growth rate in Brazil and China rest BRICS nations. They reach in conclusion that, economic activity and employment increase due to foreign direct investment.

Adi and Allan (2008) investigated how budget deficits and economic growth affect re-election prospects in a sample of 74 countries over the period 1960-2003. According to their research conclusion, they found that in developed countries and old democracies, election-year deficits actually reduce the probability that a leader is re-elected. On the other

hand, higher growth rates of real GDP per-capita raise the probability of re-election only in the less developed countries and in new democracies.

Table 3. 2 Summary of the above selected empirical literature

AUTHOR(S)	COUNTRY(S)	PERIOD	METHODOLOGY	RESULT
Laura, Areendam, Sebnem, and Selin	71 countries	1975-1995	Ordinary Least Square Method	Countries with well-developed financial markets gain significantly from FDI
Amritkant and Amba	Five BRICS nations	2000 - 2015	Correlation analysis	FDI has a positive impact on the growth rate in Brazil and China's rest BRICS nations FDI do have any significant positive impact on growth.
Adi and Allan	74 countries	1960-2003	Narrow sample	In developed countries and in old democracies, election-year deficits actually reduce the

				probability that a leader is re-elected.

3.3.3. The causal relationship between FDI and budget deficit in SADC.

Adams (2009) used OLS and fixed effects estimation to examine the impact of FDI on economic growth in the context of developing countries, and particularly Sub-Saharan Africa over the period 1990-2003. The analysis suggested that FDI exerts a significant positive effect on economic growth by augmenting domestic capital and enhancing efficiency. In support of Adams (2009), Luu, Trinh and Vu (2017) found that inward have a strong positive impact on economic growth, while at the same time, greater growth could help the country to attract additional FDI capital in Vietnam over the five-year post-crisis period of 2010-2014. The study employed the two-step system generalized method of moment (GMM), estimator. Sandalcilar and Altiner (2012) were concerned about to investigate the causality relationship between FDI inflow and GDP in the region of Economic Cooperation Organization (ECO). The study was conducted for the period of 1995-2011. The researcher had applied the Granger causality test based on Error Correction Model. In their research, the results showed that a strong positive causality from FDI to GDP and a slightly less positive causality from GDP to FDI in the ECO region have been detected. Nobakht and Madani (2014) used data evidence from 33 Upper-Middle-income Countries (UMCs) over the period of 1990–2011. The study applied the General Method of Moment and found a negative effect of trade openness on FDI spillovers.

Nikolaos and Pavlos (2016) mainly focused on investigating the causal link between Budget Deficit, Economic Growth and foreign direct investment in Baltics over the period 1995-2012. According to their research conclusion, they found a positive and significant long-run relationship between foreign direct investment and economic growth in Baltic countries. Further, the analysis indicated a unidirectional causal relationship from budget deficit to economic growth. Catao and Terrones (2005) investigated the relationship between fiscal deficit and inflation including 107 countries. They did their study through literature survey 1960-2001. The study used panel techniques (fixed and random effects)

that explicitly distinguish between short and long-run effects of fiscal deficits. The results showed that there is a strong positive relationship between fiscal deficits and inflation.

Serdar, Guneş and Davasligil (2012) examined the effects of the global financial crisis on-budget deficits in European countries covering the 1998-2008 period. The study formed a crisis dummy to determine the effect of the crisis. The results confirmed that total government revenue and inflation have a positive effect on the budget balance. Bose, Haque and Osborn (2007) investigated the growth effects of government expenditure for a panel of 30 developing countries over the 1970s and 1980s. This study found two fold results; firstly, the share of government capital expenditure in GDP is positively and significantly correlated with economic growth, but current expenditure is insignificant. Secondly, they found that at the disaggregated level, government investment in education and total expenditures in education are the only outlays that are significantly associated with growth once the budget constraint and omitted variables are taken into consideration.

Afonso and Jalles (2014) investigated the relationship between budget deficit and economic growth, using panel data over the period 1970-2008. Their results revealed that governments have increased primary balances when facing higher government indebtedness, which follows the Ricardian fiscal regime, while primary balances have improved to reduce government debt. They used the single regression panel analysis and for the panel VAR. Miteza (2012) assessed the presence of a causal relationship and the impact of budget deficits and investment spending on current account deficits using data for 20 OECD countries for the 1974-2008 period. The analysis adopts the Granger causality technique to a panel data framework. The results showed that the presence of a causal relationship between budget deficits and current account deficits as well as between investment and current account deficits. Further, the analysis suggested that growing budget deficits lead to higher current account deficits, especially in the short-term. Moreover, Brender and Drazen (2008) among others, have concentrated on the relationship between budget deficit and economic growth. Some of these studies, such as Ahmed and Rahman (2017) argue that the absence of a positive electoral effect of deficits can be consistent with the political deficit cycle found in new democracies.

Table 3. 3 Summary of the above selected empirical literature

AUTHOR(S)	COUNTRY(S)	PERIOD	METHODOLOGY	RESULT
Samuel	Sub-Saharan Africa	1990-2003	OLS and fixed effects estimation,	FDI has an initial negative effect on DI and DI is positive and significantly correlated with economic growth
Hiep, Nam, and Vu	Vietnam	2010-2014	Simultaneous Equations Approach, employing the two-step system generalized method of moment (GMM) estimator.	FDI has a strong positive impact on economic growth
Nikolaos and Pavlos	Baltics	1995-2012	Vector Error Correction Model	Unidirectional causal relationship from FDI to economic growth as well as from budget deficit to economic growth.
Sandalcilar, et al.	Economic Cooperation	1995-2011	Granger Causality test	Strong positive causality from

	Organization (ECO)			FDI to GDP and less positive causality from GDP to FDI
Li, X., and Liu, X.	33 Upper-Middle-income Countries	1990-2011	GMM estimator	A negative effect of trade openness on stimulating FDI spillovers.
Dirk	China	2001-2012.	Granger Causality test	Significant and positive results are found for the relation between FDI and economic growth
Luis and Marco	107 countries	1960- 2001	Fixed and random effects	A strong positive relationship between fiscal deficit and inflation among high inflation and developing country groups.
Serdar, Canan, and Verda	European countries	1998-2008	Crisis dummy	Total government revenue and inflation have

				a positive effect on a budget balance

Author's own compilation.

3.4. Chapter Summary

In this chapter, the theoretical and empirical theories of foreign direct investment (FDI) and budget deficit were examined. Theories of both FDI and budget deficit were discussed in the foregoing sections. With regard to the budget deficit framework, various schools of thought were identified namely; Neoclassical, Keynesian, and Ricardian schools of thought. Further, four theories of FDI were classified; Production cycle theory, Theory of exchange rates on imperfect capital markets, Internalisation theory, and Eclectic paradigm of dunning theory. The theoretical study proved that budget deficit can be eliminated by attracting more FDI inflows as a key driver for economic growth. On the other hand, the empirical literature has discussed previous studies on the impact of FDI on the budget deficit and other macroeconomic variables. Still, various results were found by scholars and researchers unlike, with most of them revealed a negative relationship between FDI and budget deficit, which in turn promotes economic growth. Hence, this study pursued to improve the argument on FDI and budget deficit nexus using panel data for the selected SADC countries (Malawi, South Africa, Tanzania, Namibia, and Zambia) over the period 1996-2017.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1. INTRODUCTION

The aim of this study is to empirically establish the impact budget deficit has on foreign direct investment. To fulfil the study objective, different approaches are used. This chapter is divided into three subdivisions, namely: brief justification of the use of panel data method on this study; theoretical background of the model specification, which discusses in detail the models; estimation techniques used in this study and lastly a chapter summary.

4.2. Justification for using panel data

This study used a macro panel of 5 selected SADC countries for the period 1996 to 2017, whereby letter 'N' represents the individuals in the panel while the letter 'T' represents the time period. According to Mahembe (2014), panel data refers to the pooling together of observations for multiple entities (individuals, firms, countries) in which each entity's characteristics are o` bserved over several time periods. Panel data is simply the combination of cross-sectional and time-series issues.

Several scholars and researchers presented several advantages of using panel data over cross-sectional or time-series (Mahembe, 2014; Baltagi, Jung & Song, 2010; Matyas & Sevestre, 1996; Nerlove, 2002; Muda, Maulana, Sakti & Indra, 2018). Such advantages are:

- Panel data usually contain more degrees of freedom and more sample variability than cross-sectional data, hence improving the efficiency of econometric estimates (Hasio, 2005).
- Greater capacity for capturing the complexity of human behaviour than a single cross-section or time-series data (Baltagi et al., 2010; Hasio, 2005; Matyas & Sevestre, 1996; and Nerlove, 2002).
- Panel data can diminish bias that might result from the aggregation of individuals into broad groups, because of more observations (Gujarati & Porter, 1999).

The study used panel data because it uplifts the effectiveness of testing for causality amongst the variables. However, researchers start by testing for a unit root in order to determine the stationarity of the variables and secondly carry out cointegration tests to examine whether a short and long-run relationship exists between inflation, interest rate, foreign direct investment inflows and budget deficit. Lastly, panel data offers a huge quantity of interpretations, adds to the degrees of freedom among the independent variables.

4.3. Model Specification

4.3.1. Theoretical Background of the Model

It is important to determine the relationship between FDI and budget deficit since a balanced budget and greater FDI inflows contribute towards growth in the economy. An increase in investment by a firm from one country in a business that it controls in another country is the foreign direct investment. The budget deficit is described by Nayab (2015) as a situation whereby government spending is more than its collection. The study primarily estimated the effects of FDI on budget deficit within the selected SADC countries. Based on the selected theoretical economic knowledge, empirical literature, and the driving objectives of the study, the following variables are included in the econometric model for estimation purpose: budget deficit (BD), which serves as the dependent variable, while foreign direct investment (FDI) and inflation (INFL) and interest rate (INT) are used to serve as the independent variables.

Therefore, the starting point of an empirical model for this study is the production function framework adopted from the study of Shuaib, Igbinosun, and Ahmed, (2015); Shuaib, Frank, and Augustine (2014); Ahmad (2015); Ogbokor (2016) to examine the link between the dependent and independent variables. The model used in this study is built upon the following production function form:

$$BD = f(FDI, INFL, INT) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots. (4.1)$$

From equation (4.1), the budget deficit is assumed to be a function of foreign direct investment, inflation, and interest rate. For the purpose of this study, the equation (4.1) can be rewritten in linear form as:

$$BD_{it} = \beta_0 + \beta_1 FDI_{it} + \beta_2 INFL_{it} + \beta_3 INT_{it} + \mu_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4.2)$$

In the equation (1.2), FDI represent the total foreign direct investment inflows, BD denote budget deficit, $INFL$ represent inflation and IN signify interest rate. However, the optimal quality of these variables depends on the availability of data. The β_0 is the intercept of the model and $\beta_1 \; to \; \beta_3$ are the unknown parameters of the model to be estimated. On the other hand, i is a cross-sectional data among the 5 selected countries and t is a time-series data and μ_{it} represent the stochastic disturbance error term.

Definitions of Variables: In this study, there is one dependent variable which is budget deficit (BD) and independent variables such as foreign direct investment (FDI), inflation (INF), and interest rate (INT).

4.3.2. Operational definitions of the variables

In this study, the operational definitions are as follows:

- **Budget Deficit:**

The budget refers to the effective planning for the intended revenues and expenditures of the economy as a whole**.** A balanced budget plays an important role in suitable economic growth. However, the budget may either be surplus or deficit. The budget deficit or budget surplus is one of the most important macroeconomic factors that have an impact on economic growth (Eminer, 2015). Budget deficit typically occurs when expenditures exceed revenue. The term is also referred to as government spending or national debt. Countries with higher fiscal deficit experience problems such as inflation than those with the lower fiscal deficit. This is because a deficit budget may be financed by an increase in the supply of money (Dritsakis & Stamatiou, 2015).

- **Foreign direct investment:**

Suri and Banerji (2017) described foreign direct investment (FDI) as an international capital flows where a company from one country to expand or establish a company in the country. Emphasizing Suri and Banerji's view, Duce and Espana (2003) pointed out that FDI refers to the aim of obtaining lasting interest by the resident entity of one country of an enterprise that is resident in another economy. Generally, FDI takes place when an investor establishes foreign business operations or acquires foreign business assets, including

establishing ownership or controlling interest abroad (Alfaro, Chanda, Kalemli-Ozcan & Sayek, 2007). Therefore, it can be concluded that FDI has a negative impact on the budget deficit but a positive impact on economic growth.

- **Inflation:**

Inflation measures the rate at which the general price level of a basket of selected goods and services in an economy increases over a specific period of time. Inflation exists when money supply is greater than the availability of goods and services because each unit of currency buys fewer goods and services. “Too much money chasing few goods”. Inflation is a state of rising prices, but not high prices (Hsiao, 2003).

- **Interest rate:**

An interest rate is the amount of interest due per period, as a proportion of the amount lent, deposited or borrowed called the principal sum.

4.3.3. Data Sources

To get a better view, data for this study are panel data on 5 SADC countries (Malawi, Tanzania, South Africa, Namibia, and Zambia) for the 10-year period from 1996 to 2017. Only the datasets for inflation and interest rate used in the study have been converted into their corresponding natural logarithms so as to empower the purpose of elasticity values in the estimation process. During the period of the study (1996-2017), the selected 5 SADC countries openly followed policies such as Public institutions and access to credit, infrastructure and access to electricity, Macroeconomic policies, protecting investors, and market size and trade across borders intended to attract FDI inflows as well as offering incentives and tax holidays to foreign investors (Mahembe, 2014; Mugowo et al., 2017). Table 4.1 displays the selected variables and vital sources for the gathering of macroeconomic data used in the study (Ogbokor, 2016; Mugowo et al., 2017). The statistical software Eviews9 has been used for numerical controls. Table 4.1 outlined a detail description of the variables.

Table 4. 1 Variable Used in this Study and their Source

Number	Acronym	Variable	Source
1	BD	Budget Deficit	World Development Indicators
2	FDI	Foreign Direct Investment	World BANK (WB)
3	INF	Inflation	
4	INT	Interest rate	

Source: Author's own compilation

4.4. Estimation Techniques

In this study, the nexus between foreign direct investment, budget deficit, inflation and interest rate was analyzed in the framework of panel co-integration and panel causality tests. Relevant relationships will be examined in six phases. In the first phase, the integrated orders of all variables for all countries were examined. In the second phase, the panel Granger causality test is used in order to examine the causality relationship between variables. In the third phase, long term relationships between variables will be tested with Pedroni (1999, 2004), Kao (1999) and Fisher (1932) co-integration tests. In the fourth phase, co-integration coefficients will be estimated through Panel Autoregressive Distributed Lag (ARDL). In the firth phase, diagnostic tests were conducted. In the last phase, impulse response and variance decomposition are applied to find out how each variable affects one another (Kizilkaya, Ay & Akar, 2016).

4.4.1. Panel Unit Root Tests

It is crucial to test the stationarity of the variables before continuing with other tests. Therefore, to decide whether all the four variables (budget deficit, foreign direct investment, inflation, and interest rate) are stationary or non-stationary, the researcher applied the panel unit root tests suggested by Levin, Lin and Chu (LLC, 2002), I'm, Pesaran and Shin (IPS, 2003), ADF-Fisher Chi-square test (Choi, 2001), PP Fisher Chi-Square test (Maddala & Wu, 1999), Hadri (2000) and Breitung (2000). The basic objective of these tests is to check the presence of the panel unit root and the order of integration of the variables in this study (Dritsakis & Stamatiou, 2015 and 2014; Mahembe, 2014).

4.4.1.1 Levin, Lin and Chu (LLC) (2002) Panel Unit Root Test

Levin and Lin (1992, 1993) and Levin, Lin, and Chu (2002) provided some new results on panel unit root tests. They generalized the Quah's model to allow for possible correlation and heteroscedasticity, though still assuming continued independence cross-sections. They also undertook that both N and T tend to infinitude, but T increases at a faster rate (Barbieri, 2006). Under the LLC, the evaluation of null hypothesis is that each individual time series contains a unit root against the alternative that each time series is stationary (Mahembe, 2014), which can be written as:

H_0 : Each individual time series contains a unit root

H_1 : Each time series is stationary

Thus, the arrangement of the LLC study may be detailed as follows:

$$\triangle y_{it} = \beta y_{it-1} + \alpha_0 + \alpha_{i1} t + u_{it}, \qquad i = 1,2,\ldots N, t = 1,2,\ldots T \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4.3)$$

Where; $\alpha_{it} t$ and α_i are incorporated.

Note that, $\alpha_{it} t$ and α_i represents time trend and individual effects, respectively. Since the coefficient of the lagged dependent variable is limited to be homogeneous across all units in the panel, the deterministic components are the important sources of heterogeneity in this model (Barbieri, 2006).

To follow a stationary invertible ARMA process for each individual, u_{it} is assumed to be independently distributed across individuals or cross-sections:

$$u_{it} = \sum_{j=1}^{\infty} \theta_{ij} u_{it-j} + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (4.4)$$

Equation (1.14) is estimated by pooled OLS estimation and the LLC reflects several subcases of it. Hence, the sequential limit theory, that is $T, N \to \infty$ derive limiting distribution. However, the existence of a unit root may lead to the convergence rate of the estimators and t statistics is upper when $T \to \infty$ than when$N \to \infty$.

In the case of null, the panel regression unit root t -a statistic that corresponds with the pooled OLS estimator in equation (1.14) converges to the standard $\mathcal{N}\ (0,1)$ normality distribution when $N \rightarrow \infty$ and $T\ \rightarrow \infty$ whereas $\sqrt{N/_{T}}\ \rightarrow 0$. The LLC suggested an adjusted t-statistic as:

$$t_{\rho}^{*} = \frac{t_{\rho=0} - N\tilde{T}\tilde{S}_{N\sigma_{\tilde{\varepsilon}}^{-2}}\ \tilde{\sigma}\ (\tilde{\rho})^{\mu^{*}_{m\tilde{T}}}}{\sigma^{*}_{m\tilde{T}}} \sim \mathcal{N}(0,1) \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. (4.5)$$

As T and N goes to infinity, t_{ρ}^{*} approaches a normal distribution.

4.4.1.2. Pesaran and Shin (IPS) (2003) Panel Unit Root Test

Then I'm, Pesaran and Shin (2003) (IPS) test encompasses the LLC background to allow for residual serial correlation and heterogeneity in the coefficient of the lagged dependent variable under the alternative hypothesis. This IPS test is based on the averaged across groups Augmented Dickey-Fuller (ADF) unit root test statistics (Mugowo et al., 2017).

The heterogeneous panel data model proposed by IPS is given by

$$\triangle\, y_{it} = \mu_i\ + \beta_i y_{it} + \sum \mathbb{Q}_k \triangle\, y_{it-k} + \varepsilon_{it} \quad\ i = 1,2,\ldots,N, \qquad t = 1,2,\ldots,T \ldots\ldots\ldots\ldots\ldots. (4.6)$$

Thus the tested null hypothesis is defined as, $H_0 : p_i = 0$ and the alternative hypothesis is $H_0 : pi < 0$ for at least one i.

The null hypothesis implies that each series in the panel comprises a unit root and the alternative hypothesis allows for some (but not all) of the individual series to have unit-roots. The IPS t-bar statistic is defined as the average of the individual ADF t statistics: (Baltagi, 2008).

$$\bar{t} = \frac{1}{N}\sum\nolimits_{i=1}^{N} t_{\rho i} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots.. (4.7)$$

Where, $t_{\rho i}$ represents individual t-statistics for testing $H_0 : pi = 0$. Such that, IPS assumed that, $t_{i\rho}$ are often i.i.d and have finite mean and variance. In order to propose a standardization of the t -bar statistic, the values of the mean and the variance have been computed via Monte Carlo methods based on different lag orders (pi), and different values of T. A standardized final test statistic under the IPS is as follows (Mahembe, 2014):

$$t_{IPS} = W_{t-bar} = \frac{\sqrt{N}\,(\bar{t} - \frac{1}{N}\sum_{i-1}^{N} E\left[{}^{t_{iT}}/_{pi} = 0\right])}{\sqrt{\frac{1}{N}\sum_{i-1}^{N} var\,[{}^{t_{iT}}/_{pi} = 0]}} \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots .. (4.8)$$

Where,

$E[{}^{t_{iT}}/_{pi} = 0]$ and $var[{}^{t_{iT}}/_{pi} = 0]$ represents means and variances respectively.

4.4.1.3. Fisher-ADF and Fisher-PP [Madala and Wu (1999) and Choi (2001)] tests.

According to Mahembe (2014), these two tests, like the Breitung test, focus on the shortcomings of the LLC and IPS. Fisher-ADF test developed by Maddala and Wu (1999), while Fisher PP was developed by Choi (2001). Madala and Wu (1999), and Choi (2001) suggest a non-parametric Fisher-type test based on a combination of the ρ values obtained from unit root tests for each cross-section I (Mahembhe, 2014). The test is not parametric and has a chi-square distribution with 2n freedom degree. Then in the test is the number of cross-section data in the panel. Baltagi (2008) outlined several characteristics of the Fisher-ADF and Fisher-PP in comparisons with that of LLC and IPS as:

- The Fisher-ADF and Fisher-PP can accommodate heterogeneity across cross-sections, that is, different pis.
- The Fisher-ADF and Fisher-PP assume very limited possible dependence across individuals (i).
- The Fisher-ADF and Fisher-PP can be adapted for less restrictive assumptions about cross-correlations (bootstrap techniques).
- The IPS assumes that T is constant for all i, while the Fisher-ADF test does not require a balanced panel.
- Lastly, while the IPS and LLC are fundamentally based on the ADF test, the Fisher-ADF and Fisher-PP can accommodate different unit root tests. Besides, the Phillips-Perron (PP) tests (Philips & Perron, 1988) can also be used on individual cross-sections.

As mentioned earlier, Madala and Wu (1999) proposed a Fisher (1932) based test that combines information on the unit root test p-values. Therefore, this test statistic is as follows:

$$p = -2\sum_{i=1}^{N} lnp_i \qquad \sim X_2^2 N \dots\dots (4.9)$$

With pi is the n-value for the unit root test performed on the cross-section i.

4.4.1.4. Hadri (2000) panel unit root test

Hadri (2000) proposed a panel extension of the Kwiatkowski (1992) test. Hadri test is used to evaluate the null hypothesis of stationary, in a sense that, the null hypothesis is stationary in all units against the alternative of a unit root in all units. In all cross-sectional units, the alternative of a unit root stems from the fact that these tests are based on pooling (Hlouskova & Wagner, 2005).

$H_0 =$ No unit roots in any of the series in the panel.

$H_1 =$ All series includes the unit root.

Hadri test is assembled as the residual base Lagrange multiplier test. Although the residuals resulting from the regression (Hlouskova and Wagner, 2005).

$$Y_{it} = r_{it} + \beta_i t + \varepsilon_{it} \dots\dots (4.10)$$

Where,

$r_{it} = r_{it-1} + u_{it}$

ε_{it} = denote the error term

Therefore, the stationarity hypothesis based on the Hadri test can be written as;

$$H_0: \sigma_u^2 = 0$$

$$H_0: \sigma_u^2 \neq 0$$

Whereby $\varepsilon_{it} = v_{it}$

Baltagi (2008) is of the view that beneath the assumption of homoscedasticity across cross-sections, the LM statistic is given by; (Mahembe, 2014).

$$LM_1 = \frac{1/N\left(\sum_{i=1}^{N}\frac{1}{T^2}\sum_{t=1}^{N} S_{it}^2\right)}{\hat{\sigma}_\varepsilon^2} \dots\dots (4.11)$$

Where,

$S_{it} = \sum_{s=1}^{t} \varepsilon'_{is}$ represent the partial sum of ordinary least square (OLS) residuals

$\hat{\sigma}_{\varepsilon}^{2}$ represent the consistent estimator under the null hypothesis.

Moreover, as shown in the study of Smith (2000), Mahembe (2014) and Baltagi (2008), Hadri (2000) further emphasized that the LM test that allows for heteroscedasticity across $i,$ can be writing as follows;

$$LM_2 = {}^{1}/_{N} \frac{\left(\sum_{i=1}^{N} (\frac{1}{T^2} \sum_{t=1}^{N} S_{it}^{2}\right)}{\hat{\sigma}_{\varepsilon}^{2}} \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (4.12)$$

Therefore, the t-statistics can be written as follows;

$$Z = \frac{\sqrt{N}\,(LM - \text{گ})}{\varsigma} \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots . (4.13)$$

Based on the equation above, the null hypothesis can only be rejected if p <0.05 or the degree of the test statistic is above 1.96. In line with this, the researcher can conclude that the panel is non-stationary.

4.4.1.5. Breitung (2000) panel unit root test

Breitung and Pesaran (2008) developed a pooled panel unit root test that does not require bias correction factors. The purpose of this test is mainly to test against homogenous alternatives (Hlouskova & Wagner, 2005). Breitung and Pesaran (2008) only considered two cases (cases 1 and 2), whereby case 1 is exactly the same as the Levin, Lin and Chu (2002) (LLC) test, ever since that case required no bias. However, in case 2 bias correction factors are avoided by subtracting the initial observation and it is equal to the Levin, Lin, and Chu (2002) (LLC) test through the transformation of variables (Baltagi, Demetriades & Law, 2009; Hlouskova & Wagner, 2005). That is;

$$\overline{y_{it}} = y_{it} - y_{it-1} \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots (4.14)$$

According to Mahambe (2014), the null and alternative hypotheses under the Breitung test are the same as that of LLC. The null hypothesis requires that ρ be homogenous across i. Hence;

H_0 = Each individual time series contains a unit root

H_1 = Each time series is stationary

According to Baltagi (2008) and Breitung and Pesaran (2008), both the LLC and IPS necessitate that $N \to \infty$ and $N/T = 0$ i.e. N should be too smaller relatively to T. Such that, whenever, N is small or greater relatively to T both the tests of LLC and IPS experience size distortion. Emphasizing the view of Baltagi (2008); Breitung and Pesaran (2008), Mahembe (2014) is of view that as $N, T \to \infty$, the t statistics from Breitung test i.e. ($\overline{T_{bt}} \to N(0,1)$). The null hypothesis is rejected when the t-statistic is smaller than the critical value or when $p < 0.5$.

The study of Mahembe (2014), Ziemer and Collins (1984), Fowowe (2011) and Alam, Idris, Malik and Gaadar (2016) suggested that after testing for unit roots, on whether each of the univariate series is stationary or not. If they both are stationary say at first difference or at level, that is they are $I(1)$ and $I(0)$, then the second step is to verify the long and short-run relationship between them by conducting co-integration analysis.

4.4.2. Granger causality test

To examine the long-run relationship between the series under study, several co-integration tests must be conducted. However, the tests do not show any implication about the direction of causality among the variables in the system; therefore, the Granger causality analysis must be conducted (Rasheed & Tahir, 2012). Thus, to explore the causal nexus between foreign direct investment and budget deficit in the selected 5 SADC countries, the study continued through Granger (1969) causality test (Cicak & Soric, 2015). The basic principle of the Granger causality test is to examine the causality between the variables (Armeanu, Vintila & Gherghina, 2017). In addition, empirical literature proved that Granger (1969) causality test mainly determine whether one-time series is useful in forecasting another (John & Akinyomi, 2016). Therefore, it can be concluded that to examine causality between the two variables, a Granger (1969) causality test methodology is suggested.

Assuming two temporal events, x_t and y_t. According to the theory of Granger (1969) causality, if the past values of x_t significantly contribute to forecast the future value of y_t then x_t is said to Granger-cause y_t. Conversely, if past values of y_t statistically improve the prediction of x_t, then we can conclude that y_t Granger causes x_t (Seth, 2007).

According to Seth (2007) the possible findings for causation are:

i) x causes y, but not vice versa;

ii) y causes x, but not vice versa;

iii) x Granger causes y and y Granger causes x, and;

iv) x and y are independent of each other.

In the case of this study, if the foreign direct investment can help to forecast budget deficit, then it can be concluded that FDI Granger-causes budget deficit. However, if FDI causes budget deficit and not vice versa, then it can be concluded that unidirectional causality exists from FDI and budget deficit. The Granger approach answers the question of whether budget deficit causes FDI by finding how much of the current value of budget deficit can be explained by past values of the budget deficit and lagged values of foreign direct investment (Alkhasawneh, 2013).

The main aim of this study is to examine the causal relationship between FDI and budget deficit. Therefore, following Seabra and Flach (2005); Mahembe (2014), the causality test in Granger sense will be based on the following regressions;

$$FDI_{it} = a_{1.0} + \sum_{j=1}^{k} a_{1.1j} FDI_{t-j} + \sum_{j=1}^{k} a_{1.2j} BD_{t-j} + \sum_{j=1}^{k} a_{1.3j} INF_{t-j} + \sum_{j=1}^{k} a_{1.4j} INT_{t-j} + \varepsilon_{1t} \ldots\ldots\ldots (4.15)$$

$$BD_{it} = a_{2.0} + \sum_{j=1}^{k} \beta_{2.1j} BD_{t-j} + \sum_{j=1}^{k} \beta_{2.2j} FDI_{t-j} + \sum_{j=1}^{k} a_{1.3j} INF_{t-j} + \sum_{j=1}^{k} a_{1.4j} INT_{t-j} + \varepsilon_{1t} \ldots\ldots\ldots (4.16)$$

$$INF_{it} = a_{3.0} + \sum_{j=1}^{k} a_{3.1j} FDI_{t-j} + \sum_{j=1}^{k} a_{3.2j} BD_{t-j} + \sum_{j=1}^{k} a_{3.3j} INF_{t-j} + \sum_{j=1}^{k} a_{3.4j} INT_{t-j} + \varepsilon_{3t} \ldots\ldots\ldots (4.17)$$

$$INT_{it} = a_{4.0} + \sum_{j=1}^{k} a_{4.1j} FDI_{t-j} + \sum_{j=1}^{k} a_{4.2j} BD_{t-j} + \sum_{j=1}^{k} a_{4.3j} INF_{t-j} + \sum_{j=1}^{k} a_{4.4j} INT_{t-j} + \varepsilon_{4t} \ldots\ldots\ldots (4.18)$$

Where BD is a budget deficit, FDI is foreign direct investment, INF is inflation, and INT is the interest rate. Thus, $a_{1.0}, a_{2.0}, a_{3.0}$ and $a_{4.0}$ represent constant for equation (4.15, (4.16),

(4.17) and (4.18), respectively. On the other hand, $\varepsilon_{1t}, \varepsilon_{2t}, \varepsilon_{3t}$ and ε_{4t} are the disturbance error term (Mahembe, 2014).

4.4.3. Panel Co-integration analysis

The use of the panel ARDL requires that the study variables should be co-integrated. The concept of Cointegration can be described as a systematic co-movement between two or more variables in the long term (Abbes, Mostefa, Seghir & Zakarya, 2015). According to Haseeb, Bakar, Azam, Hassan and Hartani (2014) to estimate the possibility of the panel co-integration test, it is important to examine the presence of the unit root in a panel data series. Hence, this study has chosen the previously aforementioned panel unit root tests above to tests for stationarity. In support of Haseeb et al., (2014), Mahembe and Odhiambo (2016) are of the view that when variables become stationary only after being integrated of order one, linear combinations that are stationary without differencing might occur between those variables. Further, Mahembe (2014) emphasized that for variables to form a co-integrating relationship, they have to be integrated of the same order, that is $\left(I(1)\right)$. From the literature's perspective, such variables are co-integrated. Therefore, if variables are said to be co-integrated, they must usually move together over time so that short-term disturbances are corrected in the long-run (Ndoricimpa, 2009; Mahembe, 2014).

The key question is whether variables might or might not have a common stochastic trend, or, they might or might not be co-integrated? The study resolves this question by looking for a short and long-run relationship among the variables using the panel co-integration test (Moudatsou & Kyrkilis, 2011). The econometric literature proposes a number of panel co-integration tests such as Pedroni (1999, 2004), Kao (1999) and Fisher (1932) co-integration tests.

Broadly, to test the null hypothesis of no co-integration against the alternative hypothesis of co-integration, Pedroni (1999; 2004) co-integration test employs two groups: it employs four-panel statistics and three group panel statistics. Such that, In the case of panel statistics, the first-order autoregressive term is assumed to be the equivalent through all the cross-sections, while in the case of group panel statistics the parameter is permitted to vary over the cross-sections (Ramirez, 2007). The available methods for panel data co-integration for this study are given as follows:

4.4.3.1. The Pedroni (1999, 2004) panel co-integration tests

In a panel data model, Pedroni (1999, 2004) derived seven-panel co-integration statistics for the null hypothesis that allows for heterogeneity. Broadly, the Pedroni tests can be divided into two categories; it employs four-panel statistics and three group panel statistics to test the null hypothesis of no co-integration against the alternative hypothesis of co-integration (Ramirez, 2007). The first panel statistics are defined as within-dimension-based statistics and it is assumed that order autoregressive term has to be the equal across all the cross-sections. It uses specification of null and alternative hypotheses, that is;

$$H_0 : \mathrm{p} = 1, H_1 : \mathrm{p} < 1 \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (4.19)$$

The second group of three-panel co-integration statistics is called "between-dimension" based statistics. In this case of a group, the parameter is allowed to vary over the cross-sections. These type of statistics is based on group style which includes; Phillips and Perron type ρ-statistic, a Phillips and Perron type t-statistic and finally an Augmented Dickey-Fuller type t-statistic (Gutierrez, 2003). The second category uses;

$$H_0 : \mathrm{p}_i = 1, H_1 : \mathrm{p}_i < 1 \quad for\ all\ i \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots .. (4.20)$$

Under the Pedroni (1999, 2004) tests, if the null is rejected in the panel case, then the variables are co-integrated for all the sectors. However, if the null is rejected in the group panel case, then co-integration among the variables exists for at least one of the sectors.

4.4.3.2. Kao (1999) panel co-integration test

Kao, Chiang, and Chen (1999) developed Dickey-Fuller (DF) and Augmented Dickey-Fuller (ADF) type tests for the null hypothesis of no co-integration in panel data (Dickey & Fuller, 1979; 1981). The tests are based on the assumption that hypothesizes common slopes across cross-section (Barbieri, 2008).

According to Mahembe (2014), in the null hypothesis, there is no co-integration while on the other hand of the alternative hypothesis, the co-integration relationship exists among the variables. That is;

H_0 = No co-integration

H_1 = Co-integration exists

Whereby, H_0 implies that the residuals are non-stationary while H_1 state that the residuals are stationary. Finally, Kao (1999) proposed an ADF test statistic and four DF-type statistics. The first category of four DF statistics test for co-integration based on assuming strict homogeneity in the equation between the regressors and errors while the remaining statistics allow for endogeneity in the co-integration test (Gutierrez, 2003).

The co-integrated regressions can be expressed as follows;

$$y_{it} = \alpha_i + x_{it}\beta + u_{it}, i = 1, \ldots N, \qquad t = 1, \ldots T \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (4.21)$$

$$x_{it} = x_{it-1} + \varepsilon_{it} \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (4.22)$$

Where,

α_i are individual constant terms

β is the slope parameter

u_{it} is stationary disturbance terms

Finally, y_{it} and x_{it} are integrated procedures of order one for all i.

4.4.3.3. Johansen- Fisher (1932) panel co-integration test

Applying panel co-integration tests, the next step is to use the Johansen- Fisher panel co-integration test, developed by Maddala and Wu (1999), in order to examine the long-run relationship between the variables under the study. This test is based on the co-integration trace and maximum eigenvalue tests by Johansen (1988). Johansen's methodology takes as a starting point an ARDL of an order of *p*:

$$Y_t = \sum_{t=1}^{p} A_t Y_{t-1} + \varepsilon_t \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (4.23)$$

However, this model can also be written as shown below

$$\Delta Y_t = \prod Y_{t-1} + \sum_{t=1}^{p-1} \emptyset Y_{t-1} + U_t \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots \ldots (4.23)$$

Where, $\prod = -1(I - \sum_{j=1}^{p} A_j)$ and $\emptyset = \sum_{j=i+1}^{p} A_j$, with $i = 1 \ldots p$

The equations above are related to both trace and maximum eigenvalue tests. Maddala and Wu (1999), using Fisher's test (1932), proposed the Johansen-Fisher test for testing co-integration in panel data. This test combines the individual cross-section tests, giving a statistic concerning the whole panel (Mahembe, 2014).

4.4.4. Panel Autoregressive Distributed Lag (ARDL)

In order to examine the short and long-run relationship estimations between the variables, the study has applied a panel autoregressive distributed lag model (ARDL) approach proposed by Pesaran et al., (1999). Chirwa and Odhiambo (2018) outlined several reasons for adopting this approach. Firstly, for the SADC countries, models that guarantee the achievement of long-run consistency are of dominant status to pledge convergence on joined policies adopted. This demands that the long-run level relations between budget deficit, foreign direct investment inflows, inflation and interest rate is of importance as it will direct policymakers on how to establish long-term economic guidelines. Secondly, in a panel ARDL setting, the short-run coefficients and error variances of other explanatory variables are assumed to be differentiated (Pesaran et al., 1999) as corresponding to panel fixed and random effects estimators that only tolerate the intercept to vary across. Finally, the panel ARDL modelling approach modifies for endogeneity in the regressors through the inclusion of lags on short-run coefficients that may vary across cross-section (Themba & Nicholas, 2018).

Haseeb et al., (2014) are of the view that a significant relationship among the variables in panel series is obtained by employing panel ARDL model introduced by Pesaran and Shin (2002), and Pesaran, Shin and Smith (2003). The purpose of this model is to address the key question of whether the long-run budget deficit of the five selected SADC countries can be eliminated by an inflow of foreign direct investment. This method is also used to analyze the lagged values (Dogan, Tuluce & Dogan, 2014). Pesaran et al., (2003) observed the use of autoregressive distributed lag (ARDL) model for the investigation of long-run relationships when the fundamental variables are integrated of order one $[I(1)]$. Mahembe (2014) argues that heterogeneity in panel data models is from the existence of distinctively dissimilar intercepts or the incidence of individual effects amongst individuals in the panel. According to Pesaran et al., (1999), ARDL dynamic heterogeneous panel regression can be written by using $ARDL(p, q)$ approach (Lingaraj, Ummall & Jaganat, 2016; Themba & Nicholas, 2018).Thus, the equation can be presented as;

$$lnBD_{it} = \beta_i \sum_{j=1}^{p} \beta_{1.it}\, lnBD_{it-j} + \sum_{j=0}^{q} \beta_{2.it}\, lnFDI_{it-j} + \sum_{j=0}^{q} \beta_{3.it}\, lnINF_{it-j} + \sum_{j=0}^{q} \beta_{4.it}\, lnINT_{it-j} + u_{it} \ldots \ldots \quad (4.24)$$

In equation (1.22) β_i, represents the fixed effects; while $\beta_{1.it} \ldots \ldots \beta_{4.it}$ represent the coefficients of the lagged dependent variable and regressors, p is the lags of the dependent variable and q is the lags of the independent variable.

The only condition in the study of Mahembe (2014) is that variables must be stationary. However, numerous researchers and scholars such as Ndoricimpa (2009), Fowowe (2011), Emirmahmutoglu and Kose (2011), and Cao and Jariyapan (2012) have argued that, If variables are ($I(1)$) and cointegrated, then the system of equations is modified to allow for the co-integrating relationship between those variables. After a long-run level relationship is known, in a panel ARDL framework, the error correction model (ECM) can be estimated.

4.4.5. Error correction model (ECM)

Since the Engle-Granger approach suffers from a number of weaknesses, the study further employed an error correction model (ECM) to address these weaknesses. The vector error correction (VEC) model is just a distinctive case of the VAR for variables that are integrated of order one i.e. [$I(1)$]. For the purpose of this study, the model of Tan, Lau, Khin, and Lingaraj (2016) and Mahembe (2014) has been used. In a panel data Granger causality analysis, co-integration could claim that there is a relationship between the associated variables. To determine the direction of causality, the Vector Error Correction Model (VECM) should be estimated (Dritsakis & Stamatiou, 2015). Once co-integration is established, the conditional long-run model for the vector of four variables can be estimated as follows:

$$\Delta FDI_{it} = a_{1.0t} + \sum_{j=1}^{k} \beta_{1.1j}\, \Delta FDI_{it-j} + \sum_{j=1}^{k} \beta_{1.2j}\, \Delta BD_{it-j} + \sum_{j=1}^{k} \beta_{1.3j}\, \Delta INF_{it-j} + \sum_{j=1}^{k} \beta_{1.4j}\, \Delta INT_{it-j} + \varphi_{1i} ECT_{1it-1} + \varepsilon_{1it} \ldots \ldots \quad (4.25)$$

$$\Delta BD_{it} = a_{2.0t} + \sum_{j=1}^{k} \beta_{2.1j}\, \Delta BD_{it-j} + \sum_{j=1}^{k} \beta_{2.2j}\, \Delta FDI_{it-j} + \sum_{j=1}^{k} \beta_{2.3j}\, \Delta INF_{it-j} + \sum_{j=1}^{k} \beta_{2.4j}\, \Delta INT_{it-j} + \varphi_{2i} ECT_{2it-1} + \varepsilon_{2it} \dots \dots \dots (4.26)$$

$$\Delta INF_{it} = a_{3.0t} + \sum_{j=1}^{k} \beta_{3.1j}\, \Delta BD_{it-j} + \sum_{j=1}^{k} \beta_{3.2j}\, \Delta FDI_{it-j} + \sum_{j=1}^{k} \beta_{3.3j}\, \Delta INF_{it-j} + \sum_{j=1}^{k} \beta_{3.4j}\, \Delta INT_{it-j} + \varphi_{3i} ECT_{3it-1} + \varepsilon_{3it} \dots \dots \dots (4.27)$$

$$\Delta INT_{it} = a_{4.0t} + \sum_{j=1}^{k} \beta_{4.1j}\, \Delta BD_{it-j} + \sum_{j=1}^{k} \beta_{4.2j}\, \Delta FDI_{it-j} + \sum_{j=1}^{k} \beta_{4.3j}\, \Delta INF_{it-j} + \sum_{j=1}^{k} \beta_{4.4j}\, \Delta INT_{it-j} + \varphi_{4i} ECT_{4it-1} + \varepsilon_{2it} \dots \dots \dots (4.28)$$

Where Δ is the first difference operator;

$a_{1.Ot}$ – $a_{4.0t}$ Represents the fixed country effect

ΔFDI_{it-j},ΔBD_{it-j}, ΔINF_{it-j} and ΔINT_{it-j} represents the lagged dynamic variables

k is the optimal lag length by the Schwarz.

ECT_{1it-1} - ECT_{4it-1} are the lagged values of the error correction terms

φ_{1i} - ε_{2it} represents the adjustment coefficients

According to Mahembe (2014), the error correction model approach supports the investigation of the short and long-run Granger causality between foreign direct investment, budget deficit, inflation and interest rate. However, testing for causality involves using the t-test to test the statistical significance of the lagged co-integrating vectors. In this case, it can be concluded that long-run causality is tested through the lagged co-integrating vectors, that is ECT_{1it-1} - ECT_{4it-1} (Mahembe, 2014; Moudatsou & Kyrkilis, 2011).On the other hand, short-run causality is tested through the lagged dynamic variables such as ΔFDI_{it-j},ΔBD_{it-j}, ΔINF_{it-j} and ΔINT_{it-j} (Chakroborty & Nunenkamp, 2006).

4.5. Diagnostic tests

In this test, the LM test, Jargue Bera, Kurtosis, and Skewness tests were used as a diagnostic test to check for appropriateness of assumptions, hence emergent conclusion was drawn from the data. Diagnostic checking concludes that the LM test for autocorrelation gives satisfactory results in all models. The null hypothesis of no autocorrelation between the 12th order cannot be rejected at any conventional significance level. Also, in most models, the White test cannot reject the null hypothesis of homoscedasticity of the residual variance. The assumption of a normal distribution of residuals is desecrated, as the Jarque-Bera test rejects the null hypothesis of a normal distribution of residuals at all conventional levels of significance (Deeks & Altman, 2004)

4.6. Impulse response and variance decomposition.

The impulse response function and variance decomposition are used to yield the time path of the dependent variables in the equation, thus examining the effects of shocks in respect amongst the variables. The influence of each type of shock to the forecast error variance is measured through the forecast error variance decompositions. The focus of variance decomposition is on the response variable: specifically, y (dependent variable). Simply testifying that, for every change of x, there is a corresponding change in y. In line with the purpose of this study, it was stated that for every change of foreign direct investment, there is a corresponding change in budget balance (Brahmasrene, Huang & Sissoko, 2014).

4.7. Chapter Summary

The chapter focused on the relationship between foreign direct investment and budget deficit. An annual panel data from 1996 to 2017 was collected to determine the relationship between foreign direct investment and budget deficit. Levin, Lin and Chu (LLC, 2002), I'm, Pesaran and Shin (IPS, 2003), ADF-Fisher Chi-square test (Choi, 2001), PP Fisher Chi-Square test (Maddala and Wu, 1999), Hadri (2000) and Breitung (2000 were used for stationarity, panel cointegration and panel ARDL model were used to test if variables do correlate in the long run or short run. Granger causality was employed to check the causality between the variables under the study.

This chapter enables one to understand which methods were used in order to reach the objectives of this study. Following is chapter 5 that deals with results and interpretation of tests, which were mentioned in the methodology for empirical understanding.

CHAPTER FIVE

EMPIRICAL RESULTS

5.1. Introduction

This chapter presents the empirical results of the study, and it is organised based on the estimation techniques followed. The study used panel data analysis technique to estimate the effects of foreign direct investment on-budget deficit in the SADC region over 1996-2017. The panel model encompasses annual data regarding foreign direct investment inflows (FDI), the budget deficit (BD), inflation (INF) and interest rate (INT). In the first step, the researcher examined if the four variables (BD, FDI, INF, and INT) are stationary. Therefore, the researcher begins by testing the stationarity of these variables.

5.2. Panel unit root test results

To examine the stationarity of the series used, the panel unit root tests recommended by Levin, Lin and Chu (LLC, 2002), I'm, Pesaran and Shin (IPS, 2003), ADF-Fisher Chi-square test (Choi, 2001), PP Fisher Chi-Square test (Maddala and Wu, 1999), Hadri (2000) and Breitung (2000) were applied in the study. The results of these unit root tests are presented in table 1. Each test for the level and the first difference of the variables were performed. The stationary tests entail none, individual intercept, individual intercept and trend (Dritsakis & Stamatiou, 2015).

Table 5. 1 Panel unit root results, 1996–2017

Variables	Tests	Test equation	Level	1st diff
BD	I'm, Pearson and Shin	Individual intercept	0.0135***	-
		Individual intercept and trend	0.0002***	-
	Fisher-ADF	Individual intercept	0.0331***	-
		Individual intercept and trend	0.0015***	-
		None	0.0001***	-
	Fisher PP	Individual intercept	0.2098	0.0000***
		Individual intercept and trend	0.0750	0.0000***
		None	0.0015***	-

	Levin, Lin, and Chu	Individual intercept	0.0190***	-
		Individual intercept and trend	0.0010***	-
		None	0.0157***	-
	Handri	Individual intercept	0.0000***	-
		Individual intercept and trend	0.0038***	-
	Breitung	Individual intercept and trend	0.0368***	-
FDI	I'm, Pearson and Shin	Individual intercept	0.0002***	-
		Individual intercept and trend	0.0031***	-
	Fisher-ADF	Individual intercept	0.0002***	-
		Individual intercept and trend	0.0021***	-
		None	0.2433	0.0000***
	Fisher PP	Individual intercept	0.0000***	-
		Individual intercept and trend	0.0000***	-
		None	0.0213***	-
	Levin, Lin, and Chu	Individual intercept	0.0000***	-
		Individual intercept and trend	0.0000***	-
		None	0.0447***	-
	Handri	Individual intercept	0.0000***	-
		Individual intercept and trend	0.0002***	-
	Breitung	Individual intercept and trend	0.0336***	-
LINF	Im, Pearson and Shin	Individual intercept	(0.9084)	0.0074***
		Individual intercept and trend	(0.0049)***	-
	Fisher-ADF	Individual intercept	(0.9149)	0.0071***
		Individual intercept and trend	(0.0079)***	-
		None	0.9999	0.0501***
	Fisher PP	Individual intercept	(0.7273)	0.0685***
		Individual intercept and trend	(0.5409)	0.0454***
		None	1.0000	0.0306***
	Levin, Lin and Chu	Individual intercept	(0.0866)	0.0032***
		Individual intercept and trend	(0.0002)***	-
		None	0.9999	0.0012***

	Handri	Individual intercept	(0.0000)***	-
		Individual intercept and trend	(0.0000)***	-
	Breitung	Individual Intercept and trend	(0.9541)	0.0437***
LINT	I'm, Pearson and Shin	Individual intercept	0.1047	0.0000***
		Individual intercept and trend	0.0711	0.0000***
	Fisher-ADF	Individual intercept	0.0868	0.0000***
		Individual intercept and trend	0.0708	0.0000***
		None	0.2223	0.0000***
	Fisher PP	Individual intercept	0.0000***	-
		Individual intercept and trend	0.0000***	-
		None	0.0289***	-
	Levin, Lin, and Chu	Individual intercept	0.0676	0.0000***
		Individual intercept and trend	0.5578	0.0008***
		None	0.2082	0.0000***
	Handri	Individual intercept	0.0000***	-
		Individual intercept and trend	0.0000***	-
	Breitung	Individual intercept and trend	0.3566	0.0000***

***, 5% level of significance; BD, budget deficit across countries; FDI, foreign direct investment inflows; LINF, log inflation; LINT, Log interest rate; ADF, Augmented Dickey-Fuller; PP, Phillips-Perron.

The notion of stationarity is that the probability value should be less than 0.05, and the t-statistic should be less than all the levels of critical values. The results from the I'm, Pearson and Shin test, Fisher- ADF test, Fisher-PP test, Levin, Lin, and Chu test, Handri test, and Breitung test are presented in Table 1. These unit root results are for the variables budget deficit (BD), foreign direct investment (FDI), inflation (INF) and interest rate (INT). The results of the panel unit root tests clearly showed that budget deficit appeared to be stationary at a level form in all cases except for the Fisher-PP test. These results indicated that the tests reject the null hypothesis of non-stationary at level, with a 5% level of significance. Foreign direct investment appeared to be stationary at a level form in all cases except for Fisher- ADF(none) which also implied that test rejects the null hypothesis at a 5% level of significance. However, inflation appeared to be stationary after being differenced once in all cases except for Handri test, I'm, Pearson and Shin and Levin, Lin

and Chu tests for individual intercept and trend. The results are reported in Table 1, which indicated that the panel model is integrated of order different orders [zero and one, that is $I(0)$ and $I(1)$]. The results are contradictory to those of Mahembhe (2014); Chotivanich, Tripura, Das, Day, Pukrittayakamee, Chuor, Socheat, Dondorp, and White (2014); Denbel, Ayen, and Regasa (2016) are consistent to the studies of Ncanywa and Mabusela (2017); Zakarya, Mostefa, Abbes and Seghir (2015). Having tested the stationarity of all the variables in table 1. Next, the study employed a simple Granger causality procedure inspired by Emirmahmutoglu and Kose (2011); Seyoum, Wu and Lin (2014) to investigate if there exists a causal link between FDI, budget deficit, inflation, and interest rate.

5.3. Panel causality test results

One of the objectives of this study is to establish the causal relations between foreign direct investment (FDI) and the budget deficit (BD). In other words, to examine whether the past values of foreign direct investment can help to explain the current values of budget deficit or vice versa. In particular, it is necessary to determine the optimal number of lags in the model when analysing the causality between the variables. Kresimir and Petar (2015) are of the view that the value of the optimal number of lags can be determined based on the information criteria of the model quality, AIC (Akaike), SC (Schwarz) and HQ (Hannan-Quinn). Table 2 presents the results of the panel Granger (1969) causality test across the countries under study.

Table 5. 2 BD, FDI, LINF, and LINT Causality Test Results

Null Hypothesis	F-Statistic	Prob.	Remarks
FDI does not Granger Cause BD	1.94955	0.1101	
BD does not Granger Cause FDI	5.59208	0.0005	Unidirectional
INF does not Granger Cause BD	0.09698	0.9831	
BD does not Granger Cause LINF	1.38637	0.2460	No causality
LINT does not Granger Cause BD	2.49692	0.0491	
BD does not Granger Cause LINT	1.79353	0.1381	Unidirectional
INF does not Granger Cause FDI	0.25988	0.9028	
FDI does not Granger Cause LINF	4.13505	0.0042	Unidirectional
LINT does not Granger Cause FDI	2.37077	0.0592	
FDI does not Granger Cause LINT	2.17890	0.0787	Bidirectional

LINT does not Granger Cause LINF	4.22124	0.0037	Bidirectional
INF does not Granger Cause LINT	2.36943	0.0593	

Source: Extracted from E-views 9.0 Output (Author's Computation, 2019)

Table 2 reveals the results of the panel Granger causality test between budget deficit (BD), foreign direct investment (FDI), inflation (LINF) and interest rate (LINT) by using panel annual data for the period 1996 to 2017 for the selected SADC countries. From Table 2 the optimum lag length for the Granger causality test was automatically selected by using Schwarz information criteria (SIC). Hence, the study achieved the F-statistics, and probability values, which permit checking whether changes in one series affect another variable. The results of the Granger causality test showed that in three cases (FDI and BD; LINT and BD; FDI and INFL) unidirectional causality exists. For example, there is also strong evidence to reject at a 5 percent level of significance, the null that foreign direct investment does not Granger cause budget deficit and budget deficit does Granger cause foreign direct investment. There is unidirectional causality that is very strong running from budget deficit to foreign direct investment. The budget deficit does Granger cause foreign direct investment as the probability is 0.0005 and F-statistic is 5.59208. P-value is less than 5%, therefore the null hypothesis is rejected. This implies that any change in budget deficit causes a change in foreign direct investment in the SADC region. Hence, it can be concluded that budget deficit leads to more Foreign Direct Investment inflow in the SADC region which is supported by some studies (Senibi, Oduntan, Ayo, Makwal & Eldad, 2017; Noko, 2016).

On the other hand, in relation to interest rate and FDI, both the null hypothesis that Interest rate does Granger cause foreign direct investment, and foreign direct investment does Granger cause interest rate is accepted (p-value is less than 5%). Therefore, there is bi-directional causality running from interest rate to foreign direct investment and foreign direct investment to the interest rate. This implies that LINT granger causes FDI, that is there is a positive and direct relationship between FDI and LINT. The higher the level of interest rate in SADC countries, the more inflows of foreign direct investment. This means that LINT has contributed significantly towards FDI in SADC countries during the period under consideration. Therefore, it can be concluded that the level of interest rate across the countries can be used to predict the value of FDI in the long run (Uwubanmwen & Ogiemudia, 2016). The results also show that there is no causality between inflation and budget deficit. These results contradict that of Oladipo and Akinbobola (2011), who found

that deficits can lead to inflation, if and only if the economic output is at full employment level.

Further, foreign direct investment alone does Granger cause inflation in SADC countries. From the result, it was reported that there exists a unidirectional causality between the interest rate and inflation. As shown in Table 2, while there is a causal relationship from interest rate to the inflation rate in SADC countries, there is also a causal relationship from inflation rate to interest rate at a 10% significance level. The purpose around the direction of causality is to assist policymakers to trace out policies for the elimination of budget deficit in the SADC countries. The findings suggested the important role of FDI in reducing the budget deficit. As confirmed by other scholars and researchers, the results of this study are similar to a number of empirical studies of Ramírez (2007); Fedderke and Romm (2006); Vogiatzoglou and Nguyen (2016); Tan and Tang (2016), who provide strong evidence on the causal impact of foreign direct investment and budget deficit.

Next, know that the causality between foreign direct investment and budget deficit exists, the researcher is likely to employ panel co-integration method to test the existence of the long-run relationship in the series across the selected SADC countries.

5.4. Panel Co-integration test results

As mentioned earlier, economic theory often suggested that certain pairs of economic or financial variables should be linked by a long-run economic relationship (Koster, 2009). Thus, to investigate the presence or existence of the long-run relationship, the study has employed a panel co-integration test (Mahembe, 2014; Haseeb et al., 2014). Coiteux and Olivier (2000) are of the view that the panel co-integration test constitutes an exceedingly testing power than the conventional Co-integration test. The purpose of this test is to test whether variables are co-integrated amongst one another in the long run. Furthermore, the framework of this test deals with regression models with $I(1)$ and $I(0)$ data (Koster, 2009). Therefore, it is appropriate for the researcher to continue to test the co-integration panel by relying on Pedroni (1999; 2004), Kao (1999) and Fisher tests.

Pedroni (1999; 2004) test involves seven tests in total, and all of them mainly tests the null hypothesis of no Co-integration and the homogenous panel (Mahembe, 2014). The results are shown in table 4(a-e) and were performed with respect to intercept and time trend. But before conduction co-integration, the researcher employed the lag selection criteria to

regulate the number of lags used in the study. As indicated by the Akaike criterion (AIC), Schwarz criterion (SC), Hannan-Quinn criterion (HQ), modified Schwarz and modified Hannan-Quinn, a Lag 5 criterion has been selected on table 3 (McConnell, Brue & Flynn, 2009). Table 3 presents the VAR lag order selection criteria used.

Table 5. 3 VAR Lag order selection criteria, 1996–2017.

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-366.1339	NA	0.460130	10.57525	10.70374	10.62629
1	-155.3742	391.4109	0.001765	5.010692	5.653119*	5.265872
2	-123.0762	56.29077	0.001113	4.545035	5.701404	5.004359
3	-99.56825	38.28442	0.000909	4.330522	6.000832	4.993989*
4	-77.89849	32.81421*	0.000790	4.168528	6.352781	5.036140
5	-59.76169	25.39152	0.000771*	4.107477*	6.805671	5.179233
6	-44.79535	19.24244	0.000839	4.137010	7.349146	5.412910
7	-32.60903	14.27540	0.001014	4.245972	7.972050	5.726016
8	-14.49480	19.14934	0.001068	4.185566	8.425585	5.869753

Note: *, indicates a chosen criterion: VAR, Vector autoregressive; LR, sequential modified LR test statistic (each test at 5% level); FPE, Final prediction error; AIC, Akaike information; criterion; SC, Schwarz information criterion; HQ, Hannan-Quinn information criterion.

Table 5. 4 (a) Result of Pedroni residual co-integration test

Within dimension				
Group	**Statistic**	**Prob.**	**Weighted statistics**	**Prob.**
Panel v-Statistic	0.037982	0.4849	-0.059495	0.5485
Panel rho-Statistic	0.368851	0.6439	0.052643	0.5210
Panel PP-Statistic	-2.115824	0.0172	-1.748456	0.0402
Panel ADF-Statistic	-3.558935	0.0002	-2.189970	0.0143

Table 5. 5 (b) Result of Pedroni residual co-integration test

Between dimension		
Group	**Statistics**	**Probability**
Group rho-Statistic	1.283333	0.9003
Group PP-Statistic	-2.309472	0.0105
Panel ADF-Statistic	-3.124002	0.0009

Table 5. 6 (c) Kao Residual co-integration test

Variable	**t-statistic**	**Probability**
ADF	-4.839792	0.0000*

ADF, Augmented Dickey-Fuller. * Indicate that the estimated parameters are significant at the 5% level.

Table 5. 7 (d) Johansen Fisher panel co-integration test, 1996-2017.

Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)				
Hypothesized No. of CE(s)	Fisher Statistics (from trace test)	Prob.	Fisher Statistics (from the max-Eigen test)	Prob.
None	67.09	0.0000	46.02	0.0000
At most 1	31.77	0.0004	24.37	0.0067
At most 2	17.01	0.0742	15.75	0.1069
At most 3	9.715	0.4659	9.715	0.4659

* Probabilities are computed using asymptotic Chi-square distribution.

Table 5. 8 (e) Individual cross section results, 1996–2017.

Individual Cross Section results	Trace Test Statistics	Prob.**	Max-Eign Test Statistics	Prob.**
The hypothesis of no co-integration				
MALAWI	33.3233	0.2060	18.0908	0.2675
TANZANIA	47.9331	0.0069	24.4548	0.0456
SOUTH AFRICA	65.5312	0.0000	33.2563	0.0022
ZAMBIA	70.2717	0.0000	40.0358	0.0002
NAMIBIA	47.1642	0.0085	26.8419	0.0212
The hypothesis of at most 1 co-integration relationship				
MALAWI	15.2324	0.4373	10.9267	0.3925
TANZANIA	23.4783	0.0628	12.9648	0.2301
SOUTH AFRICA	32.2750	0.0040	19.3796	0.0287
ZAMBIA	30.2360	0.0079	22.8788	0.0079
NAMIBIA	20.3223	0.1455	12.6670	0.2500
The hypothesis of at most 2 co-integration relationship				
MALAWI	4.3058	0.6667	4.2999	0.5812
TANZANIA	10.5135	0.0986	8.8803	0.1256
SOUTH AFRICA	12.8954	0.0400	9.6641	0.0929
ZAMBIA	7.3571	0.2910	7.2994	0.2246
NAMIBIA	7.6553	0.2646	7.0024	0.2493
The hypothesis of at most 3 co-integration relationship				
MALAWI	0.0058	0.9500	0.0058	0.9500
TANZANIA	1.6332	0.2363	1.6332	0.2363
SOUTH AFRICA	3.2313	0.0856	3.2313	0.0856
ZAMBIA	0.0577	0.8439	0.0577	0.8439
NAMIBIA	0.6529	0.4793	0.6529	0.4793

**, Indicates significance at a 5% level.

The Pedroni (1999; 2004) statistics are one-sided tests with a critical value of -1.64 ($k < -1.64$ implying the rejection of the null), except the t-statistic that has a critical value of 1.64 ($k > 1.64$ suggesting the rejection of the null). Hence, *** indicates the rejection of the null

hypothesis at the 1% level, ** indicates the rejection of the null hypothesis at the 5% level and *, implies the rejection of the null hypothesis at the 1% level.

The study aimed at examining the long-run relationship between foreign direct investment and budget deficit. To achieve this objective, the panel of Pedroni (1999), Kao (1999) and Johansen Fisher co-integration tests were employed. This was shown in table 4(a-e). The Pedroni tests consist of seven various statistics in total, which are divided into two-part, within the dimension and between dimension. However, all these statistics will either accept or fail to accept the alternative hypothesis based on their probability values. Table 4(a) represents the first four group statistics (within dimension) whereas table 4(b) presented the last three group statistics (between dimension) of the panel. It is important to note that amongst all the tests if the null hypothesis is rejected, depending on the probability value, then variables are co-integrated, vice versa.

The results of the Pedroni (1999) panel co-integration tests, revealed that out of all the eleven outcomes, at five percent (5%) level of significance, four outcomes do not reject the null hypothesis of no co-integration, whereas the remaining seven outcomes reject the null hypothesis of no co-integration. The results confirm that there is a co-integrating between the examined variables. Therefore, table 4(a; b) support the presence of a long-run stable relationship between budget deficit and foreign direct investment model in the selected SADC countries (Malawi, South Africa, Tanzania, Namibia, and Zambia).

Table 4(c) depict the Kao's tests (1999) for the homogeneous panel co-integration result. The Kao test composes of the notion that if a probability value is higher than the 0.05, then the null hypothesis is accepted. The results indicated that all variables used in this model are significant and reject the null hypothesis (no co-integration) at a 5% level of significance. Hence, it is safe to conclude that budget deficit, foreign direct investment, inflation rate, and interest rate are moving together in the long run since the null hypothesis is rejected at 5% level of significance.

Results of Johannes Fisher co-integration are shown in table 4(d) based on both the trace test and eigenvalue test statistics to determine the number of co-integrating equation(s) (Gujarati & Porter, 2004). Similar to the last two-panel co-integration tests (Pedroni & Kao's tests), either the presence or no presence of co-integration is determined by the probability value of a variable. For instance, if the probability value of a variable is less than 0.05 co-integration exists, vice versa.

Based on Johansen's Fisher panel test in table 4d, in Max-Eigen test only two probability values are less than 0.05 which implies that only two variables are statistically significant and support the presence of a co-integrated relation at the 5 percent significant whereas in the cases of trace statistics also only two variables are statistically significant at 5% level. Hence, it is saving for the researcher to finalize that, two co-integrating equations exist in the itemized model. Therefore, the study can conclude from these results of panel co-integration tests that, there is a panel long-run equilibrium relationship amongst the variables used under the study.

The study performed individual cross-section results across the selected countries under the study, which are presented in table 4e. The order of the presentation starts with the hypothesis of none, followed by at most 1, 2 and 3. The notion of the presentation is that if p-values are less than 0.05 co-integration exists. Firstly, at the hypothesis of no integration for Malawi, the analysis showed no co-integration for both trace and the max-eigen tests statistics. Such that, the researcher concludes that co-integration amongst the variables does not exist in Malawi. However, as for the remaining countries (Tanzania, South Africa, Zambia, and Namibia) at none, there is the existence of two co-integrating equations, since the probability values of these countries are less than 0.05 in both the trace and the max-eigen tests statistics. The results specified that a long-run relationship exists between budget deficit, foreign direct investment, inflation and interest rate towards each country in the SADC region except for Malawi.

At the hypothesis of at most 1 co-integration in table 3e for both South Africa and Zambia, there are co-integrating equations; this shows that p-values are less than 0.05 and that there is a long relationship between the variables in the specified model. Although for Malawi, Tanzania, and Namibia there exists no co-integrating equation; this is indicated by the p-values of greater than 0.05 under both trace and the max-eigen tests statistics. Under the hypothesis of both at most 2 and 3 co-integration in table 3e for all countries, the p-values are greater than 0.05 except for South Africa at most 2 under the trace statistic. This implies that for all countries there exists no co-integrating equation except for South Africa with 1 co-integration. In conclusion, the trace and maximum eigenvalue tests at the hypothesis of at most 2 co-integration, indicated one co-integrating equation and at most 3 indicated no co-integrating equation across all countries because all p-values are greater than 0.05. Therefore, the existence of long-run relationships in this study is consistent with the study of Moudatsou and Kyrkilis (2011), Chasapis, Retino, Sahraoui, Vaivads,

Khotyaintsev, Sundkvist, Greco, Sorriso-Valvo and Canu (2015); Hassen and Anis (2012). Following the existence of a co-integration relationship, it is applicable to estimate the autoregressive distributed lag model (ARDL).

5.5. Empirical Analysis of the Panel ARDL Regression Results

Since the long-run relationship between the variables is proven, the coefficients of such a long-run relationship are estimated by using a maximum lag of 5. The Akaike Information Criteria (AIC) had selected a model of ARDL (2, 3, 3, 3) arrangement. This will help to differentiate between the long and short term effects of variables under the study.

The autoregressive distributed lag (ARDL) test results aimed at providing the estimates of the long- and short-run relationships [table 5(a, b)]. Thus, the estimated short and long-run coefficients of this relationship are done by ARDL method as follows:

Table 5. 9 (a) ARDL Long Run Coefficients estimated- (BD as a Dependent Variable)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI	-1.651288	0.425380	-3.881909	0.0003
LINF	-26.83473	5.470936	-4.904961	0.0000
LINT	2.140105	1.866090	1.146839	0.2573
C	21.35951	8.643378	2.471199	0.0171

In table 5a, it is perceived that in the long run, budget deficit-foreign direct investment nexus is negative in the sense that one percent increase in foreign direct investment inflows per year in SADC countries led to 1.651288 percent decrease in budget deficit growth per year during 1996-2017 which is significant at 5% level. These results are consistent with the studies conducted by Fatima, Ahmed and Rehman (2012); Molefe and Maredza (2017).

Thus, suggesting that foreign direct investments flow to SADC countries has an exciting effect on-budget deficit. This shows the importance of foreign direct investment inflows on-budget deficit in the long-run. Therefore, the government should focus more on policies that bring awareness in attracting foreign direct investment inflows. This observation is similar to the studies of Bastaki, Bizzari, Hamici, Nair, Mohamed, Saif, Malik and Hamzeh (2018). The results follow the neo-classical approach who said that there is an inverse relationship between budget deficit and foreign direct investment.

Similarly, at a 5% level of significance, inflation has a negative significant impact on the budget deficit in the long run along with its coefficient value of -26.83473. That is, a 1%-point increase in the ratio of inflation to budget deficit should lead to a long-term decrease in the budget deficit by 26.83473% points, holding other factors constant. This analysis implies that countries that experienced a higher level of the inflation rate will have the capacity to eliminate budget deficit during the period 1996 to 2017. However, the interest rate has a positive insignificant impact on the budget deficit at a 5 percent level since the coefficient is 2.140105 and its probability value is 0.2573. The major implication of this study is that the budget deficit in SADC countries is caused by a higher interest rate. A comprehensive policy package involving budgetary and monetary policies is required to deal with the interest rate. This means that a 1 percent increase in interest rate will result in an increase in the budget deficit by 2.140105 percent holding other variables stable. These results are more or less similar with the result of Alfaro, Chanda, Kalemli-Ozcan and Sayek (2004); Tahir and Muhammad (2008), but contradicts with that of Garcia and Ramajo (2004); Nair-Reichert, and Weinhold (2001), who found a negative relationship between the variables.

Table 5. 10 (b): Estimated Short-Run Error Correction Model using ARDL Approach

After estimating the long-run co-integrating test, the short-run dynamic relationship among the variables within the ARDL framework was conducted.

ARDL (2, 3, 3, 3) selected based on AIC		**Dependent Variable: BD**		
Variable	Coefficient	Std. Error	t-statistic	Prob.
D(BD(-1))	-0.080636	0.122277	-0.659454	0.5128
D(FDI)	0.477551	0.206953	2.307531	0.0255
D(FDI(-1))	0.318443	0.207336	1.535877	0.1313
D(FDI(-2))	0.017379	0.019593	0.886992	0.3796
D(LINF)	37.64632	68.64261	0.548440	0.5860
D(LINF(-1))	-19.70974	38.24390	-0.515369	0.6087
D(LINF(-2))	13.94005	28.67255	0.486181	0.6291
D(LINT)	0.468636	0.973199	0.481542	0.6324
D(LINT(-1))	0.822393	1.877899	0.437933	0.6634
D(LINT(-2))	-0.619619	2.149712	-0.288233	0.7744
COINTEQ01	-0.363805	0.160353	-2.268778	0.0279
BD = -(-1.65128795445*FDI - 26.8347263134*LINF + 2.14010544137*LINT)				

Source: Extracted from E-view 9.0 Output (Author's Computation, 2019)

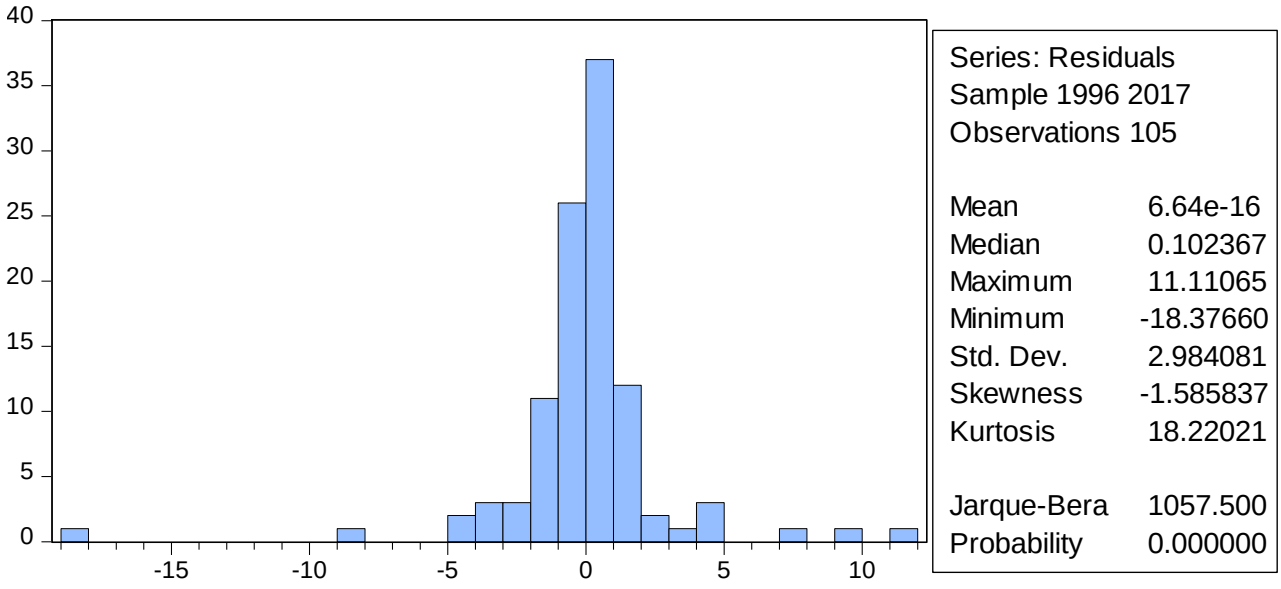
Table 5b presents ARDL short-run estimates. The table indicated the short-run estimates obtained from differenced variables under the study together with the speed of adjustment towards the equilibrium. Based on the method of Akaike Information Criterion (AIC), the maximum lag length is automatically selected. According to AIC information criterions, the study found ARDL (2, 3, 3, 3) as the superlative equation. From table 5b estimated how differenced foreign direct investment, inflation rate, and interest rate affect budget deficit in the short run. Furthermore, foreign direct investment has a positive impact on the budget deficit in the short run. The results are supported by the Keynesian view that there is a positive but the relationship between budget deficit, foreign direct investment and economic growth. Table 5b further estimate the coefficient of the Cointegration equation (CointEq1).

Often times, the coefficient of the Cointegration equation (CointEq1) is called the error correction term ECM (-1) or the speed of adjustment toward equilibrium. The purpose of the speed of adjustment is to signify that by how much percentage equilibrium will be re-established in the future. The notion is that, if the ECM coefficient is greater than zero it means there is a surplus of the dependent variables, a reduction is therefore required to restore equilibrium as opine by (Patterson, 2000). The results in table 5b indicate that the sign of the coefficient of the co-integration equation (CointEq1) is negative and significant since its probability value is 0.0279 which is less than 0.05. The negative sign proved that, although shocks can exist in the economy, the equilibrium level will be corrected (Goldstein, Newbury, Michael, Ritchie, Scott & Joy, 2017). Therefore, this implies that there exists a long-run causality successively from foreign direct investment (FDI), inflation (LINF) and interest rate (LINT) to budget deficit (BD). The estimated coefficient of the co-integration equation Co-intEq (-1) is -0.363805 and the probability value = 0.0279 indicating that the speed of adjustment from short-run disequilibrium toward long-run equilibrium level, particularly 0.363805 percent of short-run errors will be restored in the long run or next period. In other words, the COINTEQ01 coefficient of 0.36% approximately indicates that about 36% of the previous year's disequilibrium in the economy is corrected in the long run. The statistical significance of the error correction coefficient at a 5% level supports the fact that budget deficit is indeed co-integrated with foreign direct investment, inflation rate, and interest rate. Thus, it can be concluded that budget deficit plays no role in conveying the economy to its equilibrium.

5.6. Diagnostic tests

The analysis of the adequacy of the VEC model was also conducted. An overview of diagnostic test results is given in Table 6.

Table 5. 11 Diagnostic tests

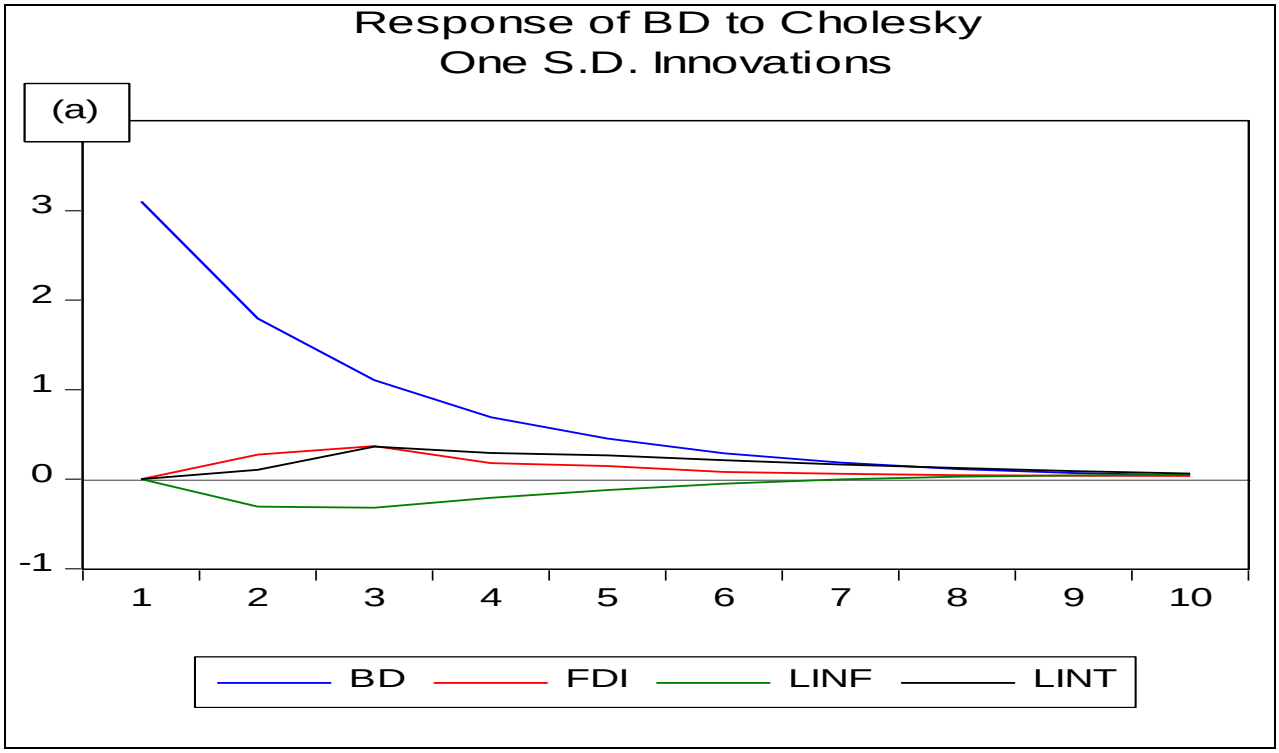


After running the ADRL model, diagnostic tests were conducted. In statistics and econometrics, however, diagnostic tests are used to determine whether a data set is modelled for normal distribution. The diagnostic can be used to extract information about the structure of the data. The diagnostic checks were performed in order to confirm if the model estimated is of a good fit. The goodness of the model was tested by employing Jarque-Bera for normality test. Results presented in table 5.11 suggest that the model estimated is of good fit and the residuals are distributed normally. The notion is that if the probability values of all lags along a particular test are less than 0.05, the null hypothesis is rejected or vice versa. These results align well with many works of literature, such as the results of Sundari (2014); Dimitrios and Argiro (2011).

5.7. Impulse response function results

Figure 7(a-d) presents the impulse response test results. The analysis is devoted to the reaction of certain variables on the unit shock in other variables over a period of 1996 to 2017.

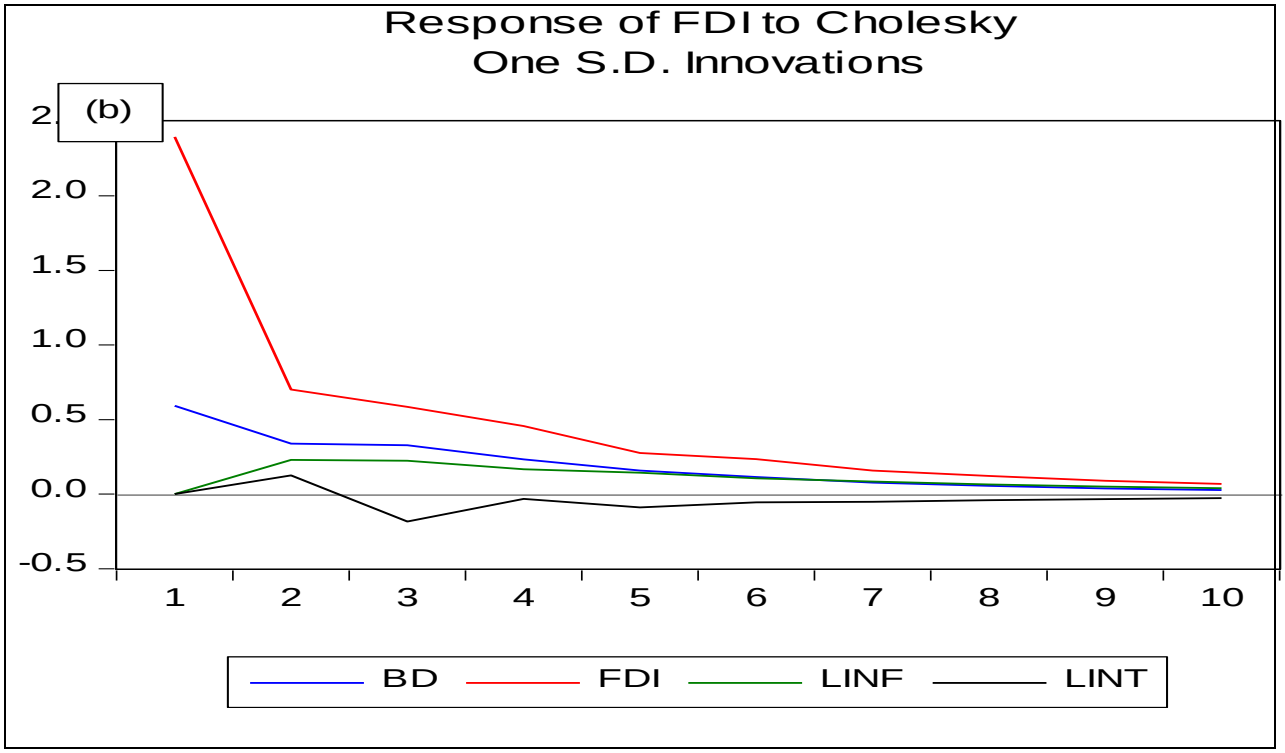
Figure 5. 1 (a) : Response of BD



Source: Author's calculations

Figure 1a depicts the response of budget deficit to foreign direct investment, inflation rate, and interest rate; from first to the tenth period, the response is positive towards FDI, and LINT. On the other hand, there is a negative impact of a shock in budget deficit on inflation but disappear in the fourth quarter. This means that any innovations in the budget deficit will result in a positive response towards foreign direct investment and interest rate but negative response towards the inflation rate. This implies that countries with the budget deficit are encouraged to attract more FDI inflows and experienced a decline in the inflation rate, which may increase the consumption expenditure of that country as the price of the product will be lower.

Figure 5. 2 (b): Response of FDI

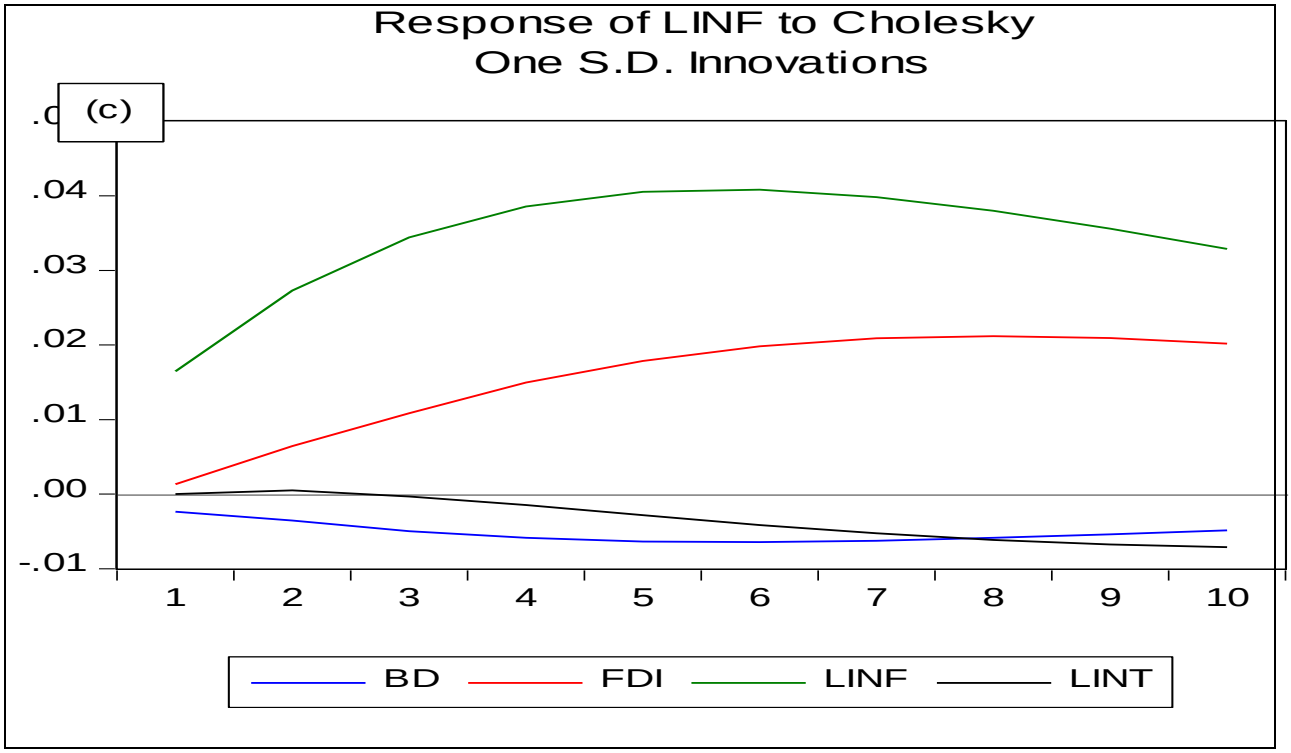


Source: Author's calculations

Figure 7b shows the response of foreign direct investment to interest rate, budget deficit, and inflation rate. The shock of one standard deviation in foreign direct investment has a positive effect on the interest rate in the first two quarters, after which the effect begins to fade away. Furthermore, there is a positive effect of shock in foreign direct investment on-budget deficit, and inflation rate. This means that any innovations in foreign direct investment will adversely impact the interest rate from the second quarter but positively impact budget deficit and inflation rate throughout the period.

This figure emphasises the importance of foreign direct inflows amongst the remaining variables under the study. It outlined foreign direct investment inflows as an important tool for the development of an economy since foreign companies bring employment, new funds, capital investment and advanced technology in the host country. As mentioned earlier, the modern world economy cannot develop successfully without foreign investment. Many foreign countries invest their funds to other countries that have great budget balance, a certain income and developing certain branches of industries of such countries (Ahmad, 2015; Ibrahim & Muthusamy, 2014).

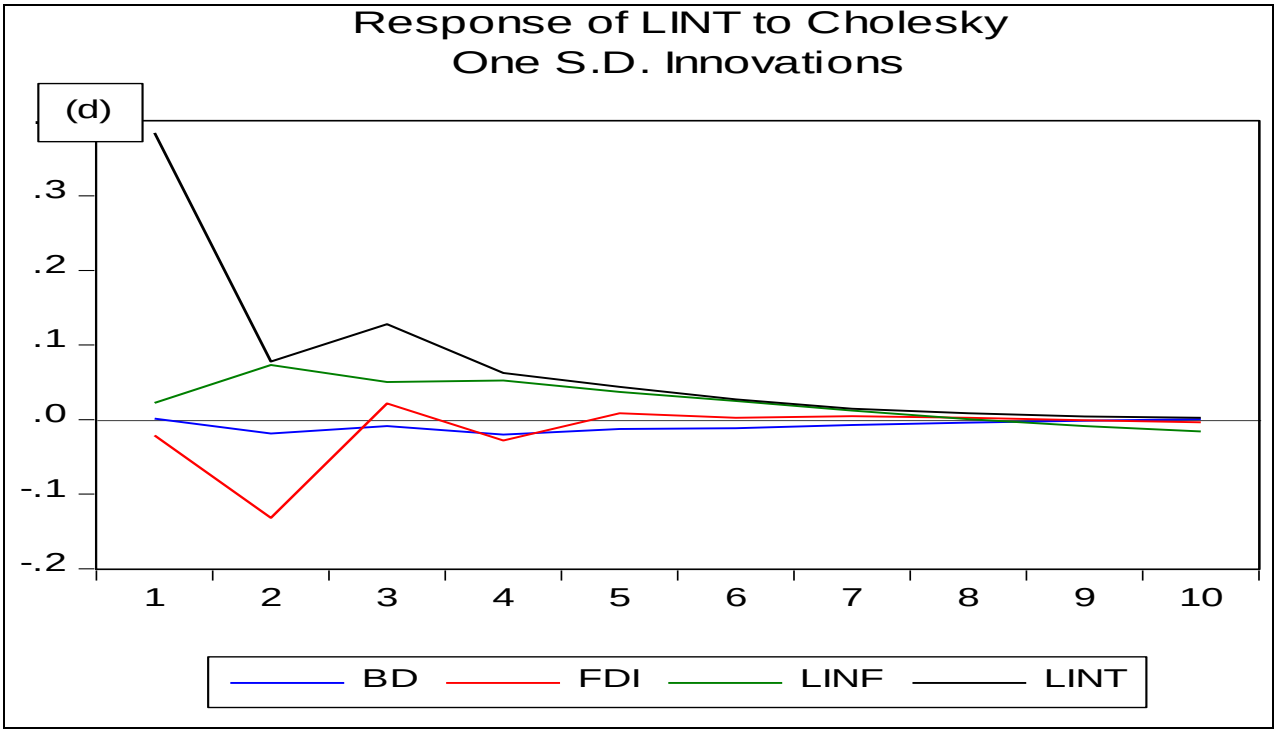
Figure 5. 3 (c): Response of LINF



Source: Author's calculations

An increase in the inflation rate by one standard deviation has a slight positive, almost neutral effect on foreign direct investment. On the other hand, the response of inflation to the budget deficit and interest rate indicates a negative shock during the rest of the period. This implies that countries that experience an increase in the general price level over a specific period of time encounter a decrease in the budget deficit and a cut of the interest rate.

Figure 5. 4 (d): Response of LINT



Source: Author's calculations

An increase of interest rate by one standard deviation has a slight positive, almost neutral effect on the inflation rate. While on the other hand, a negative impact of a shock in the interest rate on the budget deficit and foreign direct investment during the period.5.8. Variance decomposition. The results of the variance decomposition analysis for the period of 10 years are presented in Table 7a-d**.** The results aimed at indicating how much a shock in each of the variables in the system influences the other variables under the study. Presuming a certain order of variables in the model, Cholesky factorization is selected. It is known that the results of the analysis can also be affected by the order of the variables. The tables are shown below:

Table 5. 12 (a): Variance decomposition results of a budget deficit, 1996–2017

Period	S.E.	BD	FDI	LINF	LINT
1	2.418916	100.0000	0.000000	0.000000	0.000000
2	2.883069	92.27095	4.735620	1.842333	1.151098
3	3.167851	86.00100	7.497718	5.512222	0.989063
4	3.487569	74.93867	15.53992	8.356230	1.165182
5	3.708730	70.13939	19.34283	9.486744	1.031035
6	3.907926	66.27584	23.10364	9.687365	0.933159
7	4.123426	63.15187	26.53636	9.314370	0.997397
8	4.306402	61.10860	29.04684	8.924895	0.919669
9	4.496089	59.18566	31.47549	8.492587	0.846267
10	4.687159	57.32545	33.74766	8.069432	0.857461

SE, standard errors; BD, budget deficit; FDI, foreign direct investment; LINF, inflation rate; LINT, interest rate as a percentage of GDP.

In table 5.12 (a) it should be noted that the budget deficit fully explains 100% of the variance of its own prognostic error in the first future period. The table showed significant values of the shocks from the first to the tenth period, which indicated that the budget deficit is mainly shocked by its own innovations. These results, however, correlate with the impulse response function in figure 5.1 (a). Furthermore, FDI follows to indicate a significant contribution to influence budget deficit.

Table 5.13 (b): Variance decomposition results of foreign direct investment, 1996–2017.

Period	S.E	BD	FDI	LINF	LINT
1	2.396804	18.09086	81.90914	0.000000	0.000000
2	2.608822	21.35535	77.83101	0.619937	0.193704
3	2.765415	19.63780	74.25132	0.816649	5.294233
4	3.203355	21.42675	73.18791	0.764192	4.621148
5	3.368539	22.82859	71.78529	0.933613	4.452514
6	3.549790	23.06883	69.43834	0.937682	6.555148
7	3.808162	23.58175	69.68184	0.859447	5.876962
8	3.938721	24.28445	69.04331	0.865738	5.806505
9	4.103803	24.57331	68.22133	0.826717	6.378642
10	4.291966	24.98920	68.38074	0.781252	5.848799

The variance decomposition of foreign direct investment result indicates that shocks to itself account for most of the inconsistency in all the periods under the study.

The shock to budget deficit decreases from the beginning and continued to decrease at a later time horizon period. On the other hand, the shocks from the innovation to inflation rate and interest rate accounts for most of the variability in all periods.

Table 5. 14 (c): Variance decomposition results of inflation rate, 1996–2017.

periods	S.E	BD	FDI	LINF	LINT
1	0.015321	1.168550	4.839095	93.99236	0.000000
2	0.034641	0.612921	10.19868	88.75094	0.437465
3	0.056006	0.272763	13.69157	84.93421	1.101451
4	0.076555	0.177932	14.50825	84.32449	0.989320
5	0.096131	0.134577	15.27002	83.63544	0.959964
6	0.114573	0.106227	15.86807	82.95039	1.075316
7	0.131506	0.092199	16.09064	82.76001	1.057156
8	0.147308	0.080689	16.34748	82.51928	1.052556
9	0.162076	0.072126	16.53967	82.30060	1.087607
10	0.175790	0.067092	16.62639	82.22710	1.079414

In the short and medium-term, the variance decomposition of the inflation rate to itself accounts for most of the inconsistency but with a significant increase in the long-run horizon. The shock to the budget deficit decreased from the beginning but with a little decline in the longer-term periods. Equally, the shock to interest rate declined from the short and medium-term but with little increase in the longer-term periods.

Table 5. 15 (d): Variance decomposition results of interest rate, 1996–2017.

Period	S.E	BD	FDI	LINF	LINT
1	0.377018	1.682588	0.000441	0.297804	98.01917
2	0.398807	2.749646	4.500842	1.351894	91.39762
3	0.422241	2.507129	5.138036	2.529825	89.82501
4	0.505888	1.935650	3.801896	3.311434	90.95102
5	0.524760	2.762828	4.265939	4.822777	88.14846
6	0.559157	2.458413	4.613070	5.802137	87.12638
7	0.608525	2.223735	4.006538	6.596718	87.17301
8	0.626575	2.524550	3.863742	7.888286	85.72342
9	0.660621	2.316345	3.952567	8.537365	85.19372
10	0.695709	2.228712	3.608586	9.163919	84.99878

From table 7d, the shock of the interest rate to itself decreases from the beginning and continued to account for most of the variability at a longer-term horizon. The interest rate shock to foreign direct investment declining from the beginning and have little increase at a later horizon. Equally, the shock to budget deficit declined from the short and medium and in the longer-term periods.

5.8. Chapter Summary

This chapter examined the nexus among budget deficit, foreign direct investment inflows, inflation rate and interest rate in SADC countries. The results of this study showed that there is a significant negative relationship between foreign direct investment and budget deficit as well as between budget deficit and inflation rate but insignificant. The autoregressive distributed lag model (ARDL), was used to capture the short and long-run dynamic relationships between the series. It was found that both in the short and long run, unidirectional causalities exist running from budget deficit to foreign direct investment inflows and from interest rate to budget deficit as well as from inflation rate to foreign direct investment. Further, bidirectional causality was found running from interest rate to foreign

direct investment, vice versa. Although, the results of causality didn’t show an interconnection between budget deficit and inflation.

CHAPTER SIX

CONCLUSION AND POLICY IMPLICATIONS

6.1. Summary of the study

The main objective of this study was to examine the nexus between foreign direct investment and budget deficit in SADC countries. The study also investigated the causality between the variables and used the recently developed panel-data analysis methods to examine this causal relationship. This was done in order to determine if the foreign direct investment does have an impact on the budget deficit on SADC countries (Malawi, Tanzania, South Africa, Namibia, and Zambia). The first objective is to investigate the impact of FDI on-budget deficit. Secondly, to assess if a short and long-run relationship exists between budget deficit and FDI in SADC. Thirdly, to evaluate if there is a causal relationship between budget deficit and FDI.

In Chapter 2, the case study approach was employed to an overview of FDI and budget deficit dynamics in SADC countries. The findings show that in most SADC countries there is a negative relationship between FDI and budget deficit. In other words, as budget deficit decline, FDI increases, ceteris paribus. Hence, FDI plays an important role in the growth of such countries since policies were adopted to attract more foreign investors. Although, most of these policies had a somewhat negative effect on FDI inflows which were thus fairly low during the first two decades. Despite an increase in FDI inflows in recent years in these countries, there were still a number of challenges faced by some of these countries which include, e political instability, policy uncertainty, poor infrastructure, and difficulties in doing business.

Furthermore, Chapter 3 explored theoretical and empirical literature on foreign direct investment and budget deficit nexus. Hence, several theories were reviewed on both foreign direct investment and budget deficit. Theories of FDI that include the Production cycle theory of Vernon, Theory of exchange rates on imperfect capital markets, Internalisation theory, and Eclectic paradigm of dunning theory while theories of budget deficit include Neoclassical, Keynesian, and Ricardian's school of thought were discussed. A review of empirical literature showed that a causal relationship and link between FDI and

the budget deficit could be in the form of budget deficit-driven FDI (BD causing FDI), and not another way around (uni-directional causality).

Chapter four reviewed methodology which consists of model specification, the estimation techniques, that were used in order to reach the objectives of the study in chapter one. The study used secondary data from 1996 – 2017, which were sourced from SARB and world bank. To understand the relationship between the variables, the study adopted the augmented Cobb-Douglas production function framework as the basis for the formulation of the model. However, the following analytic techniques were performed namely: by Levin, Lin, and Chu (LLC, 2002), I'm, Pesaran and Shin (IPS, 2003), ADF-Fisher Chi-square test (Choi, 2001), PP Fisher Chi-Square test (Maddala & Wu, 1999), Hadri (2000) and Breitung (2000). Chapter five revealed the empirical evidence, the findings of unit root tests are reported in table 5.1 The results showed that budget deficit appeared to be stationary at a level form I (0) in all cases except for the Fisher-PP test, while Foreign direct investment appeared to be stationary at a level form in all cases except for Fisher- ADF(none). However, inflation and interest rate are integrated of order one, I (1) making the highest order of integration I (1). The diagnostic checks validated the model estimated. The variance decomposition and impulsive response function were also employed to assess the reaction of budget deficit towards shocks coming from the selected variables. Since it was found that budget deficits are detrimental to foreign direct investment in SADC countries, the government should put much emphasis on strengthening policies to attract more foreign investors.

6.2. Conclusion and Recommendations

This study examined the nature of the relationship between budget deficits and foreign direct investment in SADC countries. Overall, this study found a long-run relationship between FDI and budget in SADC. The evident is a negative relationship between FDI and budget deficit. Therefore, holding other variables constant, in the long run, an increase in the budget deficit by 1 percentage is associated with a lower FDI inflows rate, by about 0.23 percentage. In this way, the results follow the Ricardian approach that there is an inverse relation between budget deficit, FDI and economic growth. In this study, it is recommended that government should attract more foreign direct investment so as to minimise budget deficit and this could speed up the development of SADC countries.

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6.3. Areas of further research

The dissertation invites further research to investigate the relationship between budget deficit, foreign direct investment and other macroeconomic variables such as exchange rate, inflation, interest rates or money supply in the SADC region. Time series data can also be used to investigate the relationship between budget deficit, foreign direct investment and other macroeconomic variables. The study also calls for future research using other economic techniques such as VECM and OLS, different sample size or qualitative research designs such as experiments in determining the policies to attract foreign investors in SADC. Moreover, future research can, therefore, be done in examining the relationship between the budget deficit and any of these variables or a simultaneous effect of these variables on-budget deficit. It is also suggested that future research be conducted by levels of individual countries' development. Finally, future studies may also consider subdividing SADC countries into middle and lower-income countries and then test for causality separately.

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APPENDIXES

APPENDIX A: Country List

ABBREVIATION	COUNTRY
MAL	Malawi
TAN	Tanzania
ZIM	Zimbabwe
ZAM	Zambia
RSA	Republic of South Africa
SADC	South Africa Development Community
EU	European Union
ASEAN	Association of South Eastern Asian Nations

APPENDIX B: Variable List

VARIABLE LIST		
NUMBER	**ACRONYMN**	**DESCRIPTION**
1	FDI	Foreign Direct Investment
2	BD	Budget Deficit
3	INF	Inflation
4	INT	Interest rate

APPENDIX D: DATA

COUNTRY	YEAR	BD	FDI	INFL	LINF	INT	LINT
MALAWI	1996	-8,36401	0,692566	12,17786	1,08557097	4,602873197	0,663029
MALAWI	1997	-8,35401	0,558295	13,290594	1,123544384	6,136607321	0,787928
MALAWI	1998	-8,34401	0,691439	17,244366	1,236647236	15,15550944	1,180571
MALAWI	1999	-8,33401	3,295652	24,97056	1,397428288	9,945219847	0,997614
MALAWI	2000	-8,32401	1,491247	32,357224	1,509971252	17,3066457	1,238213
MALAWI	2001	-8,31401	1,124379	39,702314	1,598815815	24,31428075	1,385861
MALAWI	2002	-8,26401	0,168776	45,556275	1,658548202	29,22136223	1,4657
MALAWI	2003	-8,16401	2,053256	49,919107	1,698266807	34,95417997	1,543499
MALAWI	2004	-8,06401	3,101509	55,624764	1,745268182	19,14440701	1,282042
MALAWI	2005	-8,25401	3,82112	64,196732	1,80751292	20,17504782	1,304815
MALAWI	2006	-8,24401	0,889479	73,167772	1,864319832	10,23841066	1,010233
MALAWI	2007	-8,23401	2,806014	78,986227	1,897551369	22,68551349	1,355749
MALAWI	2008	-8,21401	3,672693	85,867983	1,933831259	11,89045703	1,075199
MALAWI	2009	-7,36401	0,793569	93,099822	1,968948851	16,07989435	1,206283
MALAWI	2010	-3,10846	1,393891	100	2	11,14611158	1,047123
MALAWI	2011	-2,77725	10,15434	107,62282	2,031904378	8,480538293	0,928423
MALAWI	2012	-3,7195	-0,1474	130,51556	2,115662286	12,47173731	1,095927
MALAWI	2013	-4,77836	8,178481	166,12455	2,220433826	14,69812997	1,167262
MALAWI	2014	-4,53517	9,889322	205,64901	2,313126633	19,36231212	1,286957
MALAWI	2015	-3,43078	8,097844	250,619	2,399013992	19,78896166	1,296423
MALAWI	2016	-2,46071	5,993557	305,03117	2,484344227	20,55136522	1,312841
MALAWI	2017	-1,50424	4,396308	340,24212	2,531788082	22,14972511	1,345368
TANZANIA	1996	-6,67267	2,310066	34,551974	1,538472868	12,27968756	1,089187
TANZANIA	1997	-5,05051	2,054764	40,111613	1,603270129	4,712578399	0,673259
TANZANIA	1998	-4,12304	1,404238	45,245801	1,655578282	26,49957712	1,423239
TANZANIA	1999	-3,92944	4,06492	48,815891	1,688561219	10,12178781	1,005257
TANZANIA	2000	-3,85026	3,464426	51,707725	1,713555433	12,36253164	1,092107
TANZANIA	2001	-2,94309	4,044211	54,369364	1,735354252	14,54100202	1,162594
TANZANIA	2002	-3,19191	2,797102	57,260636	1,757856169	8,547002752	0,931814
TANZANIA	2003	-4,8089	2,091408	60,297492	1,780299248	5,624748515	0,750103
TANZANIA	2004	-4,36821	2,653759	63,153061	1,800394409	6,787345317	0,8317
TANZANIA	2005	-2,94683	5,084615	66,332547	1,821726671	8,327256062	0,920502
TANZANIA	2006	-1,63733	2,161114	71,142301	1,85212791	9,612352709	0,98283
TANZANIA	2007	-1,41645	2,66217	76,140414	1,881615234	6,389565193	0,805471
TANZANIA	2008	-3,14656	4,950615	83,966426	1,924105666	1,201762229	0,079819
TANZANIA	2009	-7,84764	3,275734	94,16182	1,973874845	5,492230433	0,739749
TANZANIA	2010	-6,74213	5,663728	100	2	4,675261601	0,669806
TANZANIA	2011	-7,14019	3,547209	112,69097	2,051889115	2,463942653	0,391631
TANZANIA	2012	-7,49367	4,538769	130,72276	2,1163512	4,590680968	0,661877
TANZANIA	2013	-8,65803	4,569258	141,01158	2,149254792	5,649196164	0,751987
TANZANIA	2014	-7,78018	3,347458	149,65787	2,175099562	9,654169256	0,984715
TANZANIA	2015	-8,52152	3,386722	158,02101	2,198714823	7,912490759	0,898313

TANZANIA	2016	-7,37526	2,743174	166,19822	2,220626379	7,896227682	0,89742
TANZANIA	2017	-7,45364	2,213422	175,03784	2,243131935	14,52325948	1,162064
SOUTH AFRICA	1996	-6,67267	0,553079	46,576839	1,668170015	10,7641732	1,031981
SOUTH AFRICA	1997	-5,05051	2,497306	50,581409	1,703990926	11,12419118	1,046268
SOUTH AFRICA	1998	-4,12304	0,399449	54,06169	1,732889616	12,99291942	1,113707
SOUTH AFRICA	1999	-3,92944	1,100279	56,86289	1,754828925	10,25136307	1,010782
SOUTH AFRICA	2000	-3,85026	0,710486	59,898772	1,777417917	5,242548006	0,719542
SOUTH AFRICA	2001	-2,94309	5,978862	63,314143	1,801500731	5,693856798	0,755407
SOUTH AFRICA	2002	-3,19191	1,27847	69,325635	1,840893855	3,15913479	0,499568
SOUTH AFRICA	2003	-4,8089	0,44685	73,262927	1,864884268	8,662872867	0,937662
SOUTH AFRICA	2004	-4,36821	0,306382	72,755926	1,861868372	4,472705882	0,65057
SOUTH AFRICA	2005	-2,94683	2,531169	74,256773	1,870736073	4,908431373	0,690943
SOUTH AFRICA	2006	-1,63733	0,229456	76,66559	1,884600482	4,622282295	0,664856
SOUTH AFRICA	2007	-1,41645	2,199883	81,401846	1,910634253	3,966276006	0,598383
SOUTH AFRICA	2008	-3,14656	3,447016	89,587031	1,952245144	5,782783976	0,762137
SOUTH AFRICA	2009	-7,84764	2,576394	96,095137	1,982701409	3,910358844	0,592217
SOUTH AFRICA	2010	-6,74213	0,983956	100	2	3,274340373	0,515124
SOUTH AFRICA	2011	-7,14019	0,994021	105,01716	2,02126026	2,316453026	0,364823
SOUTH AFRICA	2012	-7,49367	1,167223	111,02828	2,045433615	3,293253452	0,517625
SOUTH AFRICA	2013	-8,65803	2,245376	117,44172	2,069822414	2,208786249	0,344154
SOUTH AFRICA	2014	-7,78018	1,651757	124,64797	2,095685212	3,389953757	0,530194
SOUTH AFRICA	2015	-8,52152	0,479044	130,26861	2,11483977	4,086033747	0,611302
SOUTH AFRICA	2016	-7,37526	0,749056	138,85931	2,142574992	3,450727652	0,537911
SOUTH AFRICA	2017	-7,45364	0,393248	146,05372	2,164512627	4,581039582	0,660964
ZAMBIA	1996	16,10562	3,255291	9,6300873	0,983630226	23,67048576	1,374207
ZAMBIA	1997	16,0501	4,819577	11,981632	1,07851596	16,97662997	1,229851
ZAMBIA	1998	-3,42162	5,596884	14,912154	1,173540371	12,7393085	1,105146
ZAMBIA	1999	0,920106	4,758671	18,906776	1,276617483	19,15879543	1,282368

ZAMBIA	2000	0	3,379914	23,828288	1,377092838	4,66476807	0,66883
ZAMBIA	2001	2,436768	3,541352	28,92606	1,461289281	16,67746349	1,22213
ZAMBIA	2002	1,267631	7,114949	35,35729	1,548478976	21,61562428	1,334768
ZAMBIA	2003	-0,88428	7,078975	42,924309	1,632703309	19,52534147	1,290599
ZAMBIA	2004	-2,12881	5,851719	50,636858	1,70446675	9,196933647	0,963643
ZAMBIA	2005	-4,96224	4,284032	59,915778	1,777541206	9,909085184	0,996034
ZAMBIA	2006	-0,52389	4,827129	65,319926	1,815045681	7,517820242	0,876092
ZAMBIA	2007	-0,46052	9,418112	72,281298	1,859025945	5,240870634	0,719403
ZAMBIA	2008	-2,89062	5,240508	81,277125	1,909968331	7,613795381	0,881601
ZAMBIA	2009	-2,63279	4,53278	92,164402	1,964563212	15,63363346	1,19406
ZAMBIA	2010	-1,66999	8,533198	100	2	6,112942212	0,78625
ZAMBIA	2011	0,433914	4,725044	106,4294	2,027061601	6,949196226	0,841935
ZAMBIA	2012	-1,43004	6,789299	113,42809	2,054720608	4,82303719	0,683321
ZAMBIA	2013	-3,36619	7,48713	121,34273	2,084013768	0,188138406	-0,72552
ZAMBIA	2014	-4,33922	5,553462	130,81581	2,116660227	5,818968761	0,764846
ZAMBIA	2015	-8,71796	7,481503	144,04206	2,158489328	6,178266949	0,790867
ZAMBIA	2016	-8,94072	3,163072	169,78199	2,229891617	1,696020951	0,229431
ZAMBIA	2017	-5,62339	3,347373	169,78199	2,229891617	1,970588249	0,294596
NAMIBIA	1996	24,25333	3,261921	62,573477	1,796390288	3,66215607	0,563737
NAMIBIA	1997	27,00872	2,217421	62,573477	1,796390288	12,37925378	1,092694
NAMIBIA	1998	26,00619	2,514875	62,573477	1,796390288	11,43497481	1,058235
NAMIBIA	1999	-1,3548	0,041701	62,573477	1,796390288	11,04477103	1,043157
NAMIBIA	2000	-0,70884	5,121312	62,573477	1,796390288	4,61814982	0,664468
NAMIBIA	2001	-2,64727	10,91159	62,573477	1,796390288	3,017430074	0,479637
NAMIBIA	2002	-1,30626	4,503987	62,573477	1,796390288	3,402050077	0,531741
NAMIBIA	2003	-5,61172	1,353096	67,038816	1,826326336	13,41040774	1,127442
NAMIBIA	2004	-1,35645	3,449785	69,811965	1,843929864	8,743863254	0,941703
NAMIBIA	2005	0,328299	5,515185	71,405037	1,853728847	4,829854875	0,683934
NAMIBIA	2006	5,194192	7,782628	74,94756	1,874757497	1,615160528	0,208216
NAMIBIA	2007	7,672867	7,662735	79,855037	1,902302316	2,478529185	0,394194
NAMIBIA	2008	4,598058	8,834641	87,117568	1,940105741	2,549995036	0,406539
NAMIBIA	2009	2,054844	9,416369	95,351682	1,979328358	3,884938019	0,589384
NAMIBIA	2010	-2,59686	2,545504	100	2	5,94400652	0,774079
NAMIBIA	2011	-4,71478	6,539236	105,0056	2,021212441	4,744407807	0,676182
NAMIBIA	2012	1,244661	8,407536	112,06407	2,049466387	3,747278602	0,573716
NAMIBIA	2013	-2,35982	6,195991	118,34069	2,07313411	0,466145654	-0,33148
NAMIBIA	2014	-2,45182	3,48807	124,67136	2,095766696	2,297225784	0,361204
NAMIBIA	2015	-4,4547	10,03536	128,90478	2,110269009	7,231062897	0,859202
NAMIBIA	2016	-5,04393	3,1868	137,57723	2,138546547	0,009261859	-2,0333
NAMIBIA	2017	-4,79967	4,457288	146,02987	2,164441685	2,507173142	0,399184

APPENDIX E: Granger Causality Test

Pairwise Granger Causality Tests
Date: 08/20/19 Time: 21:26
Sample: 1996 2017
Lags: 4

Null Hypothesis:	Obs	F-Statistic	Prob.
FDI does not Granger Cause BD	90	1.94955	0.1101
BD does not Granger Cause FDI		5.59208	0.0005
LINF does not Granger Cause BD	90	0.09698	0.9831
BD does not Granger Cause LINF		1.38637	0.2460
LINT does not Granger Cause BD	90	2.49692	0.0491
BD does not Granger Cause LINT		1.79353	0.1381
LINF does not Granger Cause FDI	90	0.25988	0.9028
FDI does not Granger Cause LINF		4.13505	0.0042
LINT does not Granger Cause FDI	90	2.37077	0.0592
FDI does not Granger Cause LINT		2.17890	0.0787
LINT does not Granger Cause LINF	90	4.22124	0.0037
LINF does not Granger Cause LINT		2.36943	0.0593

APPENDIX F: Panel Co-integration tests

1.1. Pedroni test (intercept)

Pedroni Residual Cointegration Test
Series: BD FDI LINF LINT
Date: 07/30/19 Time: 16:27
Sample: 1996 2017
Included observations: 110
Cross-sections included: 5
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

			Weighted	
	Statistic	Prob.	Statistic	Prob.

Panel v-Statistic	-0.370038	0.6443	-0.059495	0.5237
Panel rho-Statistic	0.820672	0.7941	0.492476	0.6888
Panel PP-Statistic	-0.769058	0.2209	-0.945326	0.1722
Panel ADF-Statistic	-2.354568	0.0093	-1.594867	0.0554

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	1.594263	0.9446
Group PP-Statistic	-0.238778	0.4056
Group ADF-Statistic	-1.162172	0.1226

Cross section specific results

Phillips-Peron results (non-parametric)

Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
MALAWI	0.579	1.131317	1.131317	0.00	21
TANZANIA	0.580	1.383748	1.753771	1.00	21
SOUTH AFRICA	0.576	1.518076	1.721162	1.00	21
ZAMBIA	0.237	12.40467	12.40467	0.00	21
NAMIBIA	0.594	36.29969	33.30042	2.00	21

Augmented Dickey-Fuller results (parametric)

Cross ID	AR(1)	Variance	Lag	Max lag	Obs
MALAWI	0.480	1.134027	1	--	20
TANZANIA	0.524	1.249216	1	--	20
SOUTH AFRICA	0.531	1.531021	1	--	20
ZAMBIA	-0.086	9.683441	1	--	20
NAMIBIA	0.433	31.91552	1	--	20

1.2. Pedroni Test (intercept and trend)

Pedroni Residual Cointegration Test
Series: BD FDI LINF LINT
Date: 07/30/19 Time: 16:49
Sample: 1996 2017
Included observations: 110
Cross-sections included: 5
Null Hypothesis: No cointegration
Trend assumption: Deterministic intercept and trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

Alternative hypothesis: common AR coefs. (within-dimension)

	Statistic	Prob.	Weighted Statistic	Prob.
Panel v-Statistic	-0.180036	0.5714	-0.835922	0.7984
Panel rho-Statistic	0.993757	0.8398	1.108521	0.8662
Panel PP-Statistic	-0.577679	0.2817	-0.934784	0.1749
Panel ADF-Statistic	-0.894554	0.1855	-1.071372	0.1420

Alternative hypothesis: individual AR coefs. (between-dimension)

	Statistic	Prob.
Group rho-Statistic	2.122287	0.9831
Group PP-Statistic	-0.146092	0.4419
Group ADF-Statistic	-0.307870	0.3791

Cross section specific results

Phillips-Peron results (non-parametric)

Cross ID	AR(1)	Variance	HAC	Bandwidth	Obs
MALAWI	0.653	0.800469	0.800469	0.00	21
TANZANIA	0.344	1.177249	1.177249	0.00	21
SOUTH AFRICA	0.513	1.356547	1.480376	1.00	21

ZAMBIA	0.228	12.45381	12.45381	0.00	21
NAMIBIA	0.439	27.85376	27.85376	0.00	21

Augmented Dickey-Fuller results (parametric)

Cross ID	AR(1)	Variance	Lag	Max lag	Obs
MALAWI	0.464	0.679768	1	--	20
TANZANIA	0.318	0.960065	1	--	20
SOUTH AFRICA	0.497	1.399613	1	--	20
ZAMBIA	-0.062	10.38288	1	--	20
NAMIBIA	0.353	25.51701	1	--	20

1.3. Kao Test.

Kao Residual Cointegration Test
Series: BD FDI LINF LINT
Date: 07/30/19 Time: 17:15
Sample: 1996 2017
Included observations: 110
Null Hypothesis: No cointegration
Trend assumption: No deterministic trend
User-specified lag length: 1
Newey-West automatic bandwidth selection and Bartlett kernel

	t-Statistic	Prob.
ADF	-4.839792	0.0000
Residual variance	14.20793	
HAC variance	10.57028	

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID)
Method: Least Squares
Date: 07/30/19 Time: 17:15
Sample (adjusted): 1998 2017
Included observations: 100 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.567599	0.076691	-7.401135	0.0000
D(RESID(-1))	0.058171	0.085525	0.680164	0.4980

		Mean dependent var	-0.313106
R-squared	0.365641		
Adjusted R-squared	0.359168	S.D. dependent var	4.206735
S.E. of regression	3.367576	Akaike info criterion	5.286061
Sum squared resid	1111.376	Schwarz criterion	5.338164
Log likelihood	-262.3030	Hannan-Quinn criter.	5.307148
Durbin-Watson stat	1.898303		

1.4. JOHANSEN FISHER TEST

Johansen

Fisher Panel

Cointegratio

n Test

Series: BD FDI LINF LINT

Date: 12/13/19 Time: 06:55

Sample: 1996 2017

Included observations: 110

Trend assumption: No deterministic trend

Lags interval (in first differences): 1 1

Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)

Hypothesized No. of CE(s)	Fisher Stat.* (from trace test)	Prob.	Fisher Stat.* (from max-eigen test)	Prob.
None	67.09	0.0000	46.02	0.0000
At most 1	31.77	0.0004	24.37	0.0067

At most 2	17.01	0.0742	15.75	0.1069
At most 3	9.715	0.4659	9.715	0.4659

*

Probabilities are computed using asymptotic Chi-square distribution.

Individual cross section results

	Trace Test		Max-Eign Test	
Cross Section	Statistics	Prob.**	Statistics	Prob.**
Hypothesis of no cointegration				
MALAWI	33.3233	0.2060	18.0908	0.2675
TANZANIA	47.9331	0.0069	24.4548	0.0456
SOUTH AFRICA	65.5312	0.0000	33.2563	0.0022
ZAMBIA	70.2717	0.0000	40.0358	0.0002
NAMIBIA	47.1642	0.0085	26.8419	0.0212
Hypothesis of at most 1 cointegration relationship				
MALAWI	15.2324	0.4373	10.9267	0.3925
TANZANIA	23.4783	0.0628	12.9648	0.2301
SOUTH AFRICA	32.2750	0.0040	19.3796	0.0287
ZAMBIA	30.2360	0.0079	22.8788	0.0079
NAMIBIA	20.3223	0.1455	12.6670	0.2500
Hypothesis of at most 2 cointegration relationship				
MALAWI	4.3058	0.6667	4.2999	0.5812

TANZANIA	10.5135	0.0986	8.8803	0.1256
SOUTH AFRICA	12.8954	0.0400	9.6641	0.0929
ZAMBIA	7.3571	0.2910	7.2994	0.2246
NAMIBIA	7.6553	0.2646	7.0024	0.2493
Hypothesis of at most 3 cointegration relationship				
MALAWI	0.0058	0.9500	0.0058	0.9500
TANZANIA	1.6332	0.2363	1.6332	0.2363
SOUTH AFRICA	3.2313	0.0856	3.2313	0.0856
ZAMBIA	0.0577	0.8439	0.0577	0.8439
NAMIBIA	0.6529	0.4793	0.6529	0.4793

**MacKinnon-Haug-Michelis (1999) p-values