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The impact of government debt on foreign direct investment in Zambia

A **dissertation**

Presented to

The **Development Finance Centre (DEFIC)**

Graduate School of Business

University of Cape Town

In partial fulfilment

of the requirements for the Degree of

Master of Commerce in Development Finance

by

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August, 2021

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ABSTRACT

Zambia is a developing nation, which seeks economic growth through various economic drivers, including gross domestic product (GDP) growth. Between 2011 and 2020, the country embarked on an infrastructure development programme, which predominantly involved the construction of roads and airports. To complete these projects, the country borrowed heavily while also promoting the nation as an attractive destination for foreign direct investment (FDI) inflows. This study sought to answer the question 'Can a country that is highly indebted attract meaningful FDI inflows that spur economic growth?' The research covered a 10-year period, from 2011 to 2020, and analysed publicly available data to form the basis of the author's findings and recommendations.

The research findings show that there is a negative but insignificant relationship between government debt and FDI and a positive relationship between inflation and FDI. The latter relationship is significant, contrary to *a priori* expectations. A significant negative relationship was also established between interest rate and investment, while a negative but insignificant relationship was established between exchange rate and FDI.

The implications of the recommended policy issues will only yield the desired results if implemented through an integrated approach as opposed to an exclusive approach. For Zambia to become more attractive to foreign direct investors, the government's debt will need to be reduced. The government will also need to formulate policies that target an inflation rate, which will help to attract positive net FDI inflows. Additionally, it will need to implement interest rate and foreign exchange rate policies that attract investments, which, in turn, spur development.

ACKNOWLEDGEMENTS

Firstly, I would like to thank the Lord God Almighty for the opportunity to undertake this very important programme and for His guidance and support before, during and after my studies. To God be the glory.

To my wife and my children, thank you for your moral and spiritual support, especially during my studies, which coincided with the COVID-19 outbreak. You are the perfect support system. I remain highly indebted to you.

To my supervisors, Prof. Nicholas Biekpe and Dr Misheck Mutize, thank you for your timely, responsive and helpful supervision. Thank you, also, for your invaluable support, guidance and tolerance, which have made an indelible impact on my academic and professional journey.

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CHAPTER 1: INTRODUCTION

1.1 Background

The last decade has been described as a period of infrastructure development in Zambia. The Government of the Republic of Zambia (GRZ) has executed massive construction projects during this time, many of which have been financed through borrowing. The financing structure has included both commercial loans (Eurobonds) and bilateral loans from the World Bank and the International Monetary Fund (IMF). Commercial loans are obtained at commercial rates, while bilateral loans are obtained at below-market rates. It is envisaged that when these loans fall due for repayment, the government might not be ready, this puts pressure on the central treasury. The Zambian government aims to attract local and foreign development both during these infrastructural projects and *after* their completion. Foreign direct investment (FDI) and sovereign debt are among the drivers of economic development – they are tools for economic growth for both developed and developing countries.

According to the United Nations Conference on Trade and Development (UNCTAD, 2018), FDI inflows are commonly received in developing countries, countries with economies in transition and countries with the fastest-growing economies. Chimbalu (2018) cites Pradhan and Singh (2008), who note that attracting investment in the globalised world depends on competitive factors of production, which are essential determinants of FDI inflows and outflows. Empirical evidence also shows that most developing economies have moved away from state-led development strategies to more market-oriented strategies, with the aim of attracting FDIs to alleviate financial and technological skills deficits. Zambia's debt has risen, especially between 2011 and 2019. FDI, on the other hand, has been fairly stable (GRZ, 2017).

The general view in the literature is that when a country's debt rises, that country runs the risk of entering into debt distress, as economic and monetary variables (such as the exchange rate and inflation rate) deteriorate and the country's ability to pay back the debt is eroded. Coan and Kugler (2008) argue that these conditions result in the country becoming less attractive for FDI. Studies by Makoni (2016) and Mavrotas (2005) dispute this – the authors provide evidence that an increase in a country's debt levels has little to no impact on the country's attractiveness to foreign investors.

This study thus investigates the effect of increasing Zambian government debt on FDI flows into the country.

Figure 1 below shows the impact of debt on Zambia's gross domestic product (GDP), a key factor for measuring economic growth. As depicted in the figure, FDI decreased from 7.6% in 2010 to 6.6% in 2011. The country experienced a minor increase in 2012, from 0.1% to 6.7%. In addition, from 2012, the FDI growth rate decreased from 5.1% in 2013 to 1.7% in 2019. It should be noted, however, that debt is a double-edged sword. When managed correctly, it can spur economic development; when managed incorrectly, it can cause distress. As debt has increased from USD3,663 million in 2010 to USD26,252 million, FDI has decreased from USD4,792 million to USD569 million during the same period.

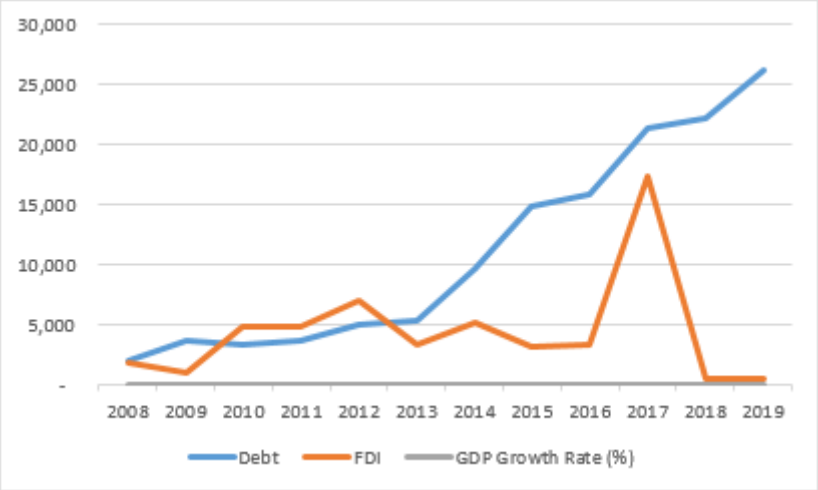

Figure 1: Impact of debt on FDI and GDP

Source: Bank of Zambia

1.2 Factors Influencing Foreign Direct Investment

The factors that influence FDI decisions can come from both the perspective of the investors and the host country.

1.2.1 Government Policies and Regulations on Foreign Direct Investment

Governments are supposed to have competitive policies and regulations in place to attract foreign investors and, thereby, promote local investment. The future potential of a nation's economy directly affects the level of capital that is available at any point in time. It also changes the

economic incentive structures of the population, based on the type of FDI available to a particular nation and on overall investment opportunities (Arbatli, 2011).

Makoni (2016), who examined the key FDI theories, classifies them under macroeconomic and microeconomic perspectives. Macroeconomic FDI theories emphasise country-specific factors that are more aligned with trade and international economics, whereas microeconomic FDI theories are firm-specific and relate to ownership and internalisation of benefits, which lean towards industrial economics and market imperfection bias.

1.2.2 Market Size

Gare (1995) notes that just as geographical factors and other factors, such as the level of development, market growth and GDP per capita, influence investors' decisions on which country to invest in, so does the market size of the host country (Chimbalu, 2018). According to the Macro Poverty Outlook (MPO) World Development Indicators (WDI), the population of Zambia, as of the 31st of December 2019, comprised roughly 18,1 million people, with the country's GDP at USD25,2 billion and GDP per capita at USD1,389. In 2019, growth slowed significantly, from 4.0% (in 2018) to 1.7%. This reflected the impact of weather shocks and fiscal policy inertia (World Bank Group, 2019).

1.2.3 Political Stability

Zambia has maintained peace and political stability as its public institutions have continued to mature. In a 2011 poll, the Patriotic Front (PF) defeated the Movement for Multi-party Democracy (MMD), which was in power for 20 years. The MMD accepted this outcome peacefully (African Development Fund, 2016).

The 2019 edition of the Ibrahim Index of African Governance (IIAG) revealed that governance in Zambia improved steadily between 2000 and 2019. Out of 12 countries in Southern Africa, the country ranked 6th on the governance index, and out of 54 countries on the continent, it ranked 12th (Mo Ibrahim Foundation, 2019).

1.2.4 Economic and Fiscal Stability

Badayi (2017) argues that FDI theories are based on market imperfections as the key determinant of firms seeking international production. He further argues that multinationals tend to locate to places that will add value to their activities (Badayi, 2017).

Macroeconomic models explain the qualitative relationship between variables in an economy and help researchers and policymakers to forecast economic growth (Kira, 2013). The African Development Bank (ADF), in its 2018 edition of the African Economic Outlook, noted that Zambia should accelerate efforts to achieve fiscal consolidation and a primary budget surplus while controlling the acquisition of new debt, both on the domestic and external markets, to achieve debt sustainability and overall macroeconomic stability (Africa Development Bank, 2018).

1.2.5 Potential Investors' Perceptions

Zambia's net FDI inflows increased to USD1,179.6 million in 2018, from USD486.1 million in 2017, according to the 2018 Foreign Private and Investor Perceptions Report. The report attributes the increase to a 67.1% increase in FDI liabilities in flows, from USD662.8 million to USD1,107.5 million, mostly reflecting higher investment in the mining and quarrying industry (GRZ, 2017).

Investors' perceptions contributed to the country's growth – specifically, 1) their perception of Zambia as a private-sector-driven economy with no restrictions on the current and capital accounts and 2) their belief that Zambia has a favourable investment legal framework, which provides various incentives to encourage private sector participation in the economy (GRZ, 2018). Foreign investors perceive the country's key strengths as follows: it has a functioning democracy, political stability and an abundance of strategic natural resources (GRZ, 2015). In addition, it has an investment promotion institution, which facilitates both local and foreign direct investment, and it has money and capital markets (GRZ, 2015).

1.2.6 Inflation

Inflation is a reflection of a government's unwillingness to implement a stable monetary policy. It is also a sign of tension in a country's economic environment. Literature suggests that risk-averse foreign investors and rising inflation results in a drop in FDI in the host country because investors are not willing to risk the rewards they expect from their investments (Kadongo, 2011). Given the

high level of uncertainty in this situation, investors would demand high price levels to offset their exposure to inflationary risks, which would reduce investment volume. Inflation rate stability is, therefore, critical for stimulating investment (Gastanaga et al., 1998).

According to Nwankwo (2006), poor monetary and fiscal policies produce unsustainable budget deficits and boost inflationary pressures. This leads to rising production costs in the local country as well as exchange rate instability (Nwankwo, 2006). As a result, the region may become too risky for FDI. The country's ability to attract FDI is hampered by fluctuations in macroeconomic factors, as indicated by high inflation and severe budget deficits (Onyeiwu & Shrestha, 2004).

1.2.7 Exchange Rates

The exchange rate has a significant impact on FDI. According to Asiedu (2002), different currency zones are responsible for the production of FDI. Dunning (1993) notes that bigger fixed capital stakes in an investment demonstrate the ability to account for future currency rate swings. Exchange rate volatility may have a negative impact on direct investment, causing it to decline. Based on an analysis of macroeconomic factors, institutional and legal frameworks, and risk in deciding FDI, Gastanaga et al. (1998) found that market size, inflation, exchange rate regime and trade openness all influence FDI. Previous research has proven that exchange rate changes are relevant and important in the case of FDI (Behera, 2008). This is because exchange rate volatility causes uncertainty in terms of the transaction plan related to a country's investments (Behera, 2008).

1.3 Impact of Government Debt on Foreign Direct Investment

According to economic theory, government debt is beneficial to a country's economic growth. However, this is only the case for a certain value of government debt; thereafter, the debt bears negative economic consequences for the country (Sichula, 2012).

Krugman's (1988) debt overhang hypothesis explains that high government debt leads to poor FDI inflows, which, in turn, result in low economic growth (Sichula, 2012). The author notes that debt overhang is a scenario in which the existing foreign debt is extremely substantial (Krugman, 1988). According to this hypothesis, on the one hand, international investors are hesitant to invest in a country with significant external debt because a portion of their profits will then be utilised to

service the debt through high taxes. On the other hand, lowering debt obligations leads to an increase in both domestic and international direct investment, lowering the risk of a debt default.

External debts have a significant negative impact on FDIs, according to Ostadi and Ashja (2014), and a rise in foreign debt impairs a foreign investor's vision and fosters a bad opinion about the future economy, resulting in a drop in the country's level of investment. The results also show that the size of the government impedes foreign investment, which is consistent with the crowding-out effect and suggests that the government's presence diminishes the private sector's presence.

Wamboye (2012) investigated the effects of external debt, trade and FDI on economic growth in developing countries. The author's findings show that high external debt, regardless of the *type* of debt, stifles economic progress.

The sovereign risks associated with debt financing, according to Schnitzer (2000), are often less severe than those associated with FDI. Therefore, an investor will choose FDI if they believe they are qualified to carry out the project, even with all the possible risks, and if they have an appropriate outside choice that reduces the chance of expropriation (Ribeiro, Vaicekauskas, & Lakstutiene, 2012). They discovered a positive correlation between FDI and state debt.

Udomkerdmongkol, Gorg, and Morrissey (2013) studied external debt, FDI and domestic investment empirically. Foreign debt has little effect on investment, according to the data. Furthermore, there are no data establishing a link between foreign debt financing and domestic investment in the two regimes.

1.4 Foreign Direct Investment Policies in Zambia

In 1991, the GRZ declared that investment was the most important factor for the country's growth and development. However, because investment decisions are based on predicted income streams, investor opinions of current and future commercial activity are important. Therefore, the government set out to address the components of an 'investment climate'. First, it established a clear strategy for a private-sector-driven economy. Second, it implemented legislation that benefits the private sector.

These regulations have evolved into the necessary confidence-building cornerstones that investors seek out. As part of this, a special Investment Act was implemented, and an Investment Centre was established. In addition, the following were operationalised: the Privatisation Act and the Privatisation Agency; the Communications Act and authority; the Pensions and Insurance Act and authority; the Energy Regulation Board (ERB), including the Office for Promotion of Private Investment in the Energy Sector (OPPI); the Securities Act and Stock Exchange Commission; and the Banking and Financial Services Act (among others). These laws and institutions are intended to foster an investment-friendly climate. As part of this research, specific policies and their implementation will be addressed.

Zambia's investment policymaking and promotion process is disjointed and reliant on outside support. Investment plans were the subject of political decision-making procedures prior to 1991. The current investment statute and the foundation of the Zambia Investment Centre (ZIC) were accomplished with the help of foreign technical support, and the legislative institutions played a minor role in the development of the Act.

Following the liberalisation in Zambia, decision-making shifted from politicians to bureaucrats. They, too, have been unable to implement changes in procedures (particularly in terms of stakeholder involvement) and to depart from the previous executive decision-making pattern. Some investment choices are made at the highest levels of management, with little input from investment promotion and regulatory bodies.

1.5 The Ability of African Countries to Manage Debt

The creditor base for Africa's debt continues to migrate away from conventional multilateral and Paris Club lenders, toward commercial creditors and non-Paris Club official lenders. During the last two decades, the proportion of multilateral debt in Africa's overall external debt has remained relatively steady. In contrast, the share of bilateral debt in total external debt has decreased by roughly half during this time. Bilateral lenders, predominantly Paris Club members, accounted for 52% of Africa's foreign debt stock in 2000, but this figure had dropped to 27% by the end of 2019.

1.6 Research Problem

To examine the impact of debt on Zambia's ability to effectively attract FDI, a key variable for measurement of economic growth, as in the why do nations borrow hypothesis literature, is used,

and the relationship between debt and FDI is tested. Zambia and other African countries have been characterised by their economic underperformance in terms of GDP. Current research related to the indebtedness of these nations addresses the relationship between debt and economic growth, but none of the studies investigate the impact of debt on a country's ability to attract meaningful FDI, which is a key factor in determining economic growth in terms of GDP.

Oche, Mah, and Mongale (2016) analysed the effects of public debt on FDI in South Africa, from 1983 to 2013, and concluded that in order for a country's level of FDI to increase, its public debt and interest rate must increase. Coan and Kugler (2008) questioned and confirmed the existence of an interactive relationship between a country's open market policies and its political capacity to attract FDI. The authors argue that governments with open market policy frameworks and high levels of political capacity send clear signals to investors that their political environment is conducive to sustained profitability.

The aim of this study is to further examine the view that a highly indebted country can effectively attract FDI that is sustainable enough to spur economic development, which is measured in terms of stable and consistent GDP growth. The researcher further seeks to examine whether there is a relationship between the level of a country's indebtedness and its FDI.

1.7 Research Questions and Scope

In light of the discussion above, the objective of this study is to interrogate the relationship between government debt and the government's ability to attract meaningful FDI, which spurs development in terms of GDP. The study attempts to answer two questions, which are split into two hypotheses:

Question 1: Is there a deterministic relationship between government debt and FDI inflows?

Hypothesis 1:

H_0: There is a negative relationship between government debt and net FDI inflows.

H_1: There is no negative relationship between government debt and net FDI inflows.

Question 2: Is there a causal relationship between government debt and FDI inflows?

Hypothesis 2:

H_0: There is no causal relationship between government debt and FDI inflows.

H_1: There is a causal relationship between government debt and FDI inflows.

1.8 Organisation of the Study

This paper comprises five chapters. Chapter 1 addresses the background to the study. Chapter 2 provides an extensive review of the literature. It includes a theoretical framework and a discussion on the limitations of the existing literature. Chapter 3 explores the analytical framework of the research methodology used in the study. Chapter 4 discusses the findings of the statistical analyses pertaining to the relationship between government debt and FDI. The chapter further analyses the findings with a view to deducing the inference from the literature regarding debt and FDI. Chapter 5 concludes with a summary of the key findings of the study. It discusses the theoretical and empirical significance of the findings in relation to the literature, and it provides suggestions for future research.

1.9 Motivation for the Study

This study was motivated by the need to justify the government's approaches to reaching its targeted economic development goals over the years. Political promises and policy declarations have been made, now and in the past, with the aim of fostering sustainable economic development for Zambia. In reality, though, there has been little, if any, *actual* development. This study undertakes to assess whether an economy like Zambia's can attain economic development, by attracting FDI, while maintaining high levels of government indebtedness.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

This chapter reviews past studies on public debt and FDI. The literature review is divided into two sections: 1) the theoretical framework for the discussion on public debt and FDI and 2) a discussion on the studies that utilise Zambian data, regional data and intercontinental data.

2.2 Theoretical Analysis

Key theories on the relationship between public debt and FDI include the Keynesian theory of economics, the industrial organisation and internalisation theories, and the neoclassical theory. The latter arose as a result of Keynesian economics, as represented by Rostow (1961), who was concerned with transforming what he saw as backward areas and unproductive societies into dynamic and rising economies (Cockcroft & Riddell, 1991).

In the 1950s, although the subject of development was not crucial to colonies or the interaction between wealthier and poorer countries, the least-developed countries received development aid throughout the colonial period (Cockcroft & Riddell, 1991). Aid was supplied to help accelerate emerging economies; therefore, the goal of outside capital is not to directly enhance living standards but to help the economy transition and achieve long-term growth (Bhagwati, 2004).

To improve their wellbeing during this time, it was also in wealthy countries' economic interests to invest in developing countries. In wealthy countries, both parties benefit when the rate of interest is *higher* than capital productivity; in underdeveloped countries, both parties benefit when the rate of interest is *lower* than capital productivity. A mutually beneficial arrangement occurs when a rich country has underutilised resources, which cannot be used due to balance of payments constraints, and chooses to channel these resources into developing countries (Brandt Report, 1980).

This hypothesis describes how the level of FDI increases as the economy becomes more open. An economy with a well-developed infrastructure and stable political conditions is always attractive for foreign investment purposes. (These conditions are important drivers in attracting FDI, which is this study's main variable.)

Industrial organisation and internalisation theories assume that foreign companies have oligopolistic power in their host countries (Cockcroft & Riddell, 1991; Meier, 1994). These theories also assume that microeconomic and macroeconomic factors are responsible for real-life deviations from the perfect market model. According to this approach, firms choose their investment location based on its comparative advantage. Meier (1994) contributes to this theory, arguing that FDI may also be undertaken to gain control over inputs, thus creating a barrier to entry for new competitors. According to internalisation theory, firms keep their operations internal by ensuring that they are a 100%-owned subsidiary. This allows them to control risk and retain control and market share. Multinationals engage in FDI to secure internalisation advantages.

A firm's links, integration, transfer pricing and economies of centralisation allow costs to be decreased through FDI when compared to foreign markets (Meier, 1994). This hypothesis explains the links between labour costs and productivity as well as economic growth and market size. When determining the attractiveness of a foreign market, international investors consider the market's viability, which is defined in terms of openness. To establish their margin, they also consider how much it would cost them to manufacture for the market and the final price they would charge. These variables are important predictors of FDI in an economy.

The neoclassical theory explains international capital flows by assuming that various countries have varying rates of return, which leads to capital arbitrage, with capital-seeking being the highest return. According to Cockcroft and Riddell (1991), future investment flows are closely tied with the package of incentives that influence the projected rate of return, the security of the investment, and the scope and speed with which corporations can disinvest. FDI is influenced by the tax system, the investment code or rules, and broader macroeconomic policies. Despite these improvements, there is still work to be done to improve the conditions that have stifled investment. The following (among others) should be addressed in this regard: lack of formal legislation and legal infrastructure, such as patents, price restrictions, labour legislation, taxation policy and foreign exchange controls. Cockcroft and Riddell (1991) note that addressing these matters will improve the foreign investment climate.

According to Meier (1994), the anticipation of better returns or profits by enterprises is the most important supply-side factor of FDI in developing nations. Developed countries are more likely to invest in poorer countries with a better rate of return on investment (Ekpo, 1996). This theory

examines the impact of taxes and how governments might use them to attract FDI. They also explain the factors that influence FDI flows, such as labour costs and output.

Despite their theoretical benefits, empirical studies on the consequences of FDI report conflicting results (Alfaro & Chauvin, 2017). According to Lipsey (2004), the data from macro-level empirical research favour favourable benefits of a foreign presence on wages and the amount and diversity of domestic exports, but there is an inconsistent association between the magnitude of inbound FDI stocks or flows and GDP or growth. On the micro level, a first generation of cross-sectional research (such as that of Caves [1974] in Australia and Blomström [1986] and Blomström and Wolff [1994] in Mexico) indicates a positive association between foreign presence and within-industry productivity. Accounting for the fact that foreigners usually enter the most *profitable* firms and industries, Aitken and Harrison (1999) note that productivity improves in plants that are established/supported by FDI, and it declines in domestically owned plants in the same industry. This implies that the net effect of FDI on sector productivity is quite small. Positive spillover effects have been found to be more prevalent in vertically integrated businesses (Javorcik, 2004) and in industrialised countries, in general (Alfaro & Chauvin, 2017).

Ricardo Hausmann et al. (2013) suggest that the interaction between an individual borrower's liability composition decisions and the best monetary policy can lead to widespread liability dollarization. The authors go on to say that the result was achieved under a policymaker who is friendly to international investors and does not want to expropriate them for the sake of domestic debtors. Instead, policymakers are attempting to make dollar debt more secure, despite the fact that those contracts have already been written (Hausmann et al., 2013).

2.3 Conceptual Framework

The link between the study variables is depicted in the conceptual model (Figure 2) below. Government debt and FDI are the two factors identified by the researcher. The control variables are inflation, exchange rates and interest rates. The dependent variable, which this study attempts to explain, is FDI inflows. These are measured quarterly.

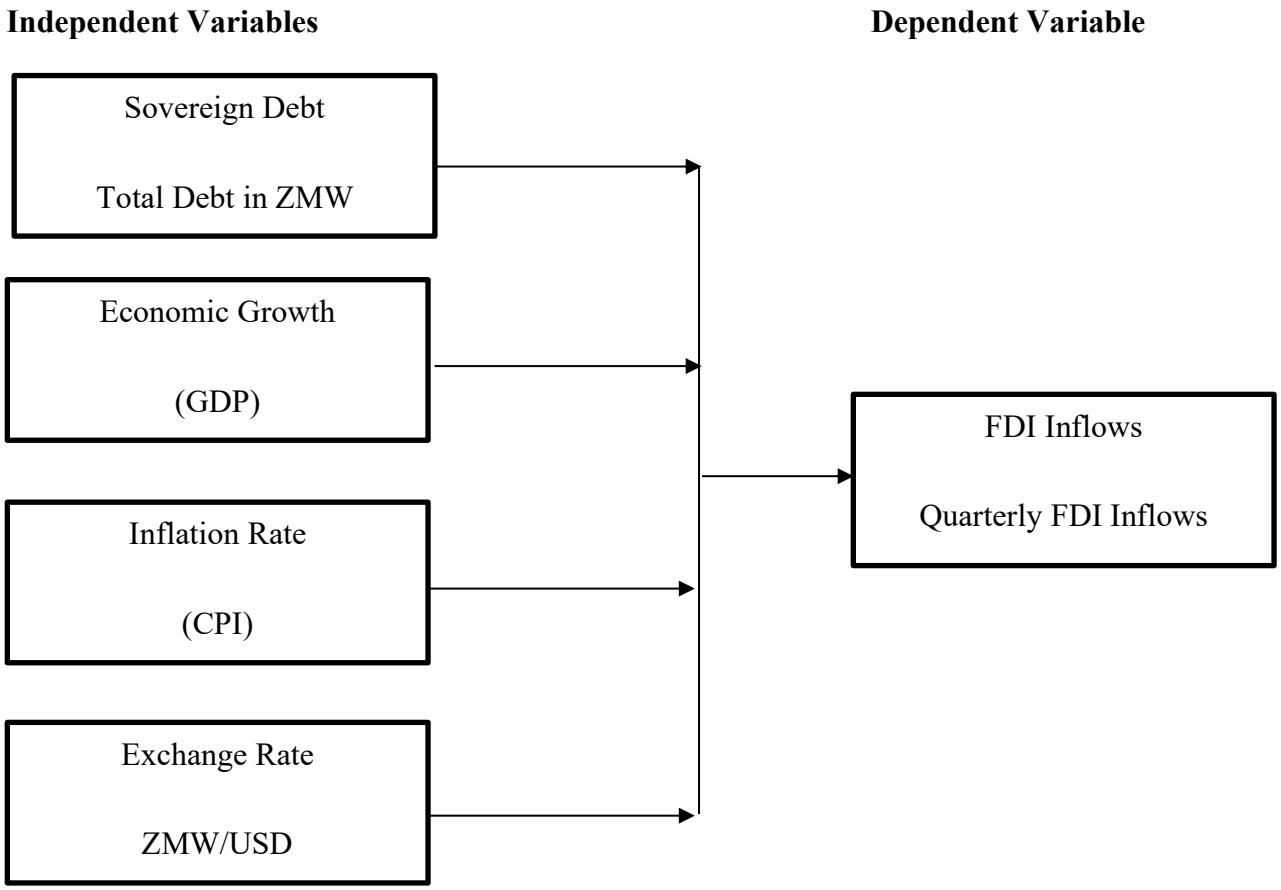

Figure 2: The conceptual framework

Source: Primary data (2021)

2.3.1 Sovereign Debt

'Sovereign debt' refers to a government's total debt stock. This variable is used as a measure of debt to GDP to establish the relationship between government debt and economic growth, measured in GDP terms.

2.3.2 Economic Growth

The GDP, as proxy for economic growth, is measured by the annual growth rate of real GDP per capita. This is indicated as a percentage.

2.3.3 Inflation Rate

'Inflation rate' refers to the rate of price increases during the period covered in this study. This relates broadly to the general increase in prices and the decrease in the purchasing value of money. This variable informs the overall increase related to the cost of doing business.

2.3.4 Exchange Rate

The exchange rate indicates the price of Zambia's money in relation to the United States dollar (USD), which is the main import currency. This will, in turn, assist in measuring the value of FDI inflows in the local Zambian currency.

2.3.5 Foreign Direct Investment Inflows

This refers to the total value of the investments coming into Zambia. Specifically, it is the total value of inward overseas investments made by foreign entities, including non-resident investors.

2.4 Empirical Analysis

A number of recent studies have empirically analysed and demonstrated the reasons why countries borrow. These works, which include a significant amount of academic research, have investigated the debt hypothesis based on data from Ricardo et al.'s (2013) cross-sectional specifications. The authors suggest that debt can have a positive or negative effect on economic development. They elaborate that it may have a positive effect when used to increase society's welfare (Ahiakpor, 2013). It can also have a detrimental effect on economic growth by discouraging investment and capital flight due to debt overhang and the debt crowding-out effect (Ahiakpor, 2013). The discussion on this empirical analysis is divided into three parts: 1) studies that utilise single Zambian data, 2) studies that utilise regional data and 3) studies that utilise international data.

2.4.1 Studies on Zambia

Ndaba and Nicholas (2015) conducted research on the impact of FDI on economic growth in Zambia, a country that is heavily reliant on natural resources. The researchers carried out an exploratory data analysis to investigate the relationship between FDI flows and GDP. Time series data from 1990 to 2013 were used in the main analysis. Prior to 2000, FDI was dispersed across the economy. According to the analysis, the influence on growth was stronger before 2000 than after. During the study, it was also discovered that due to recapitalisation, FDI contributed to increased output in the mining sector. Because of its concentration on the mining sector, the study determined that FDI was not contributing to dynamic economic growth (Ndaba & Nicholas, 2015).

Mulumba (2017) also conducted an econometric analysis of foreign borrowing and economic growth in Zambia. The researcher carried out a quantitative study using a deductive approach, which depends on subordinated data. As part of the study, the researcher used secondary data on

Zambia from 1980 to 2015. They concluded that Zambia's future GDP growth would be influenced by other factors or, rather, that various factors linked to economic growth would need to be considered. They stated, in conclusion, that the Zambian government cannot use an increase in debt stock as a precursor to improved economic output for the nation (Mulumba, 2017). They also noted that the two variables 'GDP' and 'external debt' do not Granger-cause one another (Mulumba, 2017).

Mumbi (2014) investigated significant macroeconomic factors that influence the sustainability of external debt. He concluded that exports and interest rates are positively related to sustainability, whereas government revenue, GDP growth and the exchange rate are inversely related to debt sustainability. He recommended that the Zambian government always opt for the lowest interest rates possible and that it develops credible export promotion policies that directly impact the statutory instrument and help to stabilise the exchange rate (Mumbi, 2014).

2.4.2 Regional Empirical Studies

Ngelechey (2015) conducted research in Kenya to determine the link between governmental debt and FDIs. Using regression analysis of quarterly secondary data from 2000 to 2014, a descriptive study method was utilised to analyse the relationship between state debt and FDIs in the country. The findings indicated that there was a link between foreign debt, domestic debt and FDI during the study period.

Foreign debt and FDI have been found to have a beneficial association. Domestic debt has a favourable impact on FDI as well, as evidenced by the positive beta coefficient. The high beta coefficient indicates that *foreign* debt had the greatest impact on FDI. During the study period, the variable was the second most influential in affecting FDI in the country. Domestic debt and FDI have a moderately good correlation. Ngelechey (2015) concluded that government policymakers should strive for public debt reduction to attract more FDI into the Kenyan economy because increased investor confidence in the local market acts as a stimulus for attracting FDI inflows.

Similarly, Senibi et al. (2017) applied a structural vector autoregressive (SVAR) approach to public debt, domestic investment and FDI in Nigeria over the period of 1981 to 2015. The study examined how domestic investment and FDI responded to public debt shocks using the SVAR framework to track the response of non-policy variables (public debt, domestic investment and FDI) to domestic policy shocks (real exchange rate and lending interest rate). Because a portion

of domestic borrowing goes toward servicing the external debt obligation, interest and capital repayment, the study found that high foreign debt simultaneously increases internal debt. As a result, as governmental debt rises, private sector financing is squeezed out. Domestic investment also falls over time. FDI, on the other hand, did not respond to public debt shocks, as high-debt-profile countries tend to minimise FDI inflows.

Mavhinga (2015) used time series data to analyse the influence of external debt on economic growth in Zimbabwe from 1980 to 2013. The study demonstrated a substantial negative association between external debt and economic growth in the country using the vector error correction model (VECM). The findings revealed that Zimbabwe has a debt overhang impact. The presence of the crowding-out hypothesis could not be proven, as there was an insubstantial relationship between debt service and economic development (Mavhinga, 2015).

2.4.3 Global Literature Review

Azam and Khan (2011) examined the influence of state debt on FDI in Pakistan using time series data from the Pakistan Economic Surveys from 1981 to 2007. The influence of public debt on FDI was investigated using a basic log-linear regression model and an analytical tool known as the ordinary least squares (OLS) method. For computing analysis, the data were turned into a natural log, and EViews (statistical software) was employed. The study's findings revealed that public debt is statistically significant, meaning that it has a negative impact on FDI inflows into Pakistan. As a result, the authors concluded that public debt should be handled through an active and proper debt management policy to reap the full benefits of FDI inflows (Azam & Khan, 2011).

Udomkerdmongkol et al. (2013) investigated domestic investment, FDI and external debt. In their study, they used Dalmazzo and Marini's (2000) model to predict the relative importance of three different sources of financing for domestic investment, domestic capital self-financing, FDI financing and foreign debt financing, under two types of political regimes, namely politically unstable regimes and politically stable regimes. Disregarding any political considerations based on fixed-effects estimation, the estimation results show that domestic capital self-financing and FDI financing have beneficial effects on domestic investment. In both regimes, there is no indication of a link between external debt financing and domestic investment. The findings reveal that foreign debt financing has little impact on investment.

Li and Tanna (2019) investigated the role of external debt as a barrier to reaping the benefits of FDI in terms of economic growth. They created a model that formalises a mechanism to account for the impact of external debt on the transmission of FDI-generated externalities and threshold regressions. The purpose of the model is to demonstrate the presence of a debt contingency effect, which restricts the growth-enhancing effects of inward FDI. The authors' findings validate the hypothesis that the FDI-induced growth effect was dependent on the external debt restriction, using yearly and five-year averaged data for 39 developing countries, from 1984 to 2010. Increased financial development attenuated the detrimental impact of debt thresholds in the FDI growth nexus in this scenario, according to the findings.

Oche et al. (2016) cite Khan and Khan (2011), who surveyed the impact of public debt on FDI in Pakistan using time series data from the country's economic surveys from 1981 to 2007. The authors' findings revealed that debt has a detrimental impact on FDI inflows into Pakistan. They concluded that to reap the full benefits of FDI, public debt should be handled through an active and proper debt management policy (Oche et al., 2016).

2.5 Research Gap Analysis

As mentioned previously, Li and Tanna (2019) investigated the role of external debt as a barrier to reaping the benefits of FDI in terms of economic growth. This study, on the other hand, fills in a year gap by focusing on the present year, 2021.

Ngelechey (2015) conducted research in Kenya to determine the link between governmental debt and FDIs. Using regression analysis of quarterly secondary data from 2000 to 2014, a descriptive study method was utilised to analyse the relationship between state debt and FDIs in the country. This study, on the other hand, will use *multiple* regression analyses to determine the influence of government debt on FDI.

2.6 Conclusion

The internalisation hypothesis was one of the ideas offered for FDI in this part. This chapter includes empirical studies of other researchers' work on the topic of FDI determinants, at both the local and global levels. There are few empirical studies, specifically on Zambia, which investigate the effects of public debt on FDI. The studies that *have* been carried out in this area conclude that public debt has a negative impact on economic growth in Zambia, especially over the long term.

Most of the research suggests that both debt overhang and the crowding-out effect are applicable. The purpose of this study is to analyse the relationship between government debt and FDI to determine whether the deployment of these economic elements can drive economic growth, which is measured in terms of GDP.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter presents the method of research employed in this study. The 'Research Approach' section below outlines the plan of the study and how the research activities were undertaken. Section 3.3 presents the analytical model, which was developed and employed to analyse the data using the analytical regression equations for the FDI and public debt analysis. The chapter concludes with a discussion on the estimation techniques used in the regression analysis.

3.2 Research Approach

The researcher established the association between the dependent variable (FDI) and the independent variable (public foreign debt) using a quantitative research approach. A time series analysis was employed to examine the data for the time period in question, with linear regression being used to examine the data. For the period under consideration (2010 – 2019), secondary data from reputable sources, such as the central Bank of Zambia (BoZ), the Zambia Development Agency (ZDA) and the Development Bank of Zambia (DBZ), were collected and analysed to assist in drawing conclusions that are supported by empirical evidence.

3.3 Analytical Model

Following Pattillo et al.'s (2011) model, the econometric regression analysis of the independent variables (government debt, inflation, exchange rate and interest rates) on the dependent variable (FDI) was investigated by estimating the model. The model is represented as follows:

FDI = f (GDT, INF, EXCH, INT)
Where:
GDT = government debt
INF = inflation
EXCH = exchange rate
INT = interest rates

Following the methodology in Pattillo et al. (2011), the analytical model was transformed into logarithmic form to ensure uniformity and avoid misspecification issues in the econometric

analysis. This also makes it possible to understand the results in terms of elasticities (Asteriou & Hall, 2007). In log form, the equation is written as follows:

$$Log_{FDI_t} = \beta_0 + \beta_1 Log\ GDT_t + \beta_2 Log\ INF_t + \beta_3 Log\ ER_t + \beta_4 Log\ IR_t + e_t \quad (1)$$

Where:

FDI represents movement in FDI.

GDT represents total public debt.

INF represents changes in inflation rate.

ER represents changes in exchange rate.

IR represents interest rate.

β_i are constants.

e_t is the error term.

3.3.1 Analysis Method

The above model was used to run an autoregression analysis to capture the relationship between FDI and other independent variables. The analysis proceeded in three steps. First, the test for stationarity was performed to determine if the data were stationary. This is a prerequisite for time series analysis, to avoid spurious relationship. Second, since the data were not stationary at level, the Johansen cointegration test was run to determine the long-run relationship between the variables. The results of the Johansen cointegration test showed that the variables were cointegrated at level. Finally, therefore, the researcher applied the VECM framework, as advised by Enders (2008).

The VECM approach incorporates information about short-run and long-run dynamics. This approach also provides more efficient estimates than do other models, such as the vector autoregressive model (VAR) in the case of cointegrated data (Jushan, 1999). The VECM approach was used because it is the most suitable approach for managing multivariate time series data. Since numerous macroeconomic time series are non-stationary in nature and, therefore, tend to be overwhelmed by stochastic patterns (Dickey & Fuller, 1979, 1981; Kwiatkowski et al., 1992; Phillips & Perron, 1988), one can expect biased and inefficient results when estimating a relationship of this kind of series.

3.3.2 Unit Root Tests

According to Gujarati and Porter (2009), a time series is stationary when its statistical properties, such as the mean and variance, are all constant over time. Diagnosing a unit root problem in a time series is of great significance because it helps to avoid the likelihood of spurious regression results. Various tests can be applied when testing for the unit root problem. These include the Dickey–Fuller (DF) test, the augmented Dickey–Fuller (ADF) test and the Phillips–Peron (PP) test. For the purposes of this study, the ADF test was employed, with the following hypotheses being tested:

H_0: The time series is non-stationary.
H_1: The time series is stationary.

Decision: If the ADF statistic < the ADF critic at a 5% significance level, then H_0 should not be rejected, and it can be concluded that the time series is non-stationary.

Upon discovery of the stationarity of the data, the cointegration test was performed to examine whether the variables move together in the long-run, that is: whether they have a long-run equilibrium relationship. When variables have a long-run relationship, this means they are cointegrated.

To perform the cointegration test, the appropriate lag length had to be selected, as suggested by various information criteria according to Liu (2007), Meng et al. (2011) and Philbrick and Gustafsson (2010), who are cited in Meniago et al. (2013). These criteria include the Schwarz information criterion (SIC) (Schwarz, 1978), Akaike information criterion (AIC) (Akaike, 1973) and the Hannan–Quinn information criterion (HQC) (Hannan & Quinn, 1978). Cointegration was confirmed with the Johansen cointegration test, which uses two statistics to confirm the number of cointegrating vectors among variables. These statistics include the trace statistics and the maximum eigenvalue.

To test for cointegration in this research, the researcher tested the following hypotheses:
H_0: There is no cointegrating relationship between government debt and FDI.
H_1: There is a cointegrating relationship between government debt and FDI.
Decision: If the t-statistic is greater than the t-critic, the H_0 should not be rejected, and it can be concluded that there is cointegration.

The VECM is a restricted form of the VAR, which is applied to non-stationary data that have been found to be cointegrated. It identifies both the long- and short-run relationships in the model. According to Hassan (2003), the VECM is the way in which the system corrects during each time period, towards its long-run equilibrium state. The cointegration term is called the 'error correction term' (ECT). Its coefficient shows the proportion of the long-run disequilibrium in the dependent variables corrected during each period (Hassan, 2003). The ECT was expected to be negative and statistically significant to explain the disequilibrium in FDI, which was corrected during the next period.

The compact VECM model is as follows:

$$\Delta Y_t = \alpha + \sum_{t-i}^{k-1} \beta_i \, \Delta Y_{t-i} + \sum_{j-i}^{j-1} \gamma_j \, \Delta X_{j-i} + \cdots + \sum_{m-i}^{k-1} \delta_m \Delta R_{m-i} + \gamma ECT_{t-1} + \mu_t \quad (2)$$

X to R represent the explanatory variables in the VECM model, and ECT_{t-1} is the ECT, which is the lagged value of the residuals obtained from cointegrating regression of the dependent variables on the regressors. The term ECT_{t-1} contains the long-run information derived from the long-run cointegrating relationship. The γ-coefficient is the speed of adjustment. It takes a negative sign, and it measures the speed of convergence back to long-run equilibrium after a shock or deviation arising from changes in the independent variables.

The model was also examined for goodness of fit by performing both a diagnostics test and a stability test. In addition, the variance decomposition approach was employed to examine the contributions of each type of shock to the variation in the dependent variable. This technique assists in understanding the relevance of the variables in the equation. It splits the variation in the independent variable into the component shocks to the VECM. It has the potential to inform the researcher whether the variables in the model have a long- or short-term effect on the variable under consideration. It is thus used to show the variation in the dependent variable, caused by independent variables in a model.

This study also used the impulse response function, which, according to Brooks (2008), can reveal the extent to which the dependent variable responds to shocks or innovations in each variable. As noted by Lutkepohl (1993), this approach accounts fully for historical patterns of correlations among the various shocks. For the purposes of this research, this approach revealed whether the

response of FDI to shocks in PDEBT, exchange rate and interest rates was positive or negative during the period under study.

3.3.3 Diagnostic Tests

3.3.3.1 Autocorrelation Test

Gujarati (2004) clarifies autocorrelation as correlation between members of a series of observations ordered in time. The presence of autocorrelation violates the mean variance property of the OLS estimators, which limits the precision of the results. In this study, the Breusch–Godfrey (BG) serial correlation LM test for serial correlation was employed to test for the presence of autocorrelation.

3.3.3.2 Heteroscedasticity Test

Heteroscedasticity occurs when the error term variance fluctuates across all the observations (Gujarati & Porter, 2009). Allowing for heteroscedasticity using the OLS estimation will provide unnecessarily large confidence intervals, and, as a result, the T-test and F-test are likely to produce inaccurate results and overestimated standard errors (Gujarati & Porter, 2009). Gujarati (2004) emphasised that when one persists in using the usual testing procedures, despite heteroscedasticity, the conclusions that they draw or inferences that they make may be misleading.

This study utilised the Breusch–Pagan–Godfrey test and tested the following hypotheses:
H_0: There is an absence of heteroscedasticity.
H_1: There is a presence of heteroscedasticity.

At a 5% level of significance, the null hypothesis is not rejected if the probability value of the Breusch–Pagan–Godfrey test is greater than 0.05.

3.3.3.3 Multicollinearity Test

According to Gujarati (2004), multicollinearity is the presence of more than one perfect linear relationship among some or all explanatory variables of a regression model. It is important to note that the multicollinearity problem frequently results in inefficient computation of parameters, and it can be detected by pairwise correlation of regressors. The pairwise correlation of regressors is constantly present and can never be eradicated. It can, however, be controlled to some degree. In

addition, severe multicollinearity occurs when the pairwise correlation is more than 0.8. This correlation is detected by the correlation matrix.

H0: There is no severe multicollinearity.
H1: There is severe multicollinearity.

The null hypothesis is rejected if the correlation is greater than 0.8.

3.3.3.4 Normality Test

A normality test was carried out to examine if the generated residuals are random. According to Gujarati (2004), a common suggestion for this test is to ensure that the mean of the residuals is zero and that the variance is constant for all observations. The Jarque–Bera (JB) test of normality was utilised, since it is based on the OLS residuals.

The following null and alternative hypotheses were tested:
H0: The residuals are normally distributed.
H1: The residuals are not normally distributed.

The null hypothesis is not rejected if the probability value of the JB F-statistic is greater than 0.05, kurtosis is close to 3 and the mean of the series is equal to or close to 0, at a 5% level of significance.

3.4 Research Design

A quantitative explanatory approach was used in this study, the goal being to examine the relationship between economic growth determinants and sovereign debt, as well as the factors that attract FDI. The study's findings are expected to reveal the presence, relevance and direction of a link between corporate governance and efficiency-based performance.

3.4.1 Research Instruments

The secondary data-gathering tools in this study were reading and reviewing publications on economic growth, with a particular focus on FDI and government debt as economic growth drivers. The researcher was aware that choosing suitable instruments would significantly impact the

validity and reliability of the study effort. The chosen data-collection procedure was scrutinised to determine if it would provide the researcher with fair and impartial results.

3.4.2 Data-collection Procedures

The researcher used secondary data covering a period of 10 years, from 2010 to 2019. This information originated from studies that are related to the research problem and which were conducted by other researchers. The data were gathered from the BoZ, the Zambia Statistics Agency (ZSA), the ZDS and the DBZ, among others, from previously published literature and unpublished documents. This was done to improve the substance of the entire research project.

Zambia's stock of total public debt has risen sharply since 2011, predominantly reflecting issuance of Eurobonds by the government. By the end of 2016, outstanding public debt stood at nearly USD8 billion (36.5% of GDP) compared to USD1.9 billion (8.4% of GDP) at the end of 2011. Concerns have been raised about the rapid rate at which new debt is being contracted. The total debt burden is expected to rise to over 60% of GDP, which is above the acceptable threshold and which will create a high risk of debt distress for Zambia (Kamwanga, Funjika, & Koyi, 2018). The reason for the worsening debt burden is that USD4 billion was contracted from early 2016 through the first half of 2017; additionally, and the government has had borrowing plans for another USD4 billion over the next five years. The key macroeconomic performance indicators for the period 2011 – 2019 were collected and used as proxy data variables to measure the impact of government debt on FDI, as shown in Figure 3 below.

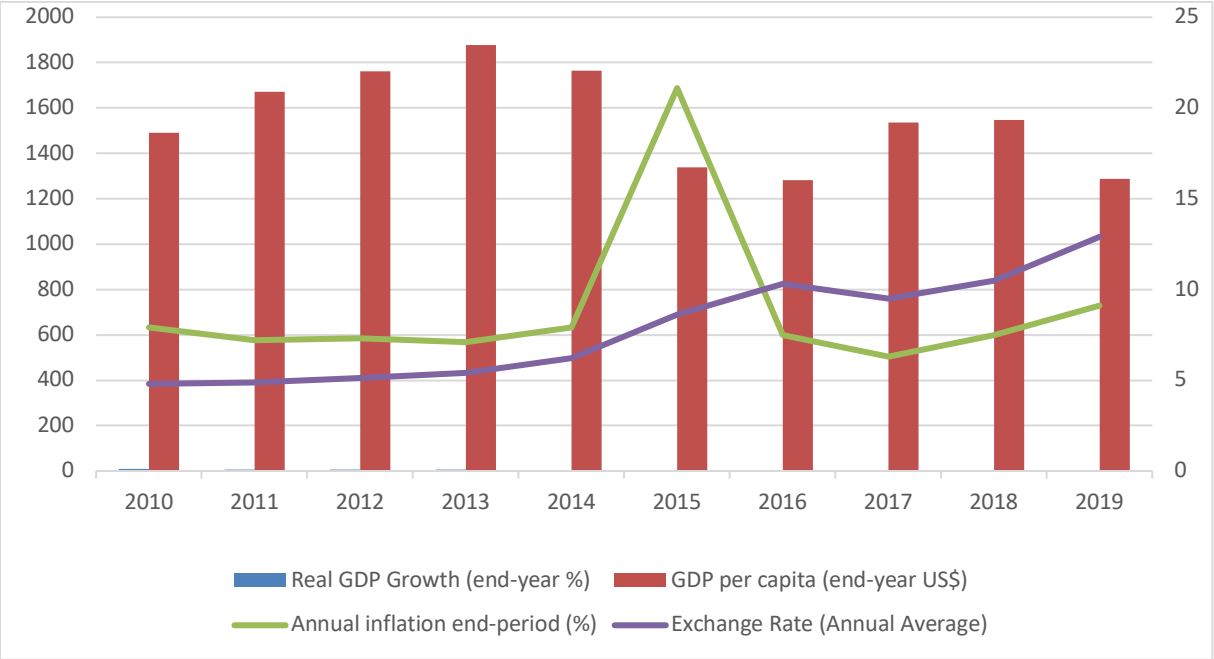

Figure 3: Key macroeconomic performance indicators

3.4.3 Dependent Variable

3.4.3.1 Foreign Direct Investment

The dependent variable in this study is FDI. It was logged (logFDI) to assist with multicollinearity and heteroscedasticity issues. FDI is defined as an investment in a foreign country that takes the form of controlling ownership. Examples of this type of investment are physical capital, industrial techniques, product advertising and business strategies. The literature on the relationship between FDI and government debt offers mixed results, leaving the relationship between the two variables unclear.

3.4.4 Repressors

3.4.4.1 Government Debt

When the government borrows money, it issues securities to its creditors that detail the terms of the loan, the amount borrowed, the interest rate to be paid on the principal, and the interest and principal repayment schedule. Government debt is equal to the quantity of outstanding securities plus the amount of debt that has not yet been serviced. The government coefficient was projected to have a negative sign.

3.4.4.2 Inflation

The pace of increase of the prices for goods and services is referred to as 'inflation'. Excess demand or growing production costs may cause the general level of prices in an economy to rise. The purchasing power of the monetary unit depreciates as a result of inflation. Inflationary pressures in local markets make domestic goods prohibitively expensive. The sign of the inflation coefficient was projected to be negative against this series of economic events.

3.4.4.3 Exchange Rate

The rate at which one currency is exchanged for another is known as the 'exchange rate'. It is also considered the worth of one country's currency in terms of another country's currency. Depreciation of a country's currency improves that country's trade balance; it may also ease protectionist policies, reducing the motivation for tariff jumping. When one looks beyond the effects of exogenous shocks that cause exchange rates to fall below their long-run trend in FDI, more difficulties arise. Exchange rates are endogenous variables, which are affected by a wide range of shocks.

3.4.4.4 Interest Rates

The simplest definition of interest rates is return on investment. According to Singania and Gupta (2011), interest rates are modified to reflect inflationary fluctuations. As a result, they play a crucial role in FDI. Investors seek low-cost borrowing or low interest rates, and they invest their money in economies that promise bigger returns.

Table 1: Summary of variables and data

Variable	**Symbol**	**Expected Effect**
Foreign direct investment	FDI	Dependent variable
Government debt	GDT	+ or -
Inflation rate	INF	-
Exchange rate	ER	+
Interest rate	IR	-

3.4.5 Data Analysis

To ensure data integrity and unbiased behaviour on the part of the researcher, the data were analysed using EViews. The researcher analysed and interpreted the data by connecting them to

the research theory, problem, purpose and questions, and by ensuring that the research was coherent throughout. This aided in the development of a multiple regression model that demonstrates the consistency of the relationship between the dependent and independent variables.

3.4.6 Ethical Considerations

The most important ethical concerns were addressed during the course of the research. Because the topics are of national importance, the researcher ensured that all legal and legislative standards for information sharing were followed. Informed confidentiality, respect for the rule of law, and the dependability of information and data sources were all major considerations. The researcher obtained permission from the university for all ethical matters.

3.5 Conclusion

This chapter focused on the methodology that was used to determine the impact of government debt on FDI. The research method was outlined; this was followed by a justification for the variables and a discussion on the data sources, period of study and diagnostic tests that the researcher chose.

CHAPTER 4: RESEARCH FINDINGS AND DISCUSSION

4.1 Introduction

Chapter 4 provides a presentation and discussion of the study results obtained from the procedures presented in Chapter 3. In this study, the decision whether to accept or reject the null hypothesis was based on the probability value. A 5% significance level was chosen for this decision.

4.2 Unit Root Test Results

The researcher used the ADF test to perform the unit root test. The results are shown in Table 2 below.

Table 2: Unit root test results

Variables	Level of Test	Model Specification	ADF T-value	Critical Value (5%)	P-value	Conclusion
LFDI	level	intercept	-2.504005	-2.951125	0.1234	Non-stationary I (0)
		Trend and intercept	-1.538218	-3.552973	0.7954	
		none	0.471600	-1.952332	0.8113	
	First difference	intercept	-8.581375	-2.954021	0.0000	Stationary I (1)
		Trend and intercept	-8.692869	-3.552973	0.0000	
		none	-8.665623	-1.951332	0.0000	
LDEBT	level	intercept	0.314170	-2.951125	0.9757	Non-stationary I (0)
		Trend and intercept	0.224810	-3.548490	0.9897	
		none	1.294660	-1.951000	0.9475	
	First difference	Intercept	-4.116864	-2.954021	0.0030	Stationary I (1)
		Trend and intercept	-4.438504	-3.552973	0.0065	
		none	-4.063351	-1.951332	0.0002	
LEXCH		intercept	-3.576474	-2.951125	0.0117	Stationary I (0)
LINFL	level	intercept	-1.386746	-2.951125	0.5771	

		Trend and intercept	-2.262811	-3.548490	0.4417	Non-stationary I (0)
		none	-0.908527	-1.951000	0.3156	
	First difference	intercept	-5.709812	-2.954021	0.0000	Stationary I (1)
		Trend and intercept	-5.624640	-3.552973	0.0003	
		none	-5.767096	-1.951332	0.0000	
LINTR	level	intercept	-1.673570	-3.004861	0.4301	Non-stationary I (0)
		Trend and intercept	-1.677511	-3.791172	0.7066	
		none	-1.094018	-1.957204	0.2395	
	First difference	intercept	-2.860551	-3.175352	0.0816	Stationary I (1)
		Trend and intercept	-3.035647	-3.933364	0.1676	
		none	-6.656775	-1.959071	0.0000	

The results in Table 2 show that the probability values generated for the t-statistics for all the variables in the model, except LEXCH, are not significant at level. The decision emanates from the fact that the p-values that were obtained are greater than the chosen 5% significant level. The null hypothesis is, therefore, rejected in favour of the alternative.

The conclusion is that the series has unit roots. However, the probability values generated at first difference reveal that all the variables are stationary, as indicated by the p-values that are less than 0.05. The study thus concludes that the series are stationary at first difference. Therefore, all the variables in the model are integrated of order one, 1(1), save for LEXCH, which is stationary at level.

4.3 Cointegration Test Results

The Johansen cointegration test was employed in this research to examine if series are cointegrated. It was necessary to estimate an optimal lag length to ensure parsimony and goodness of fit (Gujarati, 2004). The results are shown in Table 3 below.

Table 3: Lag selection criteria

VAR Lag Order Selection Criteria **Endogenous variables: LOG(FDI) LOG(DEBT) LOG(INTR) LOG(INFL) LOG(EXCH)**						
Lag	**LogL**	**LR**	**FPE**	**AIC**	**SC**	**HQ**
0	-61.73673	NA	0.000545	6.673673	6.922606	6.722267
1	12.50972	103.9450*	4.35e-06*	1.749028*	3.242627*	2.040594*
2	35.78238	20.94539	9.32e-06	1.921762	4.660026	2.456300

*Indicates lag order selected by the criterion

LR: sequential modified likelihood ratio test statistic (each test at 5% level)
FPE: final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan–Quinn information criterion

The results show that one lag 1 is sufficient to estimate the model. This lag was chosen based on the lag order defined by the likelihood ratio (LR), final prediction error (FPE), Hannan–Quinn information criteria (HQC) and Akaike information criterion (AIC). Misspecification errors, such as autocorrelation, can be avoided by selecting the right lag. In this regard, the information criteria deduced results that are in consensus. Therefore, the researcher conducted a Johansen cointegration test using a single lag for the VECM. The results are shown in Table 4 below, based on the trace and maximum eigenvalue tests.

A trace tests the null hypothesis that the number of cointegrating equations (CEs) is greater than the number of variables involved in the model. In this study, the null hypothesis was not rejected because the test statistic was less than the critical trace values. A maximum eigenvalue test was done on the null hypothesis of the number of cointegrating equations (r) against the alternative hypothesis of the number of cointegrating equations plus one ($r + 1$). The null hypothesis could not be rejected because the test statistic is smaller than the maximum eigenvalue test critical value.

Table 4: Cointegration rank test (trace)

Series: LOG(FDI) LOG(DEBT) LOG(INTR) LOG(INFL) LOG(EXCH)				
Unrestricted Cointegration Rank Test (Trace)				
Hypothesised No. of CE(s)	**Eigenvalue**	**Trace Statistic**	**0.05 Critical Value**	**Prob.****
None*	0.768697	76.05924	69.81889	0.0146
At most 1	0.703159	46.77875	47.85613	0.0629
At most 2	0.563707	22.48757	29.79707	0.2721
At most 3	0.214014	5.898721	15.49471	0.7075
At most 4	0.052682	1.082405	3.841466	0.2982

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

*Denotes rejection of the hypothesis at the 0.05 level

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

Table 5: Cointegration rank test (maximum eigenvalue)

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesised No. of CE(s)	**Eigenvalue**	**Max-Eigen Statistic**	**0.05 Critical Value**	**Prob.****
None	0.768697	29.28050	33.87687	0.1605
At most 1	0.703159	24.29118	27.58434	0.1249
At most 2	0.563707	16.58884	21.13162	0.1923
At most 3	0.214014	4.816316	14.26460	0.7648
At most 4	0.052682	1.082405	3.841466	0.2982

Max-eigenvalue test indicates no cointegration at the 0.05 level

*Denotes rejection of the hypothesis at the 0.05 level

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

According to the results above, the trace test shows one cointegrating vector (Table 4), while the maximum eigenvalue (Table 5) does not indicate any cointegrating equation at a 5% level of significance. According to Lutkepohl et al. (2001), the trace test is superior to the maximum eigen value. From this point, this study relied on the results obtained during the trace test. The researcher, therefore, rejects the null hypothesis of no cointegrating equation at 5% level of significance. He does not reject the alternative hypothesis because the probability value is greater than a 5% level

of significance. According to Gujarati (2004), this entails a long-run relationship among the variables in the model, as there is cointegration.

4.4 Vector Error Correction Model

The detection of cointegration and the existence of a long-run relationship among variables in the model implied that a VECM could be utilised. This allowed the researcher to differentiate between short- and long-run effects of variables in the model to establish the impact of public debt on FDI. The summary of the VECM findings is presented in the following tables, depicting long-run and short-run equations, respectively.

Table 6: Long-run cointegration equation results

Variables	Constant	Log (FDI)	Log (GDT)	Log (INF)	Log (ER)	Log (IR)
Long-run	-39.24664	1.000000	1.107791	-7.065410	3.981420	3.740859
SE	-	-	1.76915	2.59083	2.02240	1.62390
T-statistic	-	-	0.62617	-2.72709	1.96866	2.30363

FDI is positioned as the dependent variable in Table 6. In this analysis, the signs of the coefficients were reversed in the long run. Therefore, in the long run, public debt has a negative impact on FDI *ceteris paribus*. These results indicate that a 1% increase in public debt would result in a 1.107791 decrease in FDI. However, the results are insignificant, as shown by an absolute t-statistic value of 0.62617, which is less than 2.

The results also indicate a significant and positive relationship between FDI and the inflation rate, *ceteris paribus*, as shown by an absolute t-statistic of 2.72709, which is above 2. This means that a unit increase in the inflation rate would result in a 7.065410 increase in FDI. However, the results do not comply with the *a priori* expectations, as outlined in the previous chapter.

A negative and insignificant long-run relationship is envisaged between the exchange rate and FDI, *ceteris paribus*, as shown by a t-value of 1.96866, which is less than 2. Again, this contrasts with *a priori* expectations. Furthermore, the results indicate a negative significant relationship between FDI and the interest rate, as shown by a t-statistic of 2.30363, which is greater than 2. This indicates that a 1% increase in the interest rate would cause a 3.740859 fall in FDI. These results are in alignment with what the researcher anticipated, as discussed in Chapter 3.

Table 7: Results of ECM (short-run results)

Variables	ΔLog (FDI)	ΔLog (GDT)	ΔLog (INF)	ΔLog (ER)	ΔLog (IR)
Short-run	-0.339053	-0.869152	0.288472	3.981420	0.180971
SE	0.15008	0.61891)	0.46523)	2.02240	0.18434
T-statistic	-2.25921	-1.40432	0.62007	1.96866	0.98173

From the results in Table 7, it can be deduced that the coefficient of the error correction model (ECM) (log FDI) is - 0.339053. In addition, a t-statics of -2.2592 is statistically significant at a 5% level of significance. The obtained coefficient indicates the speed of disequilibrium adjustment in the economy in the case of shocks. In other words, if there is any deviation from the equilibrium state, only 33.91% is corrected over the course of a year, as the variable moves towards the restoration of equilibrium. Therefore, there is not strong pressure on FDI to restore long-run equilibrium when there is a disturbance.

The speed of adjustment is statistically significant, with a negative t-value of - 2.25921. This implies that the speed of adjustment from any state of disequilibrium, during the previous year or period, to a state of equilibrium would be at approximately 66%.

4.5 Diagnostic Tests

In testing for the goodness of fit of the model, heteroscedasticity was conducted using the White's test with no cross terms. The researcher also conducted an autocorrelation test using the BG serial correlation LM test and a normality test using the JB test. Table 8 shows the results obtained for the heteroscedasticity test, the normality test and the serial correlation test.

Table 8: Diagnostic test results

Test	Null Hypothesis	T-statistic	P-value
Heteroskedasticity test	There is an absence of heteroscedasticity.	182.0528	0.4432
Normality test	The residuals are normally distributed.	21.9521	0.0154
Serial correlation test	There is no autocorrelation.	35.07394	0.0869

4.5.1 Heteroscedasticity Test Results

The results table above shows that the White test with no cross terms generated a chi-squared value of 182.0528 and a p-value of 0.4432, which is less than 0.05. The heteroscedasticity means that the model possesses some misspecifications. Therefore, it is not possible to obtain conclusive results from the model.

The researcher is compelled *not* to reject the null hypothesis, which states that there is no heteroscedasticity in the model. He must, therefore, conclude that the model is free from heteroscedasticity, that is has no misspecifications and that it can be relied upon.

4.5.2 Normality Test Results

The research utilised the JB test to carry out the normality test. The test follows a chi-squared distribution with two degrees of freedom. The results show a JB statistic value of 21.9521 and an associated p-value of 0.0154. Based on the criteria stipulated in the previous chapter, the researcher is, therefore, compelled *not* to reject the null hypothesis, which stipulates that the residuals are normally distributed. He, therefore, concludes that the residuals follow a normal distribution.

4.5.3 Autocorrelation Lagrange Multiplier Test

According to Gujarati (2004), a serial correlation problem arises whenever a variable has associations within itself in such a way that the value of that particular variable in previous periods has a bearing on its future values. The study results, noted in the table above, reveal that the test generated a Lagrange multiplier (LM) test of 35.07394 and p-value of 0.0869, which is greater than 0.05. According to the rule criterion stipulated, the researcher cannot reject the null hypothesis, which states that there is no autocorrelation.

The diagnostic tests all revealed the model's suitability. As a result, strong conclusions were drawn about the impact of public debt on FDI. Appropriate policies can, therefore, be developed with confidence.

4.6 Impulse Response Analysis

The impulse response function depicts the dynamic response of FDI to a single period standard deviation (SD) shock to the innovations of the system. It also shows the persistence and direction of the response to shocks over a 10-year period.

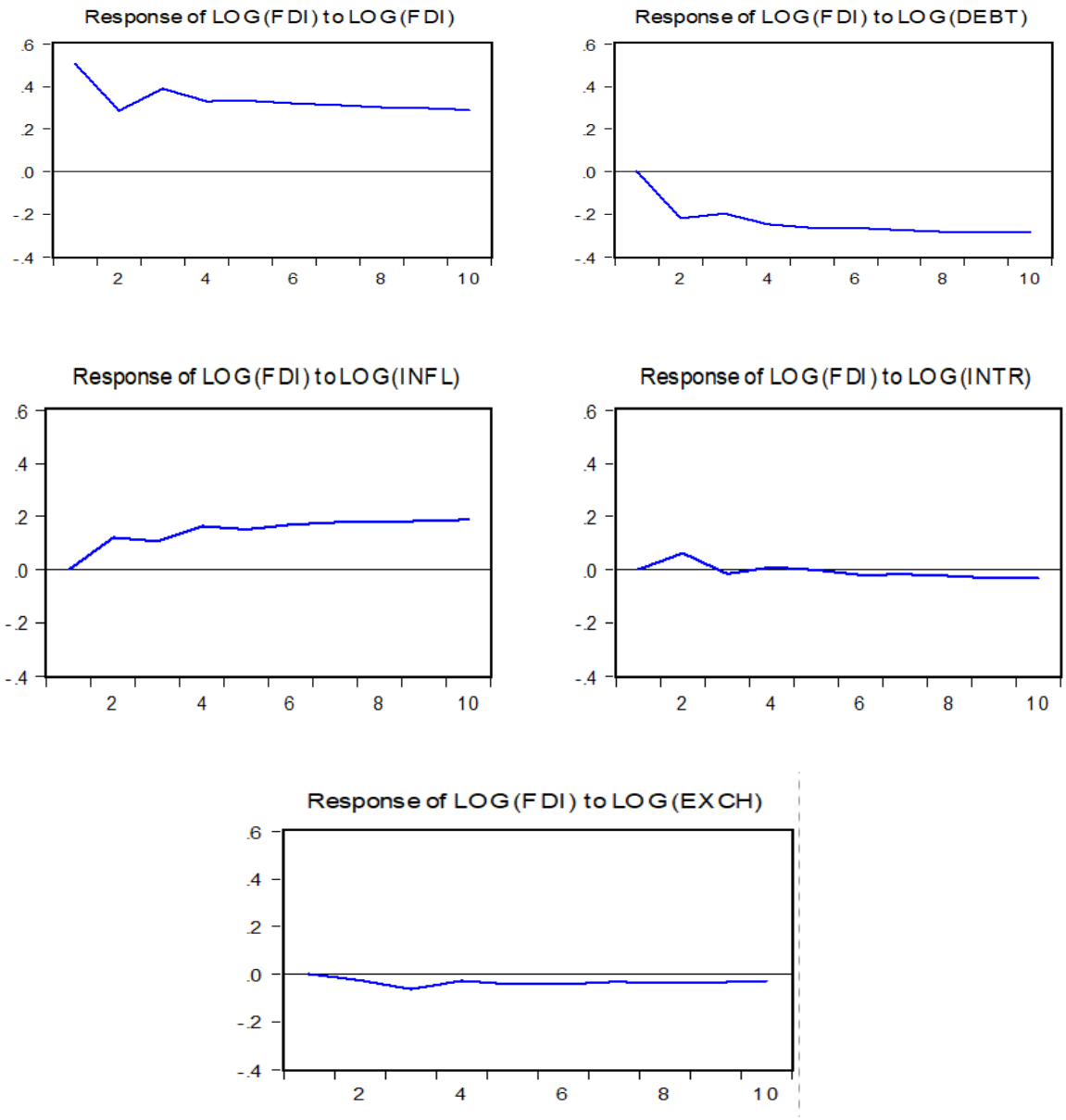

Figure 4: Response to generalise one SD innovations (shock)

Figure 4 shows that the response of FDI to a single standard deviation shock of the included variables is positive for FDI and INFL throughout the 10-year period. However, the results also indicate that one standard deviation shock to public debt (DEBT) and EXCH has a negative impact on FDI throughout the 10-year period, while one standard deviation shock to INTR has a positive impact on FDI from the first year to the third year. It becomes zero from the third year to the fifth year and, thereafter, negative up to tenth year. Shocks on INTR and EXCH generate a response that is negative on FDI. These shocks are transitory and not significantly different from zero.

4.7 Variance Decomposition Analysis

A variance decomposition analysis indicates the proportion of the movements in a sequence due to its own shocks versus shocks to other variables. It shows the fraction of the forecast error variance for each variable that is attributable to its innovations and innovations in the other variables in the system. The results of the variance decomposition analysis are presented in Table 9 below. These show the proportion of the forecast error variance in FDI, explained by its own innovations and innovations in explanatory variables.

Table 9: Variance decomposition results

Period	SE	log (FDI)	log (DEBT)	log (INFL)	Log (INTR)	log (EXCH)
1	0.504467	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.634391	83.35108	11.95441	3.568055	0.947396	0.179066
3	0.779684	80.06655	14.28677	4.210109	0.668644	0.767925
4	0.897990	73.90662	18.43932	6.460514	0.514787	0.678766
5	1.005762	69.84501	21.60442	7.422599	0.410482	0.717494
6	1.102289	66.58983	23.77346	8.509829	0.378080	0.748799
7	1.191901	63.78174	25.68567	9.475412	0.346256	0.710920
8	1.274610	61.35853	27.36002	10.24141	0.340546	0.699492
9	1.352325	59.34356	28.66135	10.95015	0.361950	0.682994
10	1.425865	57.51965	29.85011	11.59314	0.379471	0.657625

For the purposes of this study, the variance decomposition analysis covered a 10-year period so as to establish the impact when all the variables were permitted to impact FDI for a considerably longer period. As postulated by Brooks (2002), during the first year of analysis, all the variance in FDI was attributed to own innovations. In the fourth year and fifth year, FDI accounted for about 74% and 70% of its variation, respectively. These results are consistent with the results from the impulse response analysis. In the fifth year, independent variables were accountable for approximately 30% of the error variance. Specifically, DEBT attributed to 21,6% of the error variance, INFL to roughly 7.4%, INTR to roughly 0.41% and EXCH to roughly 0.71%.

After 10 years, FDI accounted for approximately 58% of its variations. Independent variables accounted for the remaining 42%. The impact of DEBT substantially increased to about 29%, and this accounted for the largest portion of the 42% variation in FDI, explained by explanatory

variables. Inflation increased to roughly 12%, while INTR and EXCH remained below 1% after 10 years.

The variance decomposition analysis findings are in accordance with economic theory. Shocks to the explanatory variables continued to explain a significant proportion of the variation in FDI. This is also consistent with results from the impulse response analysis.

4.8 Conclusion

Chapter 4 presented and discussed the results obtained in this study. Chapter 5 will provide a summary of the study as well as a conclusion, policy recommendations and suggestions for areas of further research.

CHAPTER 5: CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

Chapter 5 presents a summary of the study findings. It also presents the research conclusion and recommendations based on the findings of the study. It concludes with a discussion on areas to explore in future research.

5.2 Summary of the Study

The researcher sought to determine the impact of government debt on FDI. In addition to FDI, as an independent variable, the study employed inflation, exchange rate and interest rates as control variables. Cointegration results using the trace test showed one cointegrating vector, entailing a long-run relationship among the variables in the model. The researcher used the VECM to differentiate between short- and long-run effects of variables in the model and to establish the impact of public debt on FDI. The results showed an insignificant negative long-run impact of public debt on FDI, with a 1% increase in public debt, resulting in a 1.107791% decrease in FDI.

The study established a significant long-run relationship between FDI and inflation rate. It also established a significant negative relationship between FDI and interest rate and a negative but *insignificant* relationship between FDI and the exchange rate. Long-run results were similar, revealing that the impact of public debt was insignificant.

Diagnostic tests performed by the researcher showed that the model used by the researcher was correctly specified. The impulse response analysis showed that the response of FDI to a single standard deviation shock of the included variables was positive for FDI and INFL throughout the 10-year period. However, a negative result was observed between DEBT and EXCH during the same period, while INTR had both a positive and negative impact on FDI over the 10 years. In addition, the variance decomposition results indicated that after 10 years, FDI accounted for roughly 58% of its variations, with independent variables accounting for the remaining 42%. DEBT accounted for the largest portion of the 42% contribution by the explanatory variable, at approximately 29%. This was followed by INFL, which contributed 12%. INTR and EXCH only accounted for roughly 1% combined.

5.3 Conclusion

From the study findings, the researcher has concluded that there is a negative but insignificant relationship between public debt and FDI and that there is a positive relationship between inflation and FDI. The latter relationship is significant, contrary to *a priori* expectations. Moreover, a significant negative relationship was noted between interest rate and investment, while a negative but insignificant relationship was noted between exchange rate and FDI.

5.4 Policy Recommendations

The researcher recommends the following:

- Even though the impact of public debt on FDI is statistically insignificant, it is negative. Therefore, the government should determine how to reduce public debt to increase FDI.
- Policy formulation should target inflation, as it was found to have a significant positive impact on FDI.
- The government of Zambia should also target the interest rate, as there is a negative relationship between interest rate and FDI.

Even though the impact of exchange rate on FDI is insignificant, a negative relationship was established between the two. In this regard, the government should establish policies target at this variable to increase FDI.

5.5 Areas for Further Study

The researcher managed to determine the impact of government debt as well as inflation, exchange rate and interest rate on FDI. The researcher recommends further study to determine the impact of private debt on FDI and to include other variables, such as taxation and other investment incentives, into the model.

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