THE DETERMINANTS OF FDI IN ZAMBIA WITH PARTICULAR FOCUS ON TAX INCENTIVES

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ABSTRACT

This paper examines the determinants of FDI in Zambia from 1970 to 2014, with a particular focus on tax incentives. FDI is seen as a tool for economic development and a means of bridging the saving and investment gap in developing nations. For this reason emerging economies grant special incentives to attract FDI. However, empirical literature is controversial about the effect of tax incentives on FDI inflows, given that there are other more significant factors. This study utilizes a vector error correction model to determine the long run and short run dynamics to establish the nature of relationship between FDI and its determinants. The empirical analysis reveals that both the corporate income tax (CIT) and tax incentive indicator (TII) significantly determine trends in FDI inflows in Zambia. However in the study CIT is more important for FDI than TII. Other significant factors that attribute to FDI inflows are trade openness, market size and inflation, were positively related and significant, while infrastructure development and natural resource abundance exhibited negative and significant influence on FDI. Based on these findings, the study recommends, the government can encourage FDI inflows by making its tax policy using CIT rates more conducive towards investment and reduce its dependence on natural resource (extractive) FDI. Further the government should ensure that the Zambian economy is more integrated to the world economy and policies should be directed to enhance growth in GDP/capita as a motivating factor for the attraction of FDI into Zambia.

Key Words: Tax Incentive Index (TII), Corporate Income Tax Rate (CIT), Foreign Direct Investment (FDI), Vector Error Correcting Model (VECM).

DEDICATION

To my daughter Joy-Mupelwa; and my family for your unreserved support.

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After an intensive period of seven months, today is the day: writing this note of thanks is the finishing touch on my thesis. It has been a period of intense learning for me, not only in the scientific arena but also on a personal level. Writing this thesis has had a big impact on me. I would like to reflect on the people who have supported and helped me so much throughout this period.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF APPENDICES

ACRONYMS

AFDB	African Development Bank
BOZ	Bank of Zambia
CSO	Central Statistical Office
ECM	Error-Components Model
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GLS	Generalised Least Squares
GMM	Generalised Method of Moments
GRZ	Government of Republic of Zambia
IMF	International Monetary Fund
IRF	Impulse Response Function
MNC	Multi-National Corporation
MNE	Multi-National Enterprise
OECD	Organisation for Economic Cooperation and Development
OLI	Ownership, Location and Internalisation Framework
OLS	Ordinary Least Squares
SSA	Sub-Saharan Africa
UNCTAD	United Nations Conference on Trade and Development
VECM	Vector Error Correcting Model
USA	United States of America
ZDA	Zambia Development Agency
ZRA	Zambia Revenue Authority

CHAPTER ONE

INTRODUCTION

1.1 Overview

Foreign Direct Investment (FDI) can play an important role in an economy's development efforts. In African countries, in particular, it is a critical source of long-term capital, as many developing countries have low domestic saving and low income to fund investment. FDI provides the capital to fill the saving and investment gap.

FDI has been perceived to be a catalyst for economic diversification, helping developing economies move beyond overdependence on natural resources. It also contributes to economic development through, transferring advanced technology and organisational skills, generating technological spillover and creating linkage with local firms, generating employment and developing the skill of human capital and helping to create a competitive business environment. (Guariglia, 2007; Gohou and Soumare, 2012).

Given the role of FDI in economic growth, one of the most important policy questions is: What should be done to attract inward FDI? This question seeks to explore which policy variables can be used to attract FDI in general. Here, a policy variable is defined as a determinant of FDI which can be directly influenced by "policy makers" in the short run. Most developing countries have undertaken a number of structural reforms and provided investment incentives in order to attract FDI to welcome and encourage foreign investors to invest in all industrial sectors of host economies. This is done in a bid to relocate or attract domestic and foreign capital by offering favourable tax treatment to certain economic activities (Cleeve, 2008). Developing countries empower foreign investors with various tax benefits, such as capital allowances, export tax allowances, tax exemptions and concessions, which often aim at fostering investment, international trade and economic growth (Klemm and Van Parys, 2012). Governments may see such incentives as a necessary measure to compete with other host countries and to signal government commitment to an open investment environment (Moran, 1998). Policies to attract FDI have become standard in most countries, irrespective of their level of development, geographical location or industrial structure.

According to Morisset & Pirnia (1999), when other factors such as infrastructure, the cost of production, economic and political stability are more or less equal, tax regulation may have a significant effect on investors' choices. This competition encourages developing countries to enact tax regulations that tend to be more beneficial for the investing company than achieving their tax revenue target.

Tavares-Lehmann (2012) notes that despite the competition for FDI by either the developed or developing economies, there is no explicit agreement on the relationship between taxation and FDI. Some argue that fiscal incentives are not effective means of attracting FDI; according to them the revenue loss from fiscal incentives outweighs the gain from the investment. The opposing theoretical arguments and the ambiguity of the issue leave the matter to empirical scrutiny. Further, there is a possibility that the impacts may differ across countries depending on different economic, political and social factors.

Zambia has in recent decades witnessed a rapidly rising flow of FDI, from less than 1% of GDP in 1970 to nearly 9.5% of GDP in 2007. This rising flow of FDI is projected to increase the tax base due to expected increase in employment, business opportunities, and activities. The new business profits that come about due to the inflow of FDI are in most cases subject to domestic taxes. Hence, intuition prompts to claim that host country corporate tax policy ought to have a role to play when foreign firms are deciding to invest abroad. (Kaplinksy and Morris, 2009).

Despite this increase, there is still a low share of inbound FDI compared to her peers in SSA. In 2010, Zambia's share of total FDI inflow to the region was only 2.3% as compared to leaders such as South Africa and Nigeria who had 35.9% and 16.4% respectively (UNCTAD 2010).

This study intends to examine the effect of tax policy to influence the amount of foreign direct investment inflows in Zambia from 1970 to 2014.

1.2 Determinants of FDI

Various scholars have discussed determinants of FDI, Root and Ahmed (1978) divided their 44 potentially significant determinants into four subgroups i.e. Economic, Social, Political

and Policy factors. The focus of this paper is on mainly Economic and Policy factors, discussed below.

Economic

Market size is defined through the market volume and market potential. It is measured by GDP per capita or GDP and is considered an important determinant of FDI (Artige and Nicolini, 2005). Economic growth is the increase in the amount of the goods and services produced by an economy over a certain period of time. It is mostly measured as the per cent rate of increase in real GDP. Charkrabarti (2001), states that a rapidly growing economy provides relatively better opportunities for making profits than one growing slowly or not at all.

Productivity is a measure of economic efficiency which shows how effectively economic inputs are converted into output. Charkrabarti (2001) claims that wage as an indicator of labour cost has been the most contentious of all the potential determinants of FDI. Cheap labour helps in attracting multinationals, however, the availability of skilled labour is also considered. Human capital is found to be a relevant determinant that affects the level of productivity. Basically in skilled labour sectors where the level of education improves; productivity also increases and facilitates implementation of technological innovations (Brooks *et al*., 2010). Therefore, a significant positive relation of FDI can be expected particularly for efficiency seeking FDI.

A good financial system is of ultimate importance for the functioning of the modern economy and is represented by financial institutions; particularly banks, the government, and international institutions. The development of the domestic financial system helps foreign firms to raise finance in order to broaden activities in the host country. This would further boost the scope for technological spillovers to domestic firms. FDI, as measured by the financial flow data, is partly financed through debt and equity rise in financial markets in the host countries (Borensztein *et al*., 1998). Thus, the availability and quality of domestic financial markets may influence FDI.

Policy Factors

The ability to move capital in and out of a country is essential for foreign investors. It promotes the efficient allocation of resources through specialisation, comparative advantage, and competition in both national and international markets. It also allows easier diffusion of knowledge and technology across countries. Moreover, if less capital controls and liberal trade policies are applied, more FDI is attracted (Onyeiwu and Shrestha, 2004). Policies on trade should, therefore, ensure that they encourage trade openness to allow for easy FDI investments in a country.

The political environment of a country is a vital determinant in FDI attraction, although the level of political risk among FDI determinants still remains relatively unclear. Specific proxy variables (e.g. number of strikes and riots, work days lost) have proved important in some studies. However, quantitative estimates can only capture some aspects of the qualitative nature of political risk. Policies on infrastructure also affect the level of FDI investments a country has. Infrastructure ranges from roads, ports, railways, telecommunication systems to institutional development. Poor infrastructure can be viewed as both an obstacle and a chance for foreign investment. For the majority of low-income countries, it is frequently quoted as one of the major constraints. Nevertheless, foreign investors also point to the potential for attracting important FDI if host governments allow more substantial foreign participation in the infrastructure sector.

The exchange rate can affect FDI by lowering the costs of production by MNC and thus affect the competitiveness of goods produced and yield higher profits from foreign firms. Lim (2001), argues that the depreciation of a currency could imply that foreign firms would be able to purchase assets and technology in the host country cheaply thus increasing FDI. On the contrary, an appreciation would imply more foreign currency earnings for the foreign investors hence would increase FDI inflow.

Regional Integration, a process in which states enter into an agreement in order to enhance regional cooperation, can also determine FDI investment levels. The objectives of the agreement can be economic, political, or environmental. Currently, strong growth in Regional Trade Agreements (RTAs) and the amount of FDI flows are being observed, especially in developing countries. Through several existing channels RTAs can influence the level of foreign direct investment (Blomström and Kokko, 1997; Dunning, 1997).

The importance of the determinants renders them relevant even in contemporary empirical work. Therefore, highlighting these tested determinants in this paper is worthwhile, because these determinants provide direction to the selection of possible control variables.

So then, why do governments continue to rely so much on tax policy when it is only one of the many determinants of FDI?

1.3 Problem Statement

Theoretically, FDI is considered as a growth catalyst especially in developing countries where raising domestic capital is difficult. Empirically, the work of Borensztein (1998) has shown that there is a remarkable positive relationship between FDI and economic growth. Based on these arguments, many countries, including Zambia have put incentives, to attract FDI in place.

Since 1986, the Zambian Government has been providing a wide range of tax incentives in order to attract FDI. Honourable Chikwanda in his 2014 budget address stated that "our tax incentive regime was one of the most generous in the region. However, studies undertaken to examine the extent to which investors accessing tax incentives, have met their investment obligations including creating employment have revealed disappointing results" (2013 budget speech read by The Minister of Finance). Despite this, many administrations feel that not offering incentives could put them at a disadvantage and continue to offer programs. Overall, Zambia's FDI inflows have not changed significantly in the last twenty years, especially when measured relative to population and size of the economy. The share of FDI is low despite the existence of very favourable tax policies and investment incentives such as the use of relatively lower corporate income tax rates and widespread tax holidays for foreign investors wishing to invest. This lower level of FDI seems to be against what the neoclassical investment theory predicts that the lower cost of capital is expected to lead to higher investment flows (Van Parys and James, 2010).

Furthermore, FDI has been polarised to the extractive resource industry (the sector with the highest CIT rates), representing 65% of total FDI from 2007 to 2014 as compared to the Agricultural and Agro-processing sector (sector with the lowest CIT rates), which has been highlighted as the sector with the greatest potential to propel Zambia's economy to achieve broad-based economic growth.

Whilst FDI provides a useful indicator in itself of the effectiveness of tax incentives, there are a number of other, external factors that may influence FDI, such as the political environment; economic stability; and global market trends. Many arguments have been drawn to the effect that developing countries such as Zambia do not need to offer tax incentives for it to attract FDI.

The aim of this study is, therefore, to assess the significance of using tax incentives has been to attract FDI into Zambia.

1.4 General Objective

The general objective of the study is to assess the effectiveness of fiscal incentives in attracting FDI in Zambia while taking into consideration the effect of other determinants.

1.4.1 Specific Objectives

1. To determine the significance of tax incentives in trends of FDI inflow.
2. To offer an analysis on the evolution of tax policy towards incentives in Zambia from 1970-2014.
3. To determine the impact of other determinants of FDI such as Macroeconomic stability, infrastructure development, trade openness, natural resource abundance and market size on FDI inflows.

1.4.2 Hypothesis

1. H_0: There is no relationship between corporate income tax rates and FDI inflows.
   H_1: There is a relationship between corporate income tax rates and FDI inflows.
2. H_0: There is no relationship between tax incentive indicator and FDI inflows.
   H_1: There is a relationship between tax incentive indicator and FDI inflows.
3. H_0: There is no relationship between inflation rates and FDI inflows.
   H_1: There is a relationship between inflation rates and FDI inflows.
4. H_0: There is no relationship between infrastructure development and FDI inflows.
   H_1: There is a relationship between infrastructure development and FDI inflows.
5. H_0: There is no relationship between trade openness and FDI inflows.
   H_1: There is a relationship between trade openness and FDI inflows.
6. H_0: There is no relationship between market size and FDI inflows.
   H_1: There is a relationship between market size and FDI inflows.

7. H_0: There is no relationship between natural resource abundance and FDI inflows.
   H_1: There is a relationship between natural resource abundance and FDI inflows.

1.5 Significance of the Study

The Zambian government has set up institutions with a mandate to spearhead the task of ensuring sustained FDI inflow. However, the dilemma facing public sector economists is that even if countries use tax policy to attract FDI, there is no consensus in empirical work on the actual effect of taxation on FDI. This is because there are numerous factors behind a firm's decision to invest abroad with investment incentives playing a nuanced role. As noted by James (2009), countries typically pursue growth-related reforms using a combination of approaches, including macroeconomic policies, investment climate improvements, and industrial policy changes. It is, therefore, difficult to pinpoint the specific effect of incentives. Academic research in the area of investment determination reflects this.

Although many theoretical and empirical research has been undertaken on the subject matter, little regional specific research has been done and even little on country-specific research in Zambia. Therefore, this research contributes to filling this gap by adding empirical academic research on this topic for Zambia and also suggesting areas for further studies.

It also helps in evaluating whether certain investment policies over the years attained their desired goal. It would also be beneficial for the fiscal arms of governments to understand the actual impact of Taxation on inbound foreign investment and thereby offer optimal incentives.

1.6 Organisation of the Study

The remainder of the paper is organised as follows. Chapter 2 provides a historical perspective of the evolution of investment incentives in Zambia from 1970 including trends in FDI inflows. This is followed by the literature review in Chapter 3. Chapter 4 discusses the data and methods used in the study. Subsequently, Chapter 5 presents the results of the study and offers a discussion on the main findings. Finally, Chapter 6 offers the conclusion of the study and offers some and policy recommendations.

CHAPTER TWO

BACKGROUND

2.1 A History of Investment Tax Incentives and FDI Inflow in Zambia

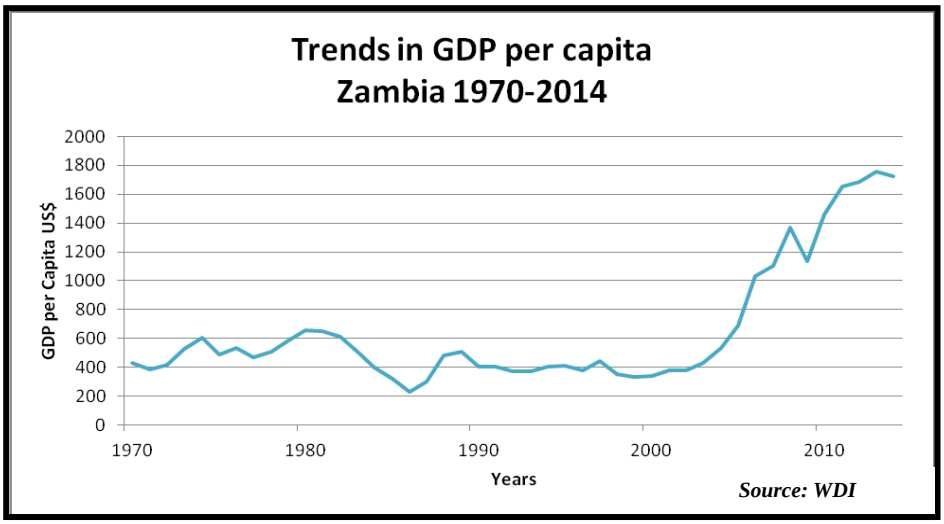
To understand the context in which this research question will be answered, it is important to look at the historical background of the Zambian economy vis-a-vis major macroeconomic indicators of drivers of FDI. Most importantly, there is need to also analyse the evolution of tax policy inclusive of incentive policy with regards to their intended implications on FDI.

2.2 Zambia's Economy 1970-2014

There are two distinct eras in which the direction of policy towards trade existed; these are the periods in which Zambia was classified as a closed economy to the period that the economy was liberalised.

1970-1990: Behind Closed Doors

A few years after independence in 1964, Zambia was one of the most prosperous nations in Africa with a rich endowment of arable land, water, and mineral resources. It held great potential for sustainable economic development. Initially, the government followed a fairly liberal political and economic policy, primarily focused on providing infrastructure and services to the majority of the people. However, after the implementation of the 1968 Mulungushi Declaration in 1972, the government switched to a more restrictive policy environment, with a heavy role for the state in national development. The state, owned and controlled industry, with high tariffs imposed for protection. Consumption was heavily subsidised, prices were controlled and agricultural marketing and credit were provided by state agencies.



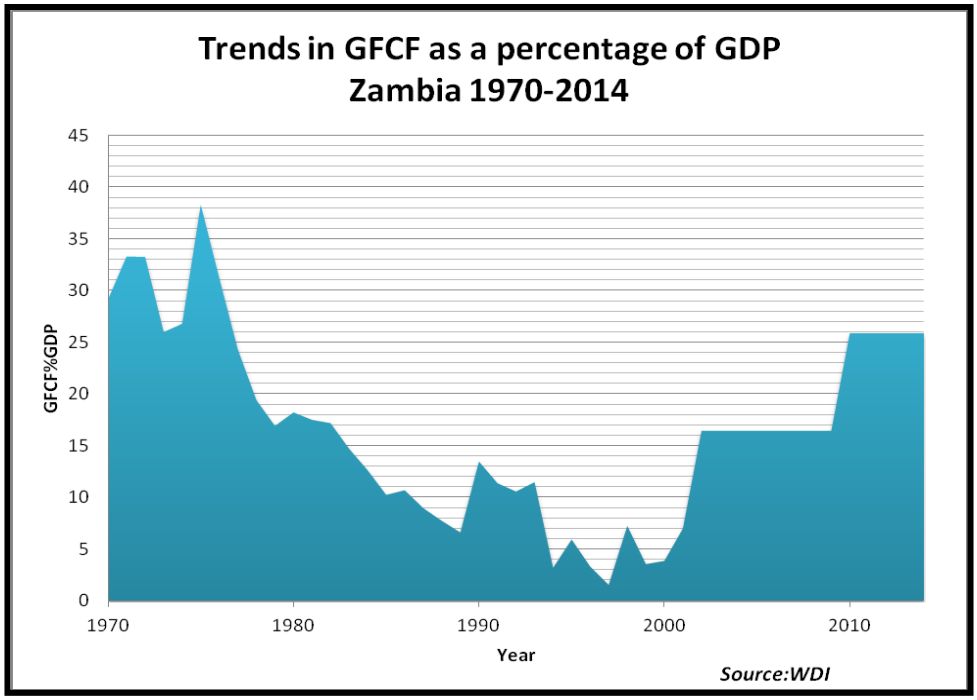
Graph 2.1: Real GDP per Capita in Zambia 1970-2014

In the first ten years after independence, the nation experienced growth in GDP averaging 2.4% a year (SAPRN). This was significantly lower than population growth thereby leading to declining per capita incomes as shown in Graph 2.1 above. After 1975, Zambia faced falling copper prices (initially thought by the government as temporal), political turmoil in neighbouring countries, and severe effects of the first oil shock. Anticipating a rise in copper prices, the government borrowed heavily to sustain the economy. By the early 1980s, however, it was clear that the 1970s reform had failed. As a result, between 1983 and 1985, the government attempted an IMF/World Bank Structural Adjustment Programme (SAP) that had stringent conditions attached. This was abandoned in May 1987, after massive food riots on the Copperbelt. SAP was replaced by another local programme that re-imposed the controls of the 1970s. However, the economy continued declining, poverty levels rising and debt swelling to US$7.1 billion by 1991(The Zambian Economist).

1990-2014: The Implications of Liberalisation

The Zambian economy has continued to record positive economic growth since the re-introduction of market reforms in the early part of the 1990s. It has been transformed through market liberalisation, deregulation, and privatisation of state-owned companies. In the past ten years, Zambia has sustained an annual grown rate of 6% in real gross domestic product (GDP), well above Africa's annual average. This economic transformation is attributed to the re-introduction of the market economy which stimulated private sector investment, encouraged by the presence of an enabling economic and stable political environment (Makano, 2015).

In the later part after the first decade of the millennium, despite unfavourable global economic conditions, the Zambian economy continued to be resilient, with GDP growth of 7.3 per cent in 2012 compared to 6.8 per cent the previous year (ZDA, 2014). This outturn was driven by the rise in output by various sectors including agriculture, manufacturing, tourism, construction, and transport and communication. This has been due to efforts by the government to diversify the economy away from mining to other potential growth sectors. The agriculture sector continued to register positive output, although lower than the output in the previous two farming seasons. The construction sector benefitted from increased public works by the Government such as the establishment of the Multi Facility Economic Zones (MFEZs), construction of roads, bridges, and health and educational facilities, coupled with strong a demand for housing and commercial buildings. During 2012/2013, the Government implemented a number of measures aimed at improving economic infrastructure, particularly roads, rail and power generation capacity. In this regard, the Government embarked on a number of road projects, including the Link-Zambia 8000, and the Pave-Zambia road projects aimed at improving accessibility to regional and international markets and open up the country to investment.



Graph 2.2: Trends in GFCF in Zambia 1970-2014

This information is aptly reflected when observing Trends in Zambia's GFCF over the period 1970 to 2014 (See Graph 2.2 above). Vast infrastructure development was evident in the early 1970's but began to decline as Zambia's economy fell into decline in the 1980s. In the early part of the millennium, it can be seen that GFCF began to rise, which can be attributed to both public and private investment in infrastructure.

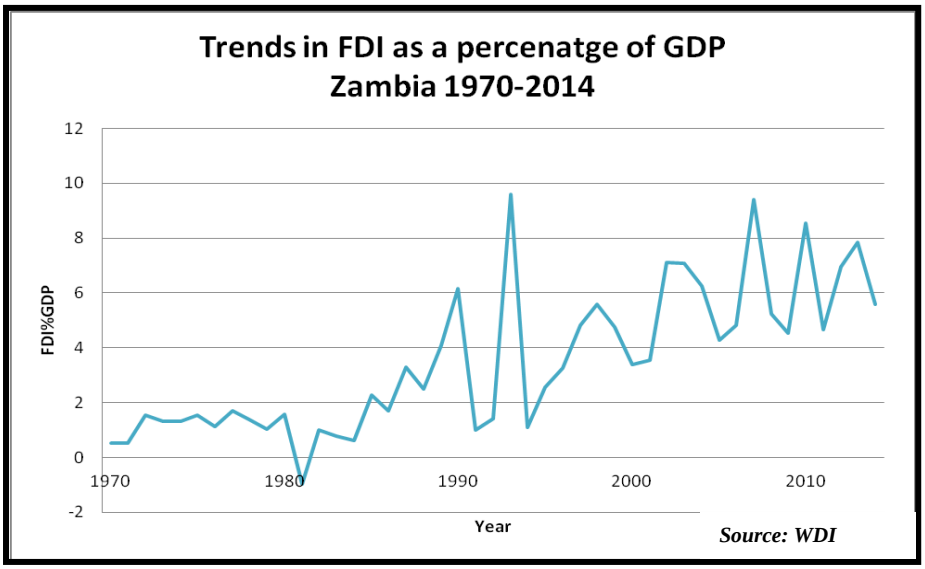
Continued growth in transport and communications was due to an increase in the mobile phone and internet subscriber base, coupled with growth in road and air transport. As with most countries in the Southern African region, Zambia experienced higher inflationary pressures from food prices in 2012, which pushed the end-year annual inflation up to 7.3 per cent from 6.0 per cent in 2011. The pressure on food prices arose from supply deficiencies in maize grain and increased exports of maize to deficit neighbouring countries. However, inflation was maintained in single digits throughout the year.

Zambia's external sector is expected to improve, supported by the rebound in copper production and continued growth of non-traditional exports. Further, the various Government initiatives aimed at lowering the cost of borrowing should also boost national output. However, threats to these prospects include uncertainties in global growth and unfavourable weather.

2.3 FDI Trends in Zambia

Graph 2.3 below depicts trends in FDI in Zambia from1970 to 2014. With the opening up of the Zambian economy in the 1990s, FDI inflows increased considerably reaching $334 million in 2004. This was largely explained by the implementation of an ambitious privatisation programme (1994-2001), investments in copper and cobalt extraction, and greenfield investments in the agricultural sector, particularly in horticulture and floriculture production; and in tourism also backed by expanding market demand and stronger investor and donor confidence (OECD, 2011).

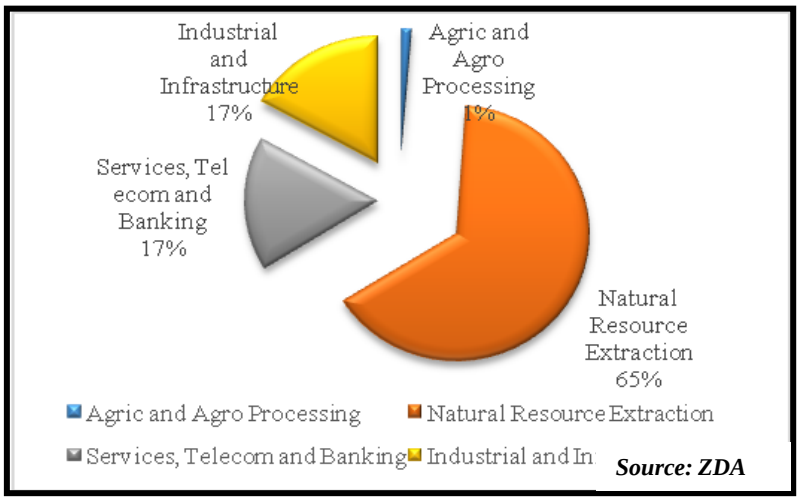
Since the creation of ZDA in 2006, FDI has almost tripled from US$ 467 million in 2006 to US$1,323 million in 2007; however, this has stabilised over time (ZDA, 2008).



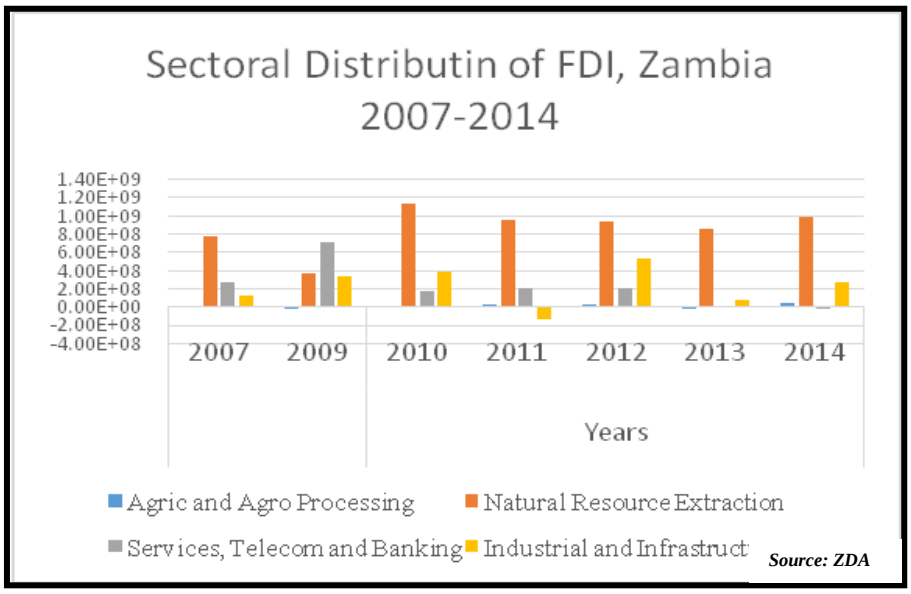
Graph 2.3: Trends in FDI Inflows as a Percentage of GDP, Zambia 1970-2014

The boom in the mining sector has been a particularly strong driver of the country's recent growth and increased FDI inflows. The pick-up in FDI since 2003 is mainly explained by the commodity price boom then, which saw copper prices increase by 80 per cent from US$1,560 per metric tonne in 2002 to US$2,816 in 2004. Two new large mines (the Kansanshi mine by First Quantum Minerals from Canada and the Lumwana Mine by Equinox Minerals from Australia) had started operations in Zambia (UNCTAD, 2006).

2.3.1 Sectoral Distribution of FDI



Graph 2.4: Sectoral Distribution of FDI in Zambia



Graph 2.5: Sectoral Distribution of FDI in Zambia 2007-2014

Graph 2.4 and 2.5 above show the sectoral distribution of FDI in the country, due to data limitations the time periods reflected are 2007-2014. The graphs show that the second largest sector for FDI in Zambia is the services sector after the Mining sector. An analysis of FDI inflows by sector in 2012, showed that the mining sector was dominant with net inflows of US $933.7 million (accounting for 53.9 per cent), followed by the manufacturing sector with net inflows of US $469.6 million (27.1 per cent), and the deposit-taking corporations with net inflows of US $184.4 million (10.6 per cent). This was followed by the construction sector at US $54.6 million (3.2 per cent) and the wholesale and retail trade sector at US $38.3 million (2.2 per cent). Other sectors such as the agriculture, forestry and fishing, other financial institutions, electricity, gas and steam, transportation and storage and the real estate activities recorded small amounts of FDI inflows of US $68.6 million collectively, whilst the information and technology sector recorded a net outflow of US $18.4 million (ZDA, 2013).

The service sector is characterised more specifically with banking, communications, and tourism. There are six international banks operating in Zambia, including Barclays, Standard Chartered, Stanbic, and Citibank. FDI in telecommunications services is more recent and concentrated in mobile telephony, with licenses granted to Telecel (which was acquired by MTN in late 2005) and Celtel (Now Airtel), which was acquired by Kuwait's MTC Group in 2005. The tourism industry has also attracted more foreign investors in recent years,

especially in the development of game parks and in sites around the Victoria Falls area. The latter saw the opening of the Sun International resort in 2001 built at an estimated cost of $45.6 million on 46 hectares. Foreign investors are also present in the country's three big international hotel chains, namely, Intercontinental, Taj Pamodzi Group of hotels and Holiday Inn, which were acquired through privatisation (ibid).

In recent years, agriculture has been attracting FDI directed mainly in the production of fruit, flowers, horticultural products, cotton, maize, tobacco, and sugar. Foreign involvement in this sector ranges from large companies such as South African listed Illovo Sugar and medium-sized foreign companies like Enviroflor.

The involvement of FDI in manufacturing is linked mainly to the production of inputs for the mining sector and food and beverages for the domestic market. FDI is also involved in the production of cotton yarn and engineering and copper-based products for the regional market. For example, Phelps Dodge Cable and Wire Company of the United States, which acquired the formerly state-owned Zambia Metal Fabricators Limited (Zamefa) in 1996, is one of the biggest manufacturers of copper rods, copper wire and power cables in Southern Africa.

2.3.2 Sources of FDI

According to UNCTAD, developed countries are the most important sources of FDI in Africa. Their share in total FDI inflows into the region averaged 79.0 per cent in 1995-1999 and 72.1 per cent in 2000-2008. The same group of countries accounted for 89.0 per cent of total FDI inward stock in Africa in 1999 and 91.6 per cent in 2008 (UNCTAD, 2010).

Although it is difficult to obtain accurate data for FDI in Zambia, the stock of FDI by country is presented below. Survey findings show that Canada (US $2,963.3 million), Australia (US $2,266.3 million), the United Kingdom (US $1,939.9 million), China (US $1,137.9 million), South Africa (US $980.1 million), the Netherlands (US $801.9 million) and Switzerland (US $598.3 million), collectively accounting for 85.9 per cent of Zambia's stock of FDI in 2012. Other major source countries included the Democratic Republic of Congo (US $428.9 million), Bermuda (US $322.9 million) and Mauritius (US $265.4 million), collectively contributing 4.6 per cent of the total stock of FDI (ZDA, 2013).

2.4 Tax Incentives Definition and Types

Tax Incentives can be defined as special exclusions, exemptions, or deductions that provide special credits, preferential tax rates or deferral of tax liability. Tax incentives can take the form of tax holidays for a limited duration, current deductibility for certain types of expenditures, or reduced import tariffs or customs duties. Given the underlying goal of tax incentives in attracting FDI, it is important to consider trends relating to foreign investment. These can act as an indicator or measure of success and impact of tax incentives, illustrating to what extent incentives have been effective in facilitating an enabling investment environment and promoting economic growth.

According to UNCTAD (2000), there are ten categories of tax incentives commonly used by both developed countries and developing countries. Those ten categories of tax incentives are:

- **Reduced corporate income tax rate:** This can be lowered by governments as an exception on common statutory income tax rate to induce FDI into some regions or specific sectors. This incentive is commonly targeted toward foreign investors who meet specific criteria to attract additional foreign investment.
- **Loss carry forwards:** This incentive permits the company to reduce its future tax burdens by subtracting future profit with current loss. The idea of this incentive is to support investors whose projects suffer from enormous loss during the first period of its production. Governments usually combine this incentive with accelerated depreciation and lowered tax rate.
- **Tax holidays:** Under this incentive, new investors will be exempted from any form of income tax during a specified period (commonly three to five years). In addition to income tax exemption, governments usually combine it with duty and excise, and goods and service tax exemption. It is considered as a simple incentive with low compliance burden in which cumbersome tax calculation over the tax holiday period can be abandoned. This benefit brings tax holiday into a lucrative incentive not only for investors but also for the government.

- **Investment allowances:** Investment allowances are considered as a stimulus in investment expansion. Under this incentive, the company will be able to accelerate writing-off their qualifying capital investment cost.
- **Investment tax credits:** In some countries, investment tax credits will be regarded as a proportion of qualified investment which will be deducted in tax liability. It is only valid in the year of investment even though some countries may consider extending the claim period.
- **Reduced taxes on dividends and interest paid abroad.**
- **Preferential treatment of long-term capital gains:** The intention of this incentive is to stimulate investors to preserve investment and if possible to expand it for a longer period. Special treatment will be granted in the form of reduced income tax rate for a longer period of investment.
- **Deductions for qualifying expenses:** Some countries prefer to aim at a specific industry, field or a specific area in their country (especially less developed area) in attracting FDI. These intentions are usually equipped with a deduction for qualifying expenses towards income tax calculation. For example, countries whose aim for technological industry development will promote R&D project by allowing companies double deduction of R&D expenses.
- **Zero or reduced tariffs**: In order to promote investment, particularly in imported capital equipment, including its spare part, the government can reduce tariff of imported capital goods. This incentive can reduce the cost of investment borne by investors, thereby encouraging investors to replace obsolete machines or upgrade outdated plants.
- **Employment-based deductions:** In many countries with the abundant labour force, the unemployment rate is an inherent condition which is troublesome. The government may formulate tax incentive to motivate investors for hiring more employees in their productions.

2.5 An Evolution of Tax Policy and Incentive Regime

At independence, in 1964, Zambia continued with the colonial taxation system until 1966. However, the function of taxation came to fall under the Ministry of Finance. For administrative purposes, there was the department of Customs and Excise on one hand and the Department of Income Tax on the other each dealing with trade and inland taxes

respectively. The two revenue bodies were separate from each other and had different management teams.

Tax policy in the post-independence period to about 1972, placed heavy reliance on mining taxation and provided favourable incentives and exemptions for local companies. The mineral tax regime had three major elements: a production based royalty at a rate of 13.5%, copper export tax (introduced in 1966) equivalent to 40% and an Income Tax at a maximum rate of 45%. These taxes especially the production based ones, remarkably increased revenues; contributing about 60% to total revenues at the time. The regime, however, had a negative impact on mining companies as evidenced by the experience of Bancroft Mine which suffered losses after paying royalties and export tax in 1967.

After assuming ownership of the industry, the government abandoned the tax regime and replaced it with a profit based mineral tax at a rate of 51% and Corporate Income Tax at a rate of 45%. The Mineral royalty was later re-introduced in 1983 but now at a lower rate of 4% of the value of mineral sales. Much of the taxation regime after 1983 did not depart so much from the production-based taxes that prevailed before.

Local non-mining companies, on the other hand, were conferred with preferential tax regimes. For instance, manufacturing companies enjoyed privileged access to import licenses and other special tax treatment. The Equity Levy Act of 1982 was another Law that favoured local parastatal companies. It provided for the payment by parastatal companies of Equity Levy instead of the Corporate Income Tax in instances where the tax chargeable under the Income Tax Act was greater than the Equity Levy. The objective of the legislation was to give relief to parastatal companies that were not performing well.

After 1986, several Investment Acts were passed all aimed at promoting investment especially foreign in priority sectors earmarked by the government that needed development.

Illustratively, the former Minister of Finance, Ronald Penza, in Zambia, contributing on the Investment Bill 1993, observed:

> *"We are dealing with very serious competition from the neighbouring countries around us... We should create those conditions which can make investors, be they American or British or South African, stay and not merely someone who comes here to use us in transit" (Mwenda, 1999).*

In 2006, ZIC was later merged with four other statutory bodies to form the Zambia Development Agency (ZDA) through the enactment of the ZDA Act No.11 of 2006 as a result of the Private Sector Development Reform Program (PSDRP). The ZDA incentive regime makes large use of tax holidays (meaning no payment or payment at reduced CIT rates for a number of years), particularly in the MFEZs. It has been argued that tax holidays are of most benefit to "short-term" investors who do not plan to operate in a country on a long-term basis. In general, these short-term investors are likely to be less beneficial for the country in terms of employment and spillovers.

For long-term investors, the tax holiday represents a small proportion of the number of years of their planned projects so it does not weigh as heavily on their investment decision. Instead, the long-term statutory rate, quality of infrastructure, and such, are more important. Tax holidays also provide an avenue for transfer pricing for multinational firms. For instance, a Shell Company of a multinational can be set up in Zambia to benefit from the tax holiday. As soon as that holiday expires, the Shell Company is disbanded. In fact, the same strategy can be followed by a domestic firm which sets up a subsidiary to benefit from the tax holiday. As such, there is a risk that no real economic benefits are conferred to the economy.

While still committed to FDI development and an incentive program, the Zambian government has expressed a desire to re-assess incentive policy – to make it more cost-effective and allow it to benefit a broader spectrum of the Zambian population. This was highlighted in the 2012 budget speech which outlined the policy focus for 2012. The Zambian government further re-committed itself to its flexible exchange rate regime and continues to carry out the Financial Sector Development Plan, which has increased access to financial services through the promotion of microfinance, mobile and rural banking (Chikwanda, 2012).

The general system of taxation (excluding special incentives) places Zambia among the countries with the heaviest tax burden among comparator countries for all sectors. Generous incentives for the agriculture and manufacturing sectors reduce the tax burden under the incentives scheme to the lower levels among comparator countries. Finally, Zambia has signed Double Taxation Treaties (DTTs) with a number of countries that are important to it as far as trade and investment are concerned (OECD, 2011).

Table 2.1 Major Investment Policy Shifts

Policy(Source)	Description	Major thrusts
1977 Industrial Development Act(GRZ 1977)	An Act to provide for the licensing and control of manufacturing enterprises, to provide incentives for investment.	• Relief from Income Tax in the priority sectors, Training and Rural Enterprise; • FDI was not given any Tax relief only remittance and immunity to nationalisation.
Investment Act of 1986 ***(GRZ 1987)***	An act to revise the law relating to investment in Zambia and in particular to revise the provisions relating to the granting of incentives, and agreements for the transfer of foreign technology and procedures for dealing with applications to invest in Zambia.	• Establish the Investment Council; • Repeal the IDA of 1977; • Did not take into account any company of SIDA and the Mines and Mineral Act of 1985. • Allowed a deduction of up to 50% on income tax and tax holidays of up to 15 years' • Only applicable in the priority sectors.
Investment Act of 1991 ***(GRZ 1992)***	An Act to revise the law relating to investment in Zambia and in particular to constitute the Investment Centre, to revise the provisions relating to procedures for dealing with applications for investment licenses and provide for investment guarantees.	• To repeal the Investment Act of 1986; • To establish the Investment Board to define functions of the Investment Centre; • Tax holiday periods were reduced to 5 years. • Allow tax deductions on an income of up to 75%.
Investment Act of 1993 ***(GRZ 1993)***	The objective of this Act was to revise the law relating to direct investment in Zambia so as to provide a comprehensive legal framework for direct investment in Zambia.	• Repealed the Investment Act 1991; • An investor shall be taxed on that portion of income which is originating from any of the priority sectors

Policy(Source)	Description	Major thrusts
Investment Act of 1993…contd		• Tax holidays were increased to a maximum of 10 years; • An investor shall be entitled to capital allowance; • An investor, who incurs capital expenditure on the growing of tea, coffee, or banana plants, citrus fruit trees or other similar plants or trees, shall be entitled to a development allowance of 10% of such expenditure. • An investor is entitled to a farm works allowance of 100% respect of expenditure on farming land in his ownership or occupation and for the purposes of farming, or stumping and clearing.
Investment Act of 2006(ZDA act) ***(ZDA, 2008; Makano, 2015)***	The ZDA Act brought in a new set of incentives applicable only to investments that are over $500,000, are licensed by the Zambia Development Agency and are operating within a sector designated as a priority by the Minister of Commerce, Trade, and Industry.	• The main function of ZDA is to promote efficiency, investment and competitiveness among businesses in Zambia. • Part VIII of the Act empowers ZDA in consultation with the Ministers in charge of Commerce and Finance to offer incentives to investors. • Dividends were exempt from tax. • Tax holidays of up to 10 years. • 50% reduction on corporate tax rates in the first 5 years of production • Capital expenditure on the improvement or upgrading of infrastructure should qualify for an improvement allowance of 100 per cent

Policy(Source)	Description	Major thrusts
Investment Act of 2006(ZDA act)….contd		• Imported machinery and equipment are exempt from customs duty. • Introduction Multi-Facility Economic Zones (MFEZs).

2.6 Comparison of Zambia's Performance Regionally

Among the five top recipients of FDI, that is countries with the largest FDI inward stocks, there are South Africa, Nigeria, Angola, Sudan and the Republic of Congo. At the end of 2010, these countries accounted for 69 per cent of total FDI inward stock in sub-Saharan Africa. The next five countries with the largest FDI inward stocks added almost 11 percent points to this value. However, it should be emphasised that the most important role in the region in attracting FDI is played by South Africa, the country with the largest GDP. The share of South Africa in region's FDI inward stock in 2010 reached 35.9 per cent, compared to 16.4 per cent of Nigeria, which was ranked second in the list of top sub-Saharan recipients of FDI. This is represented in table 2.2 below, which gives a breakdown of FDI inward stock in millions of US dollars amongst the top ten countries in Africa.

Table 2.2 Comparison against Other Similar Economies in SSA

Country	FDI inward Stock in millions of US$	FDI inward stock as a percent of total FDI inward stock of SSA
South Africa	132, 396.4	35.9
Nigeria	60, 326.7	16.4
Angola	25, 027.7	6.8
Sudan	20, 742.7	5.6
DRC	15,982.6	4.3
Ghana	9, 098	2.5
Zambia	8, 514.9	2.3
Tanzania	7, 966.3	2.2
Equatorial Guinea	7, 373.6	2
Cote d'Ivoire	6,640.8	1.8

Source: UNCTAD (2007)

Table 2.3 presents a compiled comparison of tax incentives offered in Zambia against selected countries in the region.

Table 2.3 Comparison of Tax Incentives Offered Regionally

Case	Average Corporate Tax Rate%	T.H	Different Tax Rates/Sector	Main Goal of Tax Policy	EPZ	Special Policy on Fixed Assets	Special Training of Employees and R&D	DTT
Botswana	11.25	Yes	Yes(Secondary Sector)	Making the economy less dependent on the mining industry	No	Yes(mining)	No	10
Ghana	20	Yes	Yes(Agric , rural banking, leasing, and hotel)	Stimulate export and investment in agric, rural banking, hotels and leasing	Yes	Yes	No	6
Kenya	37.5	Yes	No	Stimulate investment in mining and hotels	Yes	Yes(manufacturing)	No	8
Mozambique	26.5	Yes	Yes(Primary Sector)	Stimulate investment in Infrastructure, knowledge, and the agricultural sector	No	Yes	Yes	4
Nigeria	32	Yes	No	Stimulate export and growth in the pioneer industries(agric, agro-processing, mining, manufacturing and services)	No	Yes	Yes	5
Tanzania	30	Yes	No	Stimulate investment in agric, mining, tourism and manufacturing	Yes	Yes	No	9
Uganda	30	Yes	Yes(Mining Sector)	Stimulate Investment in the mining sector and export	Yes	Yes	Yes	5
Zambia	35	Yes	Yes (Mining and Agricultural Sector)	Attracting investments in the agricultural and mining sector	No	No	No	21

Source: Delloite (2014), KPMG (2016)

CHAPTER THREE

LITERATURE REVIEW

3.1 Introduction

In order to have a better understanding of the topic and to appreciate the work done by previous scholars, a review of the literature is imperative. This is useful, particularly, for model specification and the development of our methodology. The section, thus, presents a theoretical review and later an empirical review of the significance of using tax incentives to attract FDI. A theoretical framework will then be adopted from those that will be discussed.

3.2 Theoretical Literature Review on FDI

FDI is a form of direct capital investment engaged in various fields. Excluded from FDI, inflows are an investment in the form of portfolio, shares on the stock, bonds, and other securities. FDI is associated with direct ownership, control of plant, equipment, and infrastructure which help to finance the creation of capacity growth. In an economy, FDI is often regarded as more profitable and more secure in financing the country's development compared to other capital flows.

Before we proceed further to the body of literature review, it is worth discussing several conceptual issues related to FDI definition. Out of all excessive sources of FDI definitions, an agreement has been reached regarding the main objective of FDI which is to obtain and manage an asset in a host country. According to the OECD, FDI can be categorised as an investment in a destined country (in this case host country) conducted by a resident enterprise in the origin country (in this case investing country) whose objective is to hold lasting interest (OECD, 2008).

Similarly, the World Bank (2012) defines FDI as investment inflow to a country (host country) other than investor's country (home country), to obtain long-term interest or management control over companies operating in a host country.

3.2.1 Foreign Direct Investment Theory

Broadly, there is a lot of literature on the theories of FDI, and these have been presented in a relatively different manner by various scholars, with each presentation mostly inconclusive. This multiplicity of theories shows that there is not a single model of FDI, but there are some competing theories all of which have varying degrees of explanatory power for international flows of FDI.

However, the pivot of this research paper is tax incentives and how they relate to FDI inflows, and it is on this basis that the theoretical framework ought to explain this phenomenon. All theories stem from the understanding that a firm's objective is to maximise profits; one way this can be achieved is by lowering costs. The central question then is whether tax incentives lower the costs of business and thereby increase profits as well as influence a firm's decision to invest or not.

This study discusses three alternative theories that explain the channels through which tax incentives like corporate Income tax rates or the presence of tax holidays may affect FDI. These are: the Tobin's q theory of investment under the Neo-classical theory of investment, Ownership, Location, and Internalisation (OLI) paradigm and the OECD policy framework. This list is not an exhaustive one for providing an explanation of tax effects on FDI, but we discuss these in this thesis as they provide sound economic intuitions to understanding the topic under review.

3.2.2 Alternative Models for Analysing Tax Effects and FDI

(a) Neo-Classical Investment Theory and Tobin`s q Theory of Investment

Perhaps the framework most widely used by public finance economists to analyse tax effects on domestic and cross-border direct investment is the neoclassical investment theory. According to this theory, firms base their investment decision on their optimisation problem: profit maximisation given costs and benefits. Firms invest up to the point net present value of capital equals its costs.

Interestingly, under the neoclassical investment setting, most of the testing of the impact of taxation on FDI is twofold or in a dual fashion. Firstly, by examining the impact of corporate taxes on the cost of capital and then, secondly, by testing the effects of cost of capital on investment (Van Parys and James, 2010). In other words, according to neoclassical

investment theory, the impact of taxes on investment is more of an indirect effect, working through the cost of capital. The theory that clearly explains this is Tobin's q theory of investment which is a widely used theory in the taxation investment literature, explored in this research (Klemm and Van Parys 2012). This approach offers an alternative to explaining how taxation may affect FDI in a neoclassical school of thought setting. The neoclassical investment theory was used in taxation and investment literature by Jorgenson (1963), still referred to in contemporary literature on taxation and investment such as, Klemm and Van Parys (2012), Djankov, *et al.*,(2010), Feld and Heckemeyer (2009), and Zahir, *et al.*,(2004).

The objective under this theory is to maximise the firm's Net-present-value of profits, this leads to the Tobin's q theory as indicated below.

$$\text{Tobin's q} = \text{Market value of the firm/ Replacement value of the firm}$$

Romer (2012) states that this shows the value to the firm of one unit of capital at a time and summarises all the information about the future that is relevant to firms investment decision, implying that what is important for firms investment decisions is the marginal (i.e. ratio of market value of the marginal unit of capital to its replacement cost). Having explained the general theory we now contextualise and relate the derived q theory of investment to the Taxation and FDI's study.

Van Parys and James (2010), state that the underlying argument in the neoclassical investment theory is that, firms will invest until the benefits of investment are equal to the cost of capital accumulation. In other words, as long as the benefit or net present value of future cash flows of the firm is greater than the cost of capital, then it is beneficial to continue investing. In fact, Shah and Ahmed (2003) computed the cost of foreign capital for the period 1960/61 to 1999/00 and found that the cost of capital has strong implications for investment.

Therefore, when taxes affect the cost of capital, they also affect the level of investment in the sense that increases in taxes reduce the market value of the firm thereby providing a disincentive to investment. In fact, as a supplement to this explanation Romer (2012) highlights that an increase in taxes means that profit for firms reduces or as we have explained above, the market value of the firm reduces.

(b) Ownership, Location and Internalisation (OLI) Framework - Eclectic Paradigm

The business environment in which a firm operates also determines its level of profits and, therefore, its decision as to whether to invest abroad or not. The neoclassical investment theory although apt in explaining the variation of FDI because of taxes fails to highlight how other factors in the host economy can, in fact, have a significant impact on the level of a firm's profit and thus ultimately the flows of FDI in a country. The OLI framework, on the other hand, takes into account other variables other than tax that can affect a firm's decision to invest. Under OLI framework, firms must have ownership advantage or firm specific advantages like specific technology, managerial skill, and trademark; further, there must be a locational advantage like shipping costs, tariffs, low wages and specific resources which are not available at home. Additionally, internalisation advantages to FDI in order to operate profitably abroad must also be present. This theory basically emphasises the need to consider tax.

According to Faeth (2009), the first general theoretical effort to explain FDI was from the trade theory; the Heckscher-Ohlin model. The model had assumptions that were criticised leading to the springing up of the Multinational Enterprise (MNE) theory. Since the neoclassical era, trade theory fell short of explaining the existence of MNEs, this led to the emergence of the MNE theories such as Ownership advantages (Hymer, 1976), Location, and Internalisation advantages theories (Buckley and Casson, 1976). It is from these that Professor Dunning brought together the Ownership, Location and Internalisation theories to formulate what he called the Eclectic paradigm (or OLI Paradigm) of FDI (Dunning, 2001). The Eclectic paradigm asserts that FDI flows arise if companies have Ownership, Location and Internalisation advantages.

Eden and Dai (2010) summarised the Ownership, Location and Internalisation (OLI) justifications for outward FDI and existence of MNEs as follows:

(i) Investing firms possess specific net ownership advantages over other businesses from other countries in serving particular national markets, known as ownership advantage. These firm-specific advantages are technical capabilities, human skills, and competence, ability to raise financial resources, product differentiation, economies of scale and firm size (Coelho, 2011).

(ii) It must be beneficial for the actual investing MNE to utilise this ownership advantage itself as opposed to allowing other firms from other countries to do so through lease or sell. When this ability is possible, it is known as internalisation advantages. So utilising the Ownership advantages allows firms to internalise the advantage by being in control of the foreign investment venture.

(iii) Finally, MNEs enjoy profitability through subsidiaries abroad if they utilise these net ownership advantages by combining with the factors of production from outside the home country with the ones from the host country. This strategy is referred to as the location advantages and it is through this advantage that taxation affects FDI. In fact, this Location advantage includes cultural, legal, political and institutional features, government legislation and policies such as taxation on corporate activities (*ibid*).

From the foregoing, it is clear that taxes affect FDI through the Location advantage. However, Hajkova, *et al.,* (2007), states that in principle, the tax can affect FDI through all the three OLI advantages. For instance, since taxation may influence MNEs decisions to invest abroad, then tax treatment of royalties and dividends changes (i.e. increases or reduces) the advantage related to ownership. They also claim that with regards to the location advantage, taxation determines the competitiveness of the host country compared to other potential destinations of FDI. Finally, for internalisation, corporate tax may affect the extent to which MNEs enjoy internalisation, because of the possibility that taxation may affect the wedge between the pre-tax and post-tax rate of return on FDI. This internalisation as already explained is where firms themselves take advantage of the ownership advantages instead of permitting other companies from other countries through leases or rents.

(c) The Policy Framework for Investment: A focus on other determinants of FDI

The OLI framework does take into account how taxes can affect ownership and location decisions of the firm but does not highlight other factors that have an effect on FDI. However, the policy framework for investment is targeted at policy makers in developing and transition economies. It also draws largely on survey studies to identify key issues in weighing the pros/cons of corporate tax incentives, alternative tax policies, and to design options to attract FDI, while also raising revenue from FDI to help finance infrastructure development. In setting the tax burden on inbound investment, policy makers are encouraged to assess whether their host country offers attractive risk/return opportunities, taking into

account framework conditions (*e.g.* political/monetary/fiscal stability; legal protection; public governance), market characteristics (market size, availability/cost of labour, energy, state of infrastructure) and the prevalence of location-specific profits(OECD, 2007).

3.3 Policy Arguments for Implementing Tax Incentives in Attracting FDI

Numerous arguments have been brought forward for using tax incentives in attracting FDI. Several crucial arguments for using tax incentives can be classified as follows:

3.3.1. International Competitiveness

Tax incentives that are designed to encourage FDI, including general host country tax relief measures, those targeted at investment in R&D, and those tied to exports, are often recommended as a means to enhance the "international competitiveness" of a country by improving its ability to attract internationally mobile capital. This view assumes that multinational companies take tax incentives into account when making location decisions and that tax incentives operate at the margin to swing investment decisions in favour of the host country.

3.3.2. Correcting for "Market Failure"

Theory posits that using tax incentives corrects for market failure. The argument arises from the belief that the private market has failed in generating the appropriate level of investment. Therefore, the government should interfere by introducing tax incentives. One example of market failures is positive externalities in terms of company's research and development. Companies, who conduct R&D usually ignore its positive externalities over other companies. Tax incentives can play a positive role by encouraging companies in maintaining their interest in R&D project.

This theory can also arise on account of other factors as well, including asymmetric information. Potential foreign investors may have incomplete information on investment opportunities in a given host country, for a variety of reasons. This may result in less investment in the host country than if full information were available. In such cases, incentives might be called to promote FDI beyond the level that would otherwise occur.

3.3.3 Regional Development (income distribution)

Tax incentives may be targeted at investment in regions where unemployment is a serious problem, for example, on account of remoteness from major urban centres, tending to drive up factor costs or labour immobility or wage rigidities that prevent the labour market from clearing. Operating from a remote area means significantly higher transportation costs in accessing production materials, and in delivering end-products to markets, placing that location at a competitive disadvantage relative to other possible sites. Certain areas may also suffer from a lack of natural resources, tending to put them at a further cost disadvantage. Moreover, firms may find it difficult to encourage skilled labour to relocate and work in remote areas that do not offer the services and conveniences available in other centres. Workers may demand higher wages to compensate for this, which again implies higher costs for prospective investors.

In such cases, tax incentives may be provided to compensate investors for these additional business costs. Where the incentives are successful in attracting new investment, and/or in forestalling the out-migration of foreign capital, they may contribute to an improved income distribution in the country. There may also exist a policy desire to address regional income distribution concerns through subsidising employment through investment initiatives, rather than through direct income supplement programs.

3.3.4 Macroeconomic Considerations

Tax incentives (typically broad-based incentives) have also been advocated to address a range of macroeconomic problems, such as cyclical (or structural) unemployment, the balance of payments deficits, and high inflation. Such incentives would not be specifically targeted on FDI, but on investment in general regardless of the investors' residence. When tax incentives are used to provide countercyclical stimulation (by encouraging investment and thus aggregate demand in the economy), they are often introduced as temporary measures (for example, introduced with a three-year expiry "sunset" clause). Temporary incentives offer the prospect of increased investment in the short-term while permanent incentives play in the longer term. When such measures are used, they are typically announced and then immediately executed for a better result (OECD, 2001).

3.4 Empirical Review

An inquiry into taxation and FDI has received a lot of attention in contemporary applied research with such studies pioneered as early as the second half of the 1900s. Earlier studies have pointed out that incentive as a determinant of FDI flows was very insignificant but tax literature does not provide much information about the relation between tax regimes and FDI in developing countries, and even less about SSA and Zambia in particular.

Developed Country Studies

Hartman (1984) in his study Tax Policy and FDI in the United States, used an illustrative simple model of a ratio of investment to GNP (K/Y) between 1965 and 1979 for the USA to investigate the effect of domestic tax policy on FDI. He found a significant impact of domestic tax policy on FDI.

Jun (1994) applied panel analysis to aggregate FDI data when investigating the impact of home and host country taxes on inbound FDI to the USA by investors from 10 other industrialised countries for the period between 1980 and 1989, when analysing how taxation affect FDI(country specific evidence). Their study employed both fixed effects and random effects specification so as to avoid biased results due to the expected correlation between country error terms. It was found that home country taxes play a significant negative effect on FDI; this conformed, although weakly to the theory that tax policy is important in determining FDI.

Because of these seemingly weak results, Cassou (1997) extended this analysis and obtained relatively more robust results using panel data analysis model when investigating the links between tax rates and FDI in the US. He found that US corporate tax rate had significant coefficients of negative 0.133 and negative 0.0088 for the transfer of funds investments and returned earnings investments respectively. This result showed that there is a significant negative relationship between US corporate tax and FDI. Interesting results in this paper was the fact that they further extended the inquiry by considering the impact of the foreign corporate tax, as opposed to the domestic corporate tax rate on FDI and found a positive relationship. However, this approach of foreign tax policy was not considered in this research since it only concentrated on domestic tax policy.

Demekas, *et al*. (2007), applied generalised methods of moments (GMM) on a dynamic panel data model when analysing the role of policies on FDI in European transitional economies.

They found that high unit labour cost, high corporate tax burden, and a high level of imports tariffs discouraged FDI. However, it was found in their study that bilateral foreign exchange rate and trade regime have a positive effect on FDI. Further, the study found that tax holidays and domestic corruption seemed not to have a significant effect on FDI.

However, in recent decades, several scholars have used the gravity model to study tax effects on bilateral FDI flows and this model is ideal for this setting. The model was used by Bellak and Leibrecht (2009) when they empirically investigated 56 bilateral relationships using seven home countries in the European Union and eight host countries, from Central and Eastern European Countries and the US for taxation and FDI from 1995-2003. They found that the corporate tax had a significant influence when compared with other determinants of FDI. Their result suggested that a percent increase in corporate income tax rate, ceteris paribus, was expected to decrease net FDI outflow by 43 percent for the model that they estimated.

Studies on SSA

Most studies on SSA that focus on the effects of tax incentives on FDI inflows, panel analysis still enjoy dominance. For instance, Klemm and Van Parys (2012) utilised a data set of 40 Latin American, Caribbean and African countries for the period 1985-2004. They tested the theoretical prediction that higher tax incentives (i.e. reduced the cost of capital) lead to greater investment, when assessing the empirical evidence on the effects of tax incentives. Results showed that corporate income tax rate and extended periods of tax holidays were effective in attracting FDI in Latin America and the Caribbean but not for Africa. Specifically, using the within group estimation and the systems generalised methods of moments they found that a 10 percent increase in corporate tax was expected to decrease FDI by 0.3 percent and 0.32 percent for Latin America and Africa respectively. However, the study still did not address the heterogeneity of countries, in terms of the incentives they give and their economic fundamentals, as it was conducted at an aggregate level.

In a study conducted on South African Development Community (SADC) countries to identify the determinants of FDI inflow for the period of 1985 to 2010. Short-run and long-run relationships between FDI inflows and the other control variables are estimated in a PVECM and PVAR model respectively. Sources of the variations are studied through Generalised Impulse Response Functions and Variance Decomposition. The study findings show that trade openness, gross domestic product, natural resources and secondary school

enrolment rate are the most significant determinant of FDI for SADC countries (Vinesh *et al*. 2014).

Some of the researchers tried to identify which type of incentives work best instead of generalising. Cleeve (2008) in his study on the effectiveness of fiscal incentives to attract FDI in 16 sub-Sahara African countries, for the period 1990-2000 using multiple linear regression and pooled data, found that among fiscal incentives tax holidays were the most effective and while the other concessions seemed to cause an adverse effect especially in countries that offered too many concessions. According to this study, all fiscal incentives may not benefit the economy through attracting FDI, because some fiscal incentives may result in economic distortions. The study recommended that countries should be selective in their fiscal incentives. Another related argument forwarded by Cleeve is that the sources of FDI may also determine the effectiveness of fiscal incentives. If the investments are from USA or UK for example, incentives will have a little effect on their location decision because these countries provide a foreign tax credit. Furthermore, the impact of tax incentives on FDI may also differ among regions.

Similarly, in a study carried out by Mudenda (2015) to assess the effectiveness of using corporate income tax in attracting investment to countries found in the Southern Region of Africa, from 2004 to 2014, using Dynamic panel Data analysis, found that corporate income tax and FDI were negatively related.

Country Specific Studies

Amadi (2002) examined the impact of the macroeconomic environment on FDI in Nigeria using the ordinary least square regression technique for the period 1970-1997. While some macroeconomic variables such as GDP per capita, interest rate, and exchange rate had a significant and very strong influence on FDI, other variables like inflation rate and unemployment record had a weak relationship with FDI. The study concluded that macroeconomic environment plays a vital role in determining the volume of FDI inflows.

In a study seeking to investigate whether corporate income tax rates are high enough to influence investments in Ghana, Ahiabor and Amoah (2013) used annual data for 1970-2010 and found that corporate rates affect investments in the long-run but found no significant

impact over the short-term. The tax elasticity of FDI for their findings was that a percentage increase in corporate tax would reduce investment by 0.36 percent.

Studies on Zambia

Most studies done on Zambia are restrictive in that they focus either on the manufacturing sector and are Micro in nature as they use firm-level data. This is understandable as this area of research lacks coherent data that expands from independence to date. The focus of this study is Macroeconomic and empirical and thus at the time of research, although surveys have been carried out on investor perceptions of the business climate, no case study on Zambia could be found that examined the role of tax incentives and other macroeconomic variables on FDI. There are, however, cross-sectional studies that do include Zambia as either part of SSA, SADC or Southern Africa which have been reviewed above.

Presented below in Table 3.1 is a summary of the empirical review.

Authors and year of study	**Methodology**	**Title and Data**	**Findings**
Hartman 1984 Tax policy and FDI	Time Series	USA 1965-1979	Weak results indicated that there was a significant impact of domestic tax policy on FDI.
Cassou 1997 The link between tax rates and FDI	Panel Study analysis	USA and & other countries	There was a negative relationship between US corporate tax and FDI.
Jun 1994 How taxation affects FDI: Country specific evidence	Panel Study analysis with fixed and random effects	USA and Industrialized countries 1980-1989	Home country taxes play a significant negative effect on FDI; this confirmed, although weakly.

Authors and year of study	Methodology	Title and Data	Findings
Ahiabor and Amoah 2013 The effects of corporate taxes on the level of investment in Ghana.	Flexible Accelerator Model	Ghana 1970-2010	Corporate tax rates affect investment in the long run but had no significant relationship in the short run.
Bellak and Leibrecht 2009 Do low corporate income taxes rates attract FDI-Evidence form CEEC	Gravity Model	CEEC, EU and US 1995-2003	Tax policy had a significant influence as compared with other determinants.
Demekas 2007 FDI in European Transitional Economies-The role of policies	GMM on a dynamic panel data	EU Transition Economies	A high unit of labour cost, high corporate tax burden and high levels of import tariff's discouraged FDI.
Emmanuel Cleeve, 2008 How effective are fiscal incentives to attract FDI to SSA	Multiple Regression analysis	16 SSA Countries 1990-2000	Tax Holidays are the most effective incentives countries should be selective in incentives as some result in distortions.
Mudenda 2015 CIT and FDI the case of Southern Africa	Dynamic Panel data analysis(Fixed and Random Effects)	Southern Africa 2000-2014	Corporate Income tax rate has a significant negative effect on FDI.
Klemm and Parys, 2012 Empirical evidence on the effects of tax incentives	Spatial Econometric techniques for panel data and dynamic panel data	40 Latin American, Caribbean and African Countries 1985-2004	Lower CIT Rates are effective in attracting FDI to Latin America and Caribbean Countries but not Africa.

Authors and year of study	Methodology	Title and Data	Findings
Vinesh et al, 2014 Determinants of FDI in SADC, an empirical analysis	PVECM and PVAR model. Generalised Impulse Response Functions and Variance Decomposition.	SADC 1985-2010	Market size, abundance of skilled labour and natural resources are significant determinants of FDI in the SADC region.
Amadi, 2002 The effects of Corporate taxes on the level of investment in Ghana	OLS	Nigeria 1970-1997	GDP per capita, interest rate, and exchange rate were significant. The inflation rate and unemployment record had a weak relationship with FDI.

3.5 Conclusion

In conclusion, the review of the literature reveals that there are many approaches to studying the impact of taxes on FDI and most of these studies showed that taxes have a negative impact. This result is in tandem with the theoretical economic cornerstones.

From the 1990s however, studies observed positive results on the impact of tax incentives on FDI, owing largely to increased globalisation and regionalisation of the international economy and scarcity of public funds in developing countries which left them with limited policy choices that they turned to tax incentives. The observed departure in the many results was mainly in the differences in the significance of the impact of the tax on FDI.

From the studies, it is noted that macroeconomic fundamentals and stability still play a major role in attracting FDI; companies respond differently based on their size, years of operation, their market orientation, the type of resource they use and regional differences. It is also observed that the globalisation of the world economy has limited the ability of governments to use exchange rate and other trade policy instruments and finally, that some type of incentives are more effective than others.

This paper uses the explanation given by neoclassical investment theorists regarding the relationship between tax policy and investment. This theory is preferred on the basis that it incorporates tax parameter into the investment model explicitly. It also assumes among others that since tax reductions decrease the user cost of capital/increases the returns to capital, investment increase.

CHAPTER FOUR

RESEARCH METHODOLOGY

4.1 Research Methodology

In this chapter, the theoretical background of the applied tests, models and analysis will be explained briefly.

In this study, the multivariate Co-integration analysis of Johansen (1988, 1991) and the vector error correction model (VECM) is applied to investigate the linkages between FDI and tax incentives in Zambia.

4.2 Research Design and Sample

The research design is exploratory focusing on how tax policy can cause changes in FDI inflow, for the periods 1970-2014 in Zambia; taking into account the effect of other macroeconomic variables in Zambia.

4.3 Data

Secondary data used in the research paper was from the following sources: Bank of Zambia Annual reports, Central Statistics Office Annual reports, Zambia Development Agency, Investor Perception reports, Investment acts, budget speeches, Income Tax acts, Zambia Revenue Authority, World Bank, World development indicators, International Monetary Fund and United Nation Conference on Trade and Development.

4.4 Model Specification, Variable Description, and Data Description

4.4.1 Model

In the current study, the multivariate Co-integration analysis of Johansen (1988, 1991) by employing a VECM to investigate the linkages between FDI and Tax policy towards investment in Zambia.

As part of the empirical design, the estimated equation is specified as follows:

$$fdigdp_t = \alpha_0 + \alpha_1 loggdpcapita_t + \alpha_2 gfcfgdp_t + \alpha_3 cit_t + \alpha_4 tii_t + \alpha_5 Inf_t + \alpha_6 logopenness_t + \alpha_7 nrrgdp_t + + \varepsilon_t \quad (1)$$

Where:

Table 4.1 Variable Description

fdigdp	=	*FDI inflows as a percentage of GDP*
cit	=	*Corporate income tax rates*
tii	=	*Tax incentive index*
gfcfgdp	=	*GFCF as a percentage of GDP*
Log gdp capita	=	*Log of GDP per capita*
inf	=	*Inflation rates*
Log openness	=	*Log of Trade openness*
nrrgdp	=	*Natural resource rents as a percentage of GDP*
εt	=	*The error term is assumed to be independently and identically distributed.*
		The subscript (t) indexes time

4.4.2. Variable Description

Since this study emphasises the relationship between dependent variable (FDI inflow) and independent variable taxation (tax rate and tax incentive indicator), other independent variables will be treated as control variables.

1. FDI: Net Foreign Direct Investment Inflow

The dependent variable in this study is FDI inflow. Referring to the World Bank (2012), FDI data in this study refers to FDI net inflows (new investment inflows less disinvestment) in the reporting economy from foreign investors where the data is measured in current U.S. dollars as a percentage of GDP. FDI is standardised by GDP to remove the problem associated with the absolute measurement.

2. GFCF: Gross Fixed Capital Formation

Gross fixed capital formation includes land improvements (fences, ditches, drains, and so on); plant, machinery, and equipment purchases; and the construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. According to the 1993 SNA, net acquisitions of valuables are also considered as capital formation. GFCF data presented in this study is measured in real U.S. dollars as a percentage of GDP.

As a proxy of infrastructure, GFCF is employed. This selection is based on the notion that other measurements of infrastructure such as roads, telephones, and ports, only reflect the existing infrastructure and not the potential infrastructure as it is included in GFCF. Therefore, the GFCF is considered to represent both existing and potential infrastructure both by private and public entities.

Good infrastructure is a required condition for any country in attracting foreign investment. Lack of good infrastructure impedes access for companies in managing their production resources. As a result, when conducting investment decision analysis, foreign investors always include infrastructure in their formulation of where to locate the investment. Accordingly, we hypothesise that GFCF has a positive effect on FDI.

3. Inflation

The more stable the macro economy the more incentive firms and foreign investors have to invest. We, therefore, expect a stable macroeconomic environment to attract more foreign investors. It is, thus, safe to assume that Macroeconomic stability may be an important factor for FDI attraction.

Inflation is a common variable which many researchers use as a proxy of economic and financial stability. In this context, high or volatile inflation rate signifies an explicit evidence of country's instability and presents a barricade for FDI inflow. Asiedu (2006) in his empirical analysis proved that inflation influences negatively to FDI inflow. On the other hand, other researchers such as Vijayakumar (2010) and Mhlanga (2010) ended up their empirical analysis with conclusions that inflation does not have any impact on FDI. This study hypothesises that inflation has a negative impact on FDI inflow.

4. Trade Openness

Trade openness is considered to be a significant FDI determinant in many kinds of literature. Trade openness is a measure of economic policies that either restrict or invite trade between countries. This is the ratio of trade (imports and exports) to GDP. Computation of this variable is fairly simple as it is the ratio of imports and exports to GDP. Current values in US dollars were used to obtain this ratio.

$$openness = \frac{Imports + Exports}{GDP}$$

Trade openness is frequently used to measure the importance of international transactions and is thought to promote the efficient allocation of resources through specialisation and comparative advantage and competition in both national and international markets. It allows easier diffusion of knowledge and technology across countries. Moreover, if less capital controls and liberal trade policies are applied, it attracts more FDI (Onyeiwu and Shrestha, 2004).

Current economic theory holds that countries with greater openness receive loans and aid from global NGOs and governmental organisations in order to improve their infrastructure which leads to economic development and growth. This growth is further aided by aggressive government policy that removes trade barriers such as tariffs that make trade with other countries less profitable and more undesirable. Theory holds that development and growth will be further aided by a reduction in business taxes that make it less desirable for companies to build and operate. The higher the value of the ratio indicates that the barriers or restrictions to free trade between countries have been reduced or removed.

It should be noted, however, that this is more a measure of country size and integration into international markets rather than trade policy orientation. The variable does not take into account whether a country is a net exporter or importer. The variable allows us to assess the changes in Zambia's trade policy over time. The trends in trade openness of Zambia from 1970 to 2014 as a percentage of GDP are illustrated below in Graph 5.1.

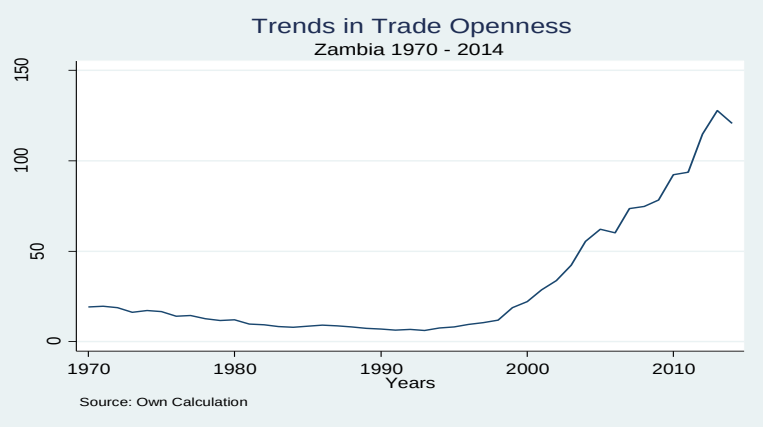


Figure 4.1: Graph of Trade Openness 1970-2014 Zambia

Graph 4.1 above shows that in 1970, trade openness of Zambia was slightly over 19%. This means that according to the size of the Zambian economy at the time, the country was an open economy and only 19% integrated to the international market. In 1972, the government switched to a more restrictive policy environment, with a heavy role for the state in national development. The state, owned and controlled industry, with high tariffs imposed for protection. Consumption was heavily subsidised, prices were controlled and agricultural marketing and credit were provided by state agencies. A booming copper industry, Zambia's economic mainstay, encouraged state-controlled policies.

By the early 1980s, however, it was clear that the 1970s reform had failed. Trade openness marginally decreased indicating that the Zambian economy was becoming less integrated to the international market and reached its lowest point in 1993 at 6%. Since late 1991, policies have moved away from import substitution to the outward orientation as the base of its growth strategy. The trade regime has been considerably liberalised and tariffs are now the main instrument of trade policy.

There has been substantial decentralisation and deregulation in other spheres of economic activity. Since 1994, the effects of the change in policy began being evident as trade openness of Zambia has been increasing at an almost exponential rate; most notably was the increase from a rate of 22% in 2000 to 127% in 2014. The source of this growth stems from the rapid increase of Zambia’s imports, relative to the growth in exports and GDP.

Therefore, in this case, trade openness is expected to have a positive and significant effect on FDI.

5. *Corporate Income Tax Rate*

There are many types of tax rate in which researchers are interested in determining the relationship between tax rate and FDI. Among those well-known tax rates are statutory tax rate which is the rate stipulated under taxation law, average effective tax rate, marginal effective tax rate, and real effective tax rate. In this study, statutory corporate income tax rate will be utilised. Out of several layers of income tax rate, the highest tax rate imposed on income will be used in this study. There are several reasons for selecting statutory income tax rate than the others. First, statutory tax rate is the easiest way to measure tax burden level compared to other methods. Second, statutory tax rate plays an important role in country selection by multinational companies because companies are more likely to choose a country

with low tax rates. As such, this study hypothesises that tax rate has a negative impact on FDI.

6. Tax Incentive Indicator

The literature remains fairly indecisive regarding whether FDI may be sensitive to tax incentives. It is argued that high levels of taxation would discourage FDI whilst the low level of taxes would encourage foreign investors.

According to Easson (2004), tax incentives can be defined as follows:

> *"In statutory terms, a tax incentive can be defined as a special tax provision granted to qualified investment projects (however determined) that represent a statutory favourable deviation from a corresponding provision applicable to investment projects in general (i.e. projects that receive no special tax provision). An implication of this definition is that any tax provision that is applicable to all investment projects does not constitute a tax incentive…."*

An index is a convenient way to express a change in a diverse group of items. Converting data to indexes also makes it easier to assess the trend in a series composed of exceptionally large numbers. Given the different categories of tax incentives the construction of this indicator only involved:

- **Reduced corporate income tax rate**

Here only sector specific prevailing tax rates were used for the following sectors

- Agriculture and Agro-processing
- Mining
- Manufacturing
- Services Industry
- Non-Traditional Exports

The base rate that is offered under the Income tax act was used and any other tax allowances under the Zambia Development Agency were then applied to arrive at an aggregated sector specific reduced rate.

- **Tax holidays**

Here the longest length of the tax holiday period under each sector was taken into consideration whether offered under the Income Tax Act or by the Zambia Development Agency. The index was then constructed on the basis of the Tax Attractiveness Index constructed by two German economists, Keller and Schanz (2013). Originally the T.A.X. covered 16 different components of real-world tax systems and the period 2005-2009. The Index was further developed by Dinkel (2016) by adding four more components.

The Tax Attractiveness Index represents a new approach to measuring the attractiveness of a country's tax environment. To construct the Tax Attractiveness Index, values are added for all 20 tax factors per country, which have been identified as determining a country's tax environment and divide the sum by 20. But for the Zambian case, only taxes and the tax holiday period as explained above for the listed sectors were taken into consideration. Hence, the index represents an equally-weighted sum of 2 tax factors across 5 sectors, these factors have been identified as determining the tax incentive environment for Zambia for the purposes of the study.

To calculate the index, each sector has an index that ranges from 0 to 1, when aggregated the indicator runs from values ranging between 0 and 5. In cases quantification schemes had to be developed, the measurement of the respective tax factors has already been adjusted to this scale. A country's tax environment is considered as more attractive, the more the value of the index approaches zero. The tax incentive index is an alternative measurement of the statutory tax rate and can be considered to be a more accurate proxy for a country's tax environment. Thus, the tax incentive indicator reflects the tax attractiveness of a country better as a single determinant.

The ***tii*** was computed for Zambia for the study period and as can be seen from the graph 4.2 below, the tax incentive indicator was very high from 1970 to about 1984. This is because during this period there were no tax holidays and reduced corporate tax rates offered to foreign investors in the 5 priority sectors. Therefore, the ***tii*** was closer to 5, indicating that Zambia was not an attractive tax destination for investors. With the creation of the Zambia Investment Centre and subsequent changes to the Income Tax Act and Investment Acts of 1986, tax incentives were introduced for both foreign and domestic investors, this is reflected in the drop in the tax incentive indicator in 1986 which has remained relatively low to 2014, reflecting that the tax environment for investors in the 5 priority sectors has become relatively

more attractive. The central question is whether the level of attractiveness is responsible for the increase in FDI inflows in the country during the same time period.

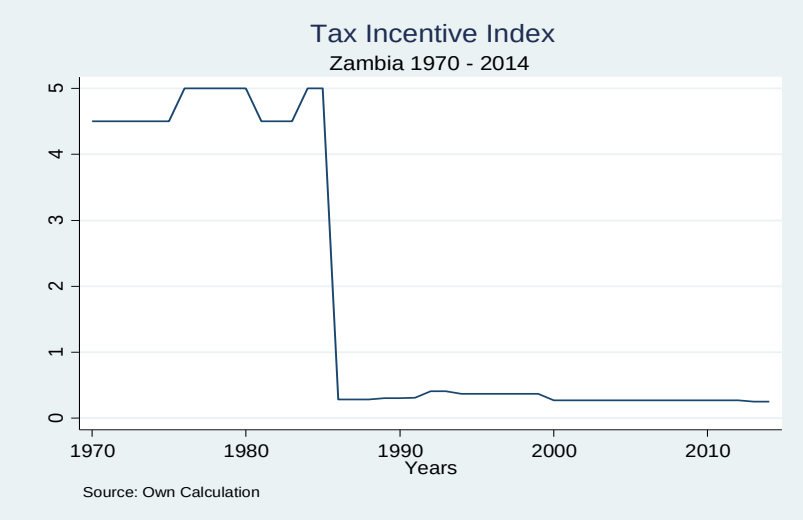


Figure 4.2: Graph of Tax Incentive Index 1970-2014 Zambia

7. GDP per Capita

Market size is defined through the market volume and market potential which is indicative of the level of economic activity. A large market size is suggestive of a prosperous business climate and hence serves as a factor attracting foreign investors. It is measured by GDP per capita and is considered as an important determinant used when determining FDI (Artige and Nicolini, 2005). Charkrabarti (2001), states that the market-size hypothesis supports an idea that a large market is required for efficient utilisation of resources and exploitation of economies of scale. As the market size grows, FDI increases and thus enables investors to benefit from economies of scale.

8. Natural Resource Abundance

Natural resources are usually valued by reference to their economic rents, referred to as "resource rents." The resource rent of a natural resource is the total revenue that can be generated from the extraction of the natural resource, less the cost of extracting the resource (including a normal return on investment to the extractive enterprise). Total natural resources rents are the sum of oil rents; natural gas rents; coal rents (hard and soft); mineral rents; and forest rents. An abundance of natural resources is intuitively expected to be a blessing. Nonetheless, it has been argued for some decades that large endowments of natural resources

may actually become more of a curse, often leading to slow economic growth and redistributive struggles (Sachs and Warner 1995; Collier and Hoeffler, 1998; Cabrales and Hauk, 2011). We hypothesise a negative association between natural resources and FDI for the following three reasons.

Table 4.2 below specifies the variable rationale.

Table 4.2: Variable Rationale

Variable	Rationale	Expected sign
gfcfgdp$_t$	Captures positive effects of infrastructure endowment	+
inf$_{it}$	Riskier countries should receive less inward FDI as fixed cost of production is higher	-
openness$_t$	Open economies mean greater market opportunities. However, at the same time, they also face greater competition from businesses based in other countries.	+
cit$_t$	A higher level of CITR should decrease inward FDI since it directly negatively impacts after tax profit level of an FDI firm	_
tii$_t$	Lower THI indicates that tax policy is more liberal or carries a lesser tax burden on the investor. Therefore THI is expected to be positively correlated with FDI inflows.	-
gdpcapita$_t$	A larger market size is assumed to attract higher levels of FDI. Therefore it is assumed that GDP and FDI are positively related.	+
nrrgdp$_t$	Dependent on the motive of FDI	+

4.4.3 Econometric Methodology

The principal methods employed to analyse the time series behaviour of the data involves Co-integration together with one short-run analysis, impulse response function from the estimation of a VECM. The Augmented Dickey-Fuller (ADF) approach is used to pre-test the order of integration for all time series variables. The model lag length selection was determined by both Schwarz Bayesian (SBIC) and Akaike (AIC) Information Criterion. Post estimation tests carried out are the Lagrange Multiplier tests, to ensure that the residuals from

the chosen lag length are serially uncorrelated and the Eigen value stability test to check the number of cointergrating equations has been correctly specified.

The nature of the data distribution is examined by using the standard descriptive statistics (mean, median and standard deviation). Normality of data distribution is ascertained by using the Jarque–Bera test.

4.4.3. (a) Stationarity and Lag Length Selection

In the time series analysis, one of the basic assumptions is the stationarity of the series. If this assumption is violated, the results of the regressions with non-stationary series will not be reliable and lead to spurious regression. In such a spurious regression case, traditional model statistics like t, F and R^2 will not be reliable anymore (Granger & Newbold, 1974)**.** Unit root tests are tools to be utilised in order to test whether the time series data are stationary or not. Furthermore, it is more likely to encounter non-stationary data in econometric time series. In this sense, Augmented Dickey Fuller (or ADF) test is a commonly used unit root test in the econometric statistical analysis and will be adopted for the study. If a series has a unit root, then this series is not stationary. In this study, the condition of being stationary or not for a series is tested using the ADF test.

To determine the lag lengths of the each variable were assi0gned according to Akaike and Schwarz information criteria under simple regression. The Akaike and Schwarz Bayesian information criteria results of every regression were recorded and the lag of regression with smallest information criteria was selected**.**

4.4.3. (b) Johansen Maximum Likelihood Cointegrating

The Johansen maximum likelihood procedure provides a unified framework for the estimation of multivariate co integrating systems based on the error correction mechanism of the VAR(k) model with Gaussian errors(Johansen, 1999).

Define *Xt* as a set of I (1) variables consisting of n variables. An error correction model of VAR (k) model can be expressed as;

$$\Delta X_t = \phi + \sum_{i=1}^{k-1} \Gamma_i X_{t-1} + \Pi X_{t-k} + \varepsilon_t \qquad (2)$$

Where;

- Δ is the first difference operator;

- Γ_ι is a coefficient matrix, defined as $\Gamma_\iota = -(I - A_1 \ldots\ldots - A_i)$, which represents the short-run dynamics, and ;
- Π is an n×n matrix defined as $\Pi = \Gamma_\iota = -(I - A_1 \ldots\ldots - A_i)$ *is* an identity matrix, whose rank determines the number of distinct co integrating vectors.

If Π has rank *r*, then there are *r* cointergrating relationships between the X_t or *n-r* common stochastic trends. The number of co integrating vectors reveals the extent of long-run relationship. If *n-r*=0 (*r*=0), which implies full rank or no stochastic trends, with all elements in X_t being stationary [I (0)].

Cointegration is not defined in such cases if, *n-r* = *n* or if *r*=0, there are no stationary long-run relationships among the elements of X_t . Reduced rank (i.e. n>n-r>0) implies the existence of at least one common stochastic trend, and there will then exist n×r matrices α and β such that Π=αβ'. The β matrix gives the co integrating vectors, while α gives the amount of each co integrating vector entering each equation of the VECM, also known as the adjustment matrix. Johansen developed two likelihood ratio tests for testing the number of cointegration vectors (*r*): the trace test given by;

$$\lambda_{trace}(r) = -T\sum_{i=r+1}^{g} \ln(1-\lambda_i) \qquad (3)$$

and the Maximum Eigen value test statistics represented as;

$$\lambda_{max}(r,r+1) = -T \ln(1-\lambda_{i+1}) \qquad (4)$$

The trace statistics tests the null hypothesis of no cointegration (i.e. *r*=0) against the alternative that there is at least one cointegration vector (i.e. *r* > 0). The maximum Eigen value statistics test the null hypothesis that the number of co integrating vectors is *r* against the specific alternative of *r* + 1 co integrating vectors.

4.4.3. (c). Vector Error Correction Model (VECM)

On the evidence of co integrating relationship, a vector error correction model (VECM) is estimated to model the long run causality and short run dynamics. The purpose of VECM model is to indicate the speed of adjustment from the short run equilibrium to the long run equilibrium state. The greater

the coefficient of the parameter the higher the speed of adjustment of the model from short run to long run. Considering equation (1), the VECM model is specified as follows:

$$\Delta fdi = \alpha_0 + \alpha_1 \sum_{t=1}^{n} \Delta fdi_{t-1} + \alpha_2 \sum_{t=1}^{n} \Delta\, gdpcaipta_{t-1} + \alpha_3 \sum_{t=1}^{n} \Delta\, gfcfgdp_{t-1} + \alpha_4 \sum_{t=1}^{n} \Delta\, cit_{t-1} +$$

$$\alpha_5 \sum_{t=1}^{n} \Delta\, tii_{t-1} + \alpha_6 \sum_{t=1}^{n} \Delta\, inflation_{t-1} + \alpha_7 \sum_{t=1}^{n} \Delta\, logopennes_{t-1} + \alpha_8 \sum_{t=1}^{n} \Delta\, nrrgdp_{t-1} + \beta_i\, ECM\,(-1)$$

$$+\varepsilon_t \qquad (5)$$

Where ε_t is the error term, ECM (-1) is the error correction term, β_i captures the long run impact. The short run effects are captured through the individual coefficients of the differenced terms α, while the coefficient of the ECM variable contains information about whether the past values of variables affect the current values. The size and statistical significance of the coefficient of the ECM measures the tendency of each variable to return to the equilibrium. A significant coefficient implies that past equilibrium errors play a role in determining the current outcomes.

The VECM specification restricts the long run behaviour of the endogenous variables to converge to their long-run equilibrium relationships and allow the short run dynamics. It can also lead to a better understanding of the nature of any non-stationarity among the different component series and can also improve longer term forecasting over an unconstrained model.

By default, identification is obtained via the Johansen normalization, Johansen proposed a default identification scheme that has become the conventional method of identifying models in the absence of theoretically justified restrictions.

4.4.4 Justification

Over the last two decades, the co-integration concept was brought to the forefront of macroeconomic research. Although still often found in various studies, it is common knowledge that a vector autoregressive (VAR) model specified in differences is valid only if the analysed variables are not cointegrated. If the series are cointegrated, an ECM should be employed. The VAR model can suggest only a short-run relationship between the variables since the long-run information is removed by first differencing, while the VECM avoids this.

Furthermore, the VECM distinguishes between long- and short-run relationships and can identify causation sources that cannot be detected by the usual causality test.

Other advantages of using the VECM model are;

1. Discovering that variables are co-integrated, allows for the use of error-correction models which allow for the separation out of long run and short run impacts.
2. The presence of co-integration between two variables ensures that an OLS regression in levels yields consistent parameter estimates.

CHAPTER FIVE

EMPIRICAL RESULTS AND DISCUSSION

5.1 Introduction

In this Chapter, the study presents the results that were obtained from the different analysis conducted on the variables employed; this includes various tests conducted on the data collected. The chapter begins with the descriptive analysis. The main findings and discussion of the study are then presented, preceded by the results of the pre estimation tests. This is followed by the post estimation results, the chapter then concludes with a summary of the main findings.

5.1 Descriptive Statistics

Table 5.1: Summary Variable Statistics

VARIABLE	OBS.	MEAN	STD. DEV.	MIN	MAX
FDI%GDP	45	3.52	2.66	-0.958	9.60
LOG GDP/CAPITA	45	6.31	0.53	5.44	7.47
GFCF%GDP	45	16.59	9.22	1.53	38.31
CORPORATE TAXES	45	39.67	5.48	35	50
TAX INCENTIVE INDICATOR	45	1.87	2.14	0.25	5
INFLATION	45	29.89	38.08	-14.17	165.53
LOG OPENNESS	45	-0.34	0.15	-0.58	-0.074
NATURAL RESOURCE RENTS%GDP	45	14.54	0.579	3.33	36.87

Source: Study data

As can be observed from Table 5.1 above, the standard deviation of each variable is low, except for inflation. When the standard deviations of the variables are then compared to their respective means, there is little variation this indicates that there is a small coefficient of variation, while the range of variation between maximum and minimum is also reasonable.

5.2 Pre-Estimation Tests

ADF

In the time series analysis, one of the basic assumptions is the stationarity of the series. If this assumption is violated, the results of the regressions with non-stationary series will not be reliable and lead to spurious regression. In such spurious regression, case traditional model statistics like t, F and R^2 will not be reliable anymore (Granger & Newbold, 1974). Unit root tests are tools to be utilised in order to test whether the time series data are stationary or not. Furthermore, it is more likely to encounter nonstationary data in econometric time series. In this sense, Augmented Dick-Fuller (or ADF) test is a commonly used as a unit root test in the econometric statistical analysis. If a series has a unit root, then this series is not stationary.

To ensure that the variables are stationary and that shocks are only temporal, will dissipate and revert to their long-run mean, we test for stationary or unit roots. Augmented Dickey-Fuller (ADF) is performed on the variables in levels and first differences. Nonstationary series are first differenced or more in order to reach stationary. However, differencing removes the past behaviours of the series and in addition suppresses the long-term relations between the variables.

Table 5.2: ADF Test Results in levels

		Critical Values		
Variables	T-Stat. levels	1%	5%	10%
fdigdp	-3.03*	-4.23	-3.05	-3.202
Ln gdp	-2.54	-4.23	-3.05	-3.202
gfcfgdp	-1.84	-4.22	-3.53	-3.199
cit	-0.96	-4.21	-3.53	-3.197
tii	-0.98	-4.21	-3.53	-3.197
Inflation	-2.29	-4.21	-3.53	-3.197
Log openness	-2.16	-4.23	-3.05	-3.202
nrrgdp	-2.68	-4.21	-3.53	-3.197

*Note: *, **, *** denotes significance at all levels (10%, 5% & 1%)*

All the variables under ADF were found to be non-stationary in levels, as shown in Table 5.2 as a result; all the variables have been differenced once to check their stationarity. At first, differencing the calculated ADF clearly reject the null hypothesis of a unit root at 1% significance level when compared with their corresponding critical values, hence the ADF tests decisively confirm stationarity of each variable at first differencing and depict the same order of integration i.e. I(1) behaviour, as shown in graph 5.3 below.

5.3 ADF Unit Root test Results using First Difference

			Critical values		
Variables	T-stat.	Decision	1%	5%	10%
fdigdp	-7.153***	I(1)	-2.348	-1.690	-1.306
Log gdp/capita	-5.273***	I(1)	-2.348	-1.690	-1.306
gfcfgdp	-5.056***	I(1)	-2.431	-1.687	-1.305
Cit	-3.852***	I(1)	-2.426	-1.685	-1.304
Tii	-3.174***	I(1)	-2.426	-1.685	-1.304
inflation	-5.544***	I(1)	-2.426	-1.685	-1.304
Log openness	-5.515***	I(1)	-2.348	-1.690	-1.306
nrrgdp	-7.181***	I(1)	-2.426	-1.685	-1.304

*Note: *, **, *** denotes significance at all levels (10%, 5% & 1%)*

Lag Length Selection

In time series analysis, values in the past affect today's values for a given variable hence the need to specify a lag length for different variables in the study. To do this, we employ the Akaike Information Criterion (AIC) and the Schwarz Bayesian Information Criterion. The table below shows the summary results of the lag determination test. The selection of the appropriate lag order that will be used in Johansen's Cointegration Test. According to the results shown in Table 5.4 below, SBIC criterion suggests the lag order be selected as 1. This means at most, each variable will be lagged once during the estimations.

Table 5.4: Summary of Lag length Selection Criterion

VARIABLE	DF	P-VALUE	AIC	LAG LENGTH SELECTION	P-VALUE	SBIC	LAG LENGTH SELECTION
FDI%GDP	1	0.00	4.24	3	0.00	4.41	3
Log of GDP capita	1	0.60	-0.06	2	0.00	-0.46	1
GFCF%GDP	1	0.00	5.67	1	0.00	5.74	1
Corporate Income Tax	1	0.00	4.65	1	0.00	4.73	1
Tax Incentive Indicator	1	0.00	2.26	1	0.00	2.35	1
Iinflation	1	0.00	9.07	1	0.00	9.16	1
Log openness	1	0.00	-1.72	1	0.00	-1.63	1
Natural Resource Rents%GDP	1	0.02	6.10	3	0.00	6.23	1
All	1	0.14	4.17	3	-	4.48	0

Johansen's Max Co-integration Test

The existence of long-term relations between the variables can be detected using the Co-integration test. If two or more time series are individually integrated but some linear combination of them has a lower order of integration, then the series are said to be cointegrated which lead to reliable regression between the variables. An example is where the individual series are first-order integrated as I (1) but some cointegrating vector of coefficients exists to form a stationary linear combination of them. This condition can lead to long-run equilibrium relationship between the series.

As a prerequisite to the test, all non-stationary data that is used in the model must become stationary to the same degree. Referencing to the results of ADF test, all non-stationary level time series become stationary at their first differences, which was of order I(1), satisfying this requirement. Using the lag order selected in the previous section, which is 1. Due to the

nature of the test, the program makes computations according to the first differences lag interval. To interpret Johansen's Cointegration test results, outcomes of two different tests, trace, and maximum Eigenvalue tests, are to be assessed. Both of the tests assert that there is 1 cointegrating equations at 5% significance level as it can be seen from the table below in table 5.5:

Table 5.5: Johansen's Cointegration test

EIGEN VALUE	LIKELIHOOD ESTIMATOR	TRACE STATISTIC	5% CRITICAL VALUE	MAX STATISTIC	5% CRITICAL VALUE	NO. OF COINTEGRATING EQUATIONS
.	-625.85	173.80	156	52.72	51.42	0
0.69825	-599.50	121.09**	124.24	42.55**	45.28	1
0.61983	-578.21	78.53	94.15	27.54	39.37	2
0.46528	-564.44	50.99	68.52	22.13	33.46	3
0.39531	-553.37	28.85	47.21	11.76	27.07	4
0.23459	-547.49	17.09	29.68	11.42	20.97	5
0.22862	-541.80	5.67	15.41	5.61	14.07	6
0.11967	-538.98	0.06	3.76	0.06	3.76	7
0.00140	-538.95					8

*** indicates that the max trace statistic falls below the 5% critical value.*
H_o: no cointegrating relationships

The decision rule states that we reject the null hypothesis if the trace statistic < critical value for I (1) regressors, if otherwise, we accept the null hypothesis. Therefore, from the table above, it is clearly evident that the trace statistic, 121.09 is less than the 5% critical value of 124.24, similarly the computed maximum trace-statistic (42.55*** < 45.28) and hence, we reject the null hypothesis of no cointegration and fail to reject the null hypothesis of almost one cointegrating equation. This indicates that there is a stable long-run cointegrating relationship among the variables. Accordingly, the Eigenvalue statistics and likelihood ratio detect one cointegrating relationship at 5% level of significance. As a result, the vector error correction model is estimated.

5.4 Model Estimates

5.4.1 Long-run Estimates

According to the Co-integration test in the previous section, the existence of Co-integrating relationship between the variables was proved. Therefore, a vector error correction model is applicable to the level data. The number of lags chosen for the model is 1, using the AIC and SBIC criterion. For the numbers of cointegrating vectors, the value was selected as 1 which was the result of Co-integration test. The results of this test are presented in the appendix E The results of the estimations are presented in the table 5.6 below are the results, of the refit model with three lags instead of one, due to the presence of serial correlation in the residuals in the first model at one lag:

Table 5.6: Estimated Long-Run Coefficients

REGRESSORS	CO-EFFICIENT	STD. ERROR	Z	P>Z
LOG OF GDP/CAPITA	5.95***	0.90	6.61	0.00
GFCF%GDP	-0.46***	0.08	-5.56	0.00
CORPORATE INCOME TAX	-1.30***	0.16	-8.25	0.00
TAX INCENTIVE INDICATOR	3.24***	0.56	5.73	0.00
INFLATION	0.63***	0.02	3.83	0.00
OPENNESS	25.33***	5.83	4.34	0.00
NATURAL RESOURCE RENTS%GDP	-0.18***	0.05	-3.54	0.00
CONSTANT	30.54	-	-	-

LR EQUATION: FDI=30.54 +5.95GDPCAPITA - 0.46GFCFGDP -1.30CIT + 3.24TII + 0.63INFLATION +25.33OPENESS-0.18NRRGDP

*Note: *, **, *** denotes significance at 10%,5%, and 1% level respectively.*

The results from the long-run VECM indicate that there exists a significant and negative relationship between taxes and FDI in Zambia between the periods 1970-2014 at 1% level of significance. It shows that a 1% increase in corporate income taxes reduces FDI by 1.30%, which is consistent with findings of Ahiabor and Amoah (2013), who found that in Ghana increasing tax rates by 1% decreased FDI inflows by 0.36%. While the tax incentive indicator was found to be positively related to FDI inflows, implying that a reduction in tax holiday

periods and/or increasing the corporate tax rates in the priority sectors increases FDI inflows, which is counter intuitive.

Market size as captured by GDP per capita has a significant and positive relationship with FDI. In the long-run, a percentage increase in GDP per capita would increase FDI by 0.0595%. This positive relationship implies that a bigger market size/higher gdp/capita increases FDI inflows in the country. This finding supports the findings of Anyanwu (1998), Salako and Adebusuyi (2001) which observed that domestic market size is a major determinant of FDI in Nigeria.

GFCF as a percentage of GDP was also found to be statistically significant; inconsistent with Asiedu (2002), and Onyeiwu and Shrestha (2004) who found infrastructure to be an insignificant factor influencing FDI inflows. Further, although significant, the results are not in tandem with literature that a high level of infrastructure development leads to increased FDI inflows. In theory, infrastructure facilitates the connection between production and consumption, and reduces transaction costs and facilitates the exchange between regions. Therefore, this variable represents a relevant characteristic that FDI recipient countries must possess to attract FDI. However, increasing infrastructure development by 1% decreases FDI inflows by 0.46 % in Zambia. This negative relation was also observed by Kamara (2013), when studying the channels of FDI growth in SSA. A possible explanation is that since the majority of FDI in the country is polarized to the natural resource extractive industry, 65% from 2007 to 2014(ZDA, 2014), which may not be sensitive to factors such as infrastructure; this however does not explain the negative relationship. When FDI inflows are disaggregated, the second largest sector is industry and infrastructure. According to Kirkpatrick *et al* (2006), countries with greater infrastructure needs are more attractive to foreign investment in infrastructure. In their study on FDI in infrastructure in developing countries, they found that physical infrastructure variables were negatively signed and statistically significant, confirming that FDI in infrastructure is attracted, other things being equal, to countries where the need for additional infrastructure provision is greater. In the case of Zambia infrastructure development proxied by GFCF, which is a net increase in fixed capital accumulation shows that form 2000, net fixed capital accumulation has been increasing(infrastructure development has been increasing) which may imply a decline in the need for infrastructure FDI, which could possibly explain the negative relationship observed between the two variables.

Trade openness and FDI are positively and significantly related (at 1% level of significance) a 1% increase in Openness increases FDI by 0.2533. This is consistent with the FDI theory that openness is indicative of the host country ease of access to the world market for material inputs, so the foreign firms can obtain raw materials at low prices. Economies in which trade is important also have relatively higher FDI (for instance they pursue policies that are more attractive to foreign investors). Thus, implementation of more liberal economic policies would certainly attract more foreign investments (Vinesh et al 2014).

Total Natural resource rents as a percentage of GDP reflect countries' natural resource abundance. The coefficient of natural resource abundance is significant at 1%, whereby a 1 percentage point increase in natural resource abundance induces 0.18 percentage point decrease in FDI inflows. This result is not consistent with Asiedu's study (2006), she used a panel data for 22 countries in Sub-Saharan Countries (SSA) over the period 1984-2000 and found that countries endowed with natural resources have large markets and attract more FDI. Dupasquier and Osakune (2006) and Deichmann *et al* (2003) also reported that the availability of natural resources has a positive and significant effect on FDI inflows. Possible reasons could be based on the idea that resource booms lead to an appreciation of local currency. This makes the country's exports less competitive at world prices, and thereby crowds out investments in non-natural resource tradable sectors. If the crowding out is more than one-for-one, it may lead to an overall decline in FDI (Asiedu, 2013).

The second reason is that natural resources are characterised by booms and busts, leading to increased volatility in the exchange rate (Sachs and Warner, 1995). In addition, a higher share of natural resources in total merchandise exports implies less trade diversification, which in turn makes a country more vulnerable to external shocks. FDI in countries with rich natural resource tends to be concentrated in the natural resource sector, resource booms lead to an appreciation of local currency which makes the country's exports less competitive at world prices, and thereby crowds out investments in non-natural resource tradable sectors.

All these factors generate macroeconomic instability and, therefore, reduce FDI. In a related vein, Hausmann and Rigobon (2002) show how the tradable manufacturing sector might suffer from a lack of investments because of the interplay between volatile resource returns and endogenous interest rates in imperfect capital markets. A booming resource sector might also crowd out public and private investments in education, or human capital (Gylfason,

2001), or discourage entrepreneurship (Sachs and Warner, 2001). Thus, a country's ability to compete on world markets is eroded, reducing the potential for export-led growth in the long-run.

Inflation was found to have a significant positive impact on FDI inflows in Zambia. This is against what most studies have found, that is inflation is an indicator of macroeconomic stability and indicates the growing cost of doing business which is a deterrent for investment. A possible explanation as to why the variable was found to be positive is the values used in the study are all nominal. Therefore when an investor has interest to invest in a certain sector of the economy, if inflation increases the nominal value of the amount required for investment increases, this means the investor will put up more mone for investment, despite the value having depreciated. Therefore the results simply, reflect the price effects.

5.4.2 Short-run VECM Estimates

Table 5.7 below reflects the results of the short run estimates from the VECM. Overall the output indicates that the model fits well, this can also be observed form the value of the R-squared, which shows that 86.59% of variation in the model can be explained by the variables under investigation. More over the negative value of the adjustment coeffecient indicates that the model is dynamically stable. Most of the coeffecients are statistically significant as is the adjustment parameter, ECM(-1).The adjustment parameter was found to be 0.47, impliying moderate speed of adjustmentthat towards equlibrium. From the time the model deviates from equlibrium and given that there are no other shocks, in a year the model would adjust back to equlibrium by 47%, therefore it would take about 2 years for the model to return to equilibrium.

The results show that levels of FDI in the previous period affect FDI in the next period. That is if FDI is low in 1 period it tends to become even lower in the next period.

In the short run tax policy is still significant but what matters most to investors is not the incentive environment per say, but CIT rates which seem to play a role in a firms location decisions.

Natural resource abundance was found to be insignificant, this is not surprising as most extractive FDI is long term investments. Further inflation rates which are an indicator of macro economic stability was equally found not be significant, this means that the macro

economic stablilty does not play a significnat role for a firms location decision in the short run.

Other control varaibles that were found to be significant were GFCF and market size, the signs of the respective coefficients were found to be in line with previous research, that is greater infrastructure development and higher incomes attract more FDI.

Table 5.7: Sort run VECM estimates

D_fdigdp	*Coef.*	*Std error*	*z*	*p>z*
ECM(-1)	-0.47	0.102	-4.60	0.00
Fdigdp(-1)	-0.41	0.12	-.344	0.001
Fdigdp(-2)	-0.52	0.11	-4.87	0.00
loggdpcapita(-1)	2.09	1.81	1.15	0.248
loggdpcaipta(-2)	3.63	1.85	1.96	0.050
gfcfgdp(-1)	0.24	0.09	2.77	0.006
gfcfgdp(-2)	0.24	0.07	3.25	0.001
cit (-1)	0.47	0.19	2.50	0.012
cit (-2)	0.73	0.16	4.42	0.000
tii (-1)	-0.34	0.37	-0.92	0.358
tii (-2)	0.61	0.41	1.49	0.137
inf (-1)	0.02	0.01	1.54	0.124
Inf(-2)	0.0016	0.01	0.13	0.898
Logopenness(-1)	-11.55	3.21	-3.59	0.000
Logopenness(-2)	-9.42	3.100	-3.04	0.002
Nrrgdp(-1)	0.02	0.06	0.39	0.699
Nrrgdp(-2)	-0.0024	0.05	-0.04	0.965
Constant	-0.665	0.30	-2.18	0.029
R-squared	0.8659			0.000

Trade openness however was found to have a negative effect in the SR, this is, however, not consistent with the FDI theory that openness is indicative of the host country ease of access to the world market. Usually, an economy in which trade is important has a relatively higher level of FDI and the implementation of more liberal economic policies certainly attract more foreign investments. The relationship between FDI and openness, however, is more complex. To the extent that trade openness reflects the economy's commitment to the freer international movement of goods and services, it can be expected to encourage FDI. On the other hand, trade protection has been widely used to provide foreign (and domestic) investors with protection from international competition, and to the extent that the trade openness variable reflects a policy of market liberalization, it may have a negative impact, at the margin, on the FDI's locational decision.

In other studies, it was found that trade adversely affects investment in low-human-capital, less-financially-developed, or more corrupted countries, but positively affects it in countries with opposite attributes (Kim *et al*, 2013). Whether Zambia has the attributes listed above is a matter of debate or can be an area of further research but may provide a valid argument as to why we are experiencing this phenomenon. Other arguments are that the impact of trade liberalisation is almost ambiguous in the primary and services sector (currently two of the largest sector in the Zambian economy) on investment (Lee and Mensbrugghe, 2001).

5.5 Post Estimation Tests

5.5.1 Eigen Value Stability Test

To check whether the cointegrating relationship is correctly specified, the Eigenvalue stability test was used. The graph of the eigenvalues shown in Figure 5.1 below shows that none of the remaining eigenvalues appears too close to the unit circle. The stability check does not indicate that our model is unspecified.

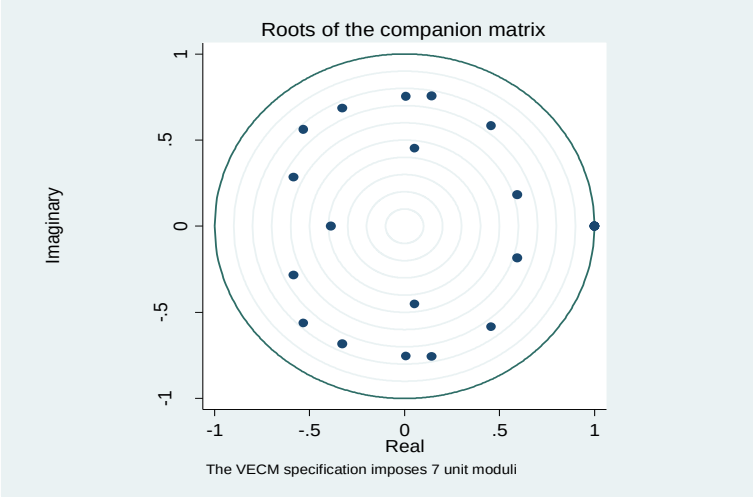


Figure 5.1: Eigen Value Stability Graph

5.5.2 Lagrange Multiplier Test for Autocorrelation

To test for serial correlation in the residuals we use the Lagrange Multiplier test for autocorrelation. Underspecifying the number of lags in a VECM can significantly increase the finite sample bias in the parameter estimates and lead to serial correlation. The results shown in Table 5.7 below clearly indicates that we fail to reject the null hypothesis that there is no autocorrelation at the chosen lag order, and we can, therefore, conclude that the there is no serial autocorrelation in the residuals.

Table 5.8: Lagrange-multiplier test

LAG	CHI^2	DF	$PROB>CHI^2$
1	64.1454	64	0.47138
2	76.4821	64	0.13636
3	59.2666	64	0.64424
4	78.5121	64	0.10478

H0: no autocorrelation at lag order

5.5.3 Normality of the Data Set

The assumption that the errors are independent, identically, and normally distributed with zero mean and finite variance allows us to derive the likelihood function. If the errors do not come from a normal distribution but are just independently and identically distributed with zero mean and finite variance, the parameter estimates are still consistent, but they are not efficient.

Table 5.8 below shows the results obtained from the Jacque-Bera, Skewness, and Kurtosis Test. We test the null hypothesis that the errors are normally distributed. The results indicate that all variables apart from GFCF and CIT have normally distributed errors. The errors for both these variables exhibit Skewness and Kurtosis.

The overall Jarque-Bera test statistics for the model as a whole rejects the null hypothesis of the normal distribution of the model. But since the sample size is large and we know that as *n* approaches infinity, the distribution can be assumed to be normal, hence the results from normality and Kurtosis are negligible.

Table 5.9 Skewness, Kurtosis, and Normality

VARIABLE	JAQUE BERA NORMALITY TEST	SKEWNESS	KURTOSIS
FDIGDP	0.98404	0.99602	0.85767
LNGDP	0.25687	0.10486	0.76629
GFCFGDP	0.06740	0.03305	0.35617
CIT	0.0000	0.00063	0.000
TII	0.72656	0.45290	0.78352
INFLATION	0.28612	0.11909	0.78641
LOGOPENNESS	0.88584	0.98011	0.62290
NRRGDP	0.10108	0.31664	0.05844
ALL	0.000	0.00355	0.000

5.6 Summary

The study data was collected from ZRA, BOZ, Income Tax acts, ZDA and the World Bank Development Indicators.The statisical package used to analyse the data collected was Stata version 13. All the variables included in the study, were integrated of order one I(1) as confirmed by the ADF test administered, while the optimum lag length selected by the Akaike Information Criterion (AIC) was one for most of the variables, due to the presence of auto correlation at lag 1 the number of lags was increased to 3. The Johansen test confirmed the presence of 1 long-run cointegrating relationship. In the short-run, it was found that FDI in one period affects FDI in the next period and that CIT rates have a bearing on a firms locational decisions more that incentives. Most of the control varaibles had the same directional relationship as they do in the long run apart from trade openess and infrastructure development. Further macro economic stablilty and natural resource abundance were found to have no significant realtionship with FDI in the short run.

In the long run all variables were found to be statistically significant at 1% level of significance. The model was found to be correctly specified form the Eigen value stability test and no serial correlation was found amongst the residual error terms.

Market size and trade openness, were found to be positively related to FDI inflows, these results are aligned to previous research and theory. While corporate taxes was found to be negatively related to FDI inflows as predicted by literature, the tax incentive indicator however was found to be positively related to FDI inflows. Inflation was also found positively related to FDI inflows, reflecting price effects. Some surprising results were found not in tandem with literature was the relationship between natural resource abundance (negatively related) and infrastructure development. Here natural resources are seen to crowd out other forms of FDI. Is Zambia falling into the trap of the natural resource curse?

CHAPTER SIX

CONCLUSION

6.1 Introduction

Throughout most parts of this research, it has been emphasised that there is an overwhelming interest to researchers in investigating taxation and FDI since the second half of the 20th Century. However, despite this trend, no consensus exists on how tax affects FDI. Most African governments are yearning to improve the livelihoods of their citizenry by aiming at reducing poverty and fostering economic development. Proponents of economic development have regarded investment as one of the essential components for securing higher growth rates.

Indeed, there is massive competition by national governments to acquire as much FDI as possible so as to reap the benefits that this FDI may bring with it. These contests for FDI by countries have been brought to the fore in different forms such as setting up of favourable domestic tax rates, giving tax incentives to potential investors, offering tax holidays to potential investors and providing capital allowances as high as hundred per cent in some countries. These benefits are among the many ways that these governments, which are the potential destinations of these FDI flows, are using to portray themselves as being relatively more competitive relatively to the alternative destinations. But the question is, does tax policy matter for FDI in developing country setting such as Zambia?

6.2 Summary of Main Findings

The VECM results for the long-run show that, as economic theory predicts, corporate tax rate has a significant negative impact on FDI, both in the short run and long run. This result is in line with previous research in this area and theory that predicts that lowering the cost of capital increases profits and, therefore, acts as a pull factor for FDI. Results for the tax incentive indicator which was a measure of the incentive environment in the priority sector, found counter intuitive results, that is increasing corporate taxes and/or decreasing the tax holiday period increases FDI inflow.In the short run however, tax incentives are found to statistically insignificant.

The findings of this study give evidence of significant effect between FDI and the level of openness, market size, and natural resources. Natural resources are seen to have a negative

impact in the long-run. The negative effect of total natural resource abundance implies that Zambia should not depend on their natural resources to attract foreign investments. These results emphasise that the higher the level of GDP and infrastructure development, the higher the amount of FDI inflows in the short run, in the long run however,the more infrastructure development a country has the less infrastructure FDI it is likely to receive. An interesting result is pointed out in the analysis where there is a negative relationship between the level of openness and the level of FDI inflows in the short run, in the long run trade openness was found to be positively related to FDI inflows, implying that grater intergration of the Zambia's eceonomy to the word market increases FDI inflows. Similarly, inflation was found to be significant and positive, as values used in the reserch were nominal, this reflects the price effects in the long run.

6.3 Policy Implications and Reccomendations

As discussed previously, countries try to attract FDI by providing several benefits. However, the research has shown that such policies are not effective ways to reap FDI's growth. For developing countries to enjoy the optimal benefits of FDI and thereby achieve economic development there are other important factors that should be considered, as follows:

- As taxes have been found to play a significant role in explaining fluctuations in FDI in Zambia, it is important for the government to continue using corporate income tax to attract investment. Offering tax holidays and reduced CIT rates in the priority sectors had no bearing on FDI inflows in the short run.
- Policy makers also need to lay emphasis on policies toward trade (openness) as it was found to have a negative impact on FDI inflows in the short run. It needs to be ascertained why trade openness is negatively related to FDI inflows especially through factors surrounding low human capital, corruption and weak institutions.
- Domestic market size had a significant bearing on FDI, implications are that policies that foster greater economic growth which translates into higher per capita income need to be in place in order to attract a higher level of investment.
- Natural resource abundance was found to be negatively related to the FDI inflows suggesting that FDI in the Natural resource sector may be crowding out FDI in other priority sectors; it is imperative therefore that the extent to which this holds true needs to be thoroughly investigated.

- The quality and regularity of information on investments are important, to monitor the sensitivity of changes in investment in the country with regard to policy changes.

6.4 Limitations of the Study and Areas of Further Research

6.4.1 Limitations of the Study

This study was subject to some limitations such as data unavailability. The data was not available for certain variables that were later on omitted. In fact, this unavailability of data was the basis for not adopting the gravity model in this study that would have given interesting insights to the analysis. The gravity model, as already noted, requires the availability of source and destination of FDI data. The other related source of difficulty was that certain data, specifically the corporate income tax rate, reduced tax rates had to be extracted from annual reports and Income Tax Acts and Budget Speeches as most institutions that are responsible for this did not have data that spans to 1980 let alone 1970.

6.4.2 Possible Areas for Further Research

This paper, as highlighted already, faced some limitations but further research could be done to circumvent some of these constraints. Therefore, based on the interesting research process and exposure to the topic, there are some research gaps that were noted and possibly could provide areas for further studies. For instance, in this study, only the impact of domestic tax policy on FDI was considered but further research in this field could incorporate the foreign tax policy on FDI as done by Cassou (1997).

1. Data limitations with regard to taxation data posed another challenge. Therefore, improved data would provide an opportunity to include other tax variables besides the corporate income tax rate such as bilateral effective tax rates and Average effective tax rates.
2. Unavailability of data for the sectoral distribution of FDI and historical sectoral tax rates and incentives meant that the impact of tax incentives on the sectoral distribution of FDI could not be examined. This is important as there is a possibility to study how incentive regimes and policies affect the sectoral distribution of FDI and if certain sectors are tax insensitive; then offering tax incentives is a waste and could be forgone. It is important to note that the impact of FDI on host economies depends on

the type of FDI that the country receives (Asiedu, 2004; Axarloglou and Pournarakis, 2007). Thus, an important issue that comes to bear is whether the recent increase in extractive industry FDI will enhance economic growth and reduce poverty in SSA countries or will it crowd out further FDI.

3. Another pertinent area of interest is whether the benefits from FDI attracted by the incentives outweigh the forgone revenue and administrative costs in administering them. This brings to light the relevance of using incentives to promote FDI.

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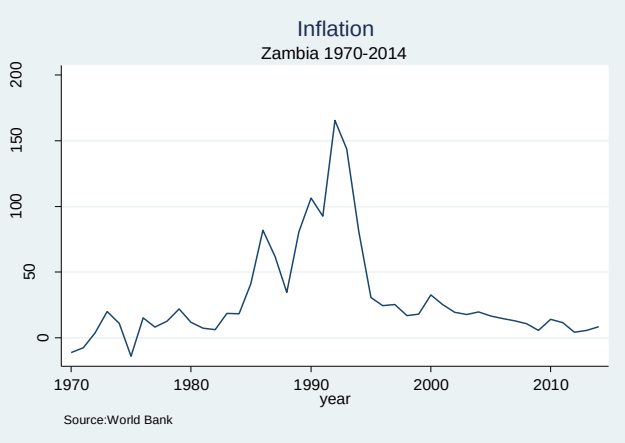
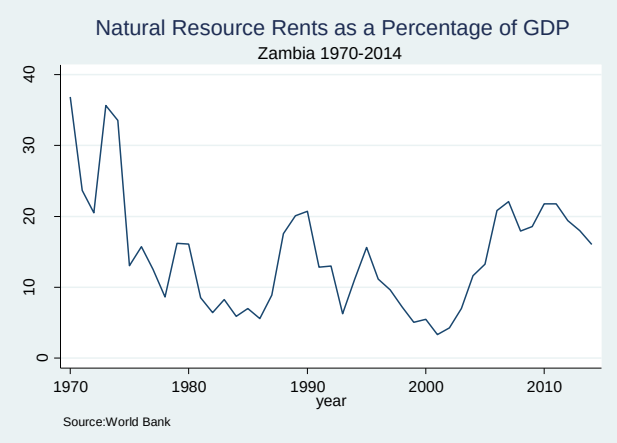
APPENDICES

Appendix A- Trends in Selected Variables

1. Inflation measured by the GDP deflator



2. Natural Resource Abundance in Zambia 1970-2014



3. Highest Statutory CIT rates

A**ppendix B-** Lag order Selection Criterion for all study variables

```
. varsoc fdigdp, maxlag(3)

   Selection-order criteria
   Sample:  1973 - 2014                        Number of obs      =        42
```

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-100.048				7.19887	4.81179	4.82696	4.85317
1	-94.4135	11.268	1	0.001	5.7737	4.59112	4.62145	4.67386
2	-92.7717	3.2836	1	0.070	5.60087	4.56056	4.60605	4.68467
3	-85.051	15.441*	1	0.000	4.0683*	4.24052*	4.30118*	4.40601*

```
   Endogenous:  fdigdp
    Exogenous:  _cons
. varsoc lngdp, maxlag(3)

   Selection-order criteria
   Sample:  1973 - 2014                        Number of obs      =        42
```

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-33.097				.296946	1.62366	1.63883	1.66504
1	13.4216	93.037*	1	0.000	.03399	-.543886	-.513556	-.46114*
2	15.1902	3.5372	1	0.060	.032774*	-.580487*	-.534992*	-.456367
3	15.1988	.01708	1	0.896	.03437	-.533274	-.472615	-.367782

```
   Endogenous:  lngdp
    Exogenous:  _cons
. varsoc gfcfgdp, maxlag(3)

   Selection-order criteria
   Sample:  1973 - 2014                        Number of obs      =        42
```

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-149.047				74.2336	7.14508	7.16025	7.18646
1	-116.981	64.131*	1	0.000	16.911*	5.66577*	5.6961*	5.74851*
2	-116.98	.00216	1	0.963	17.7379	5.71334	5.75883	5.83746
3	-116.517	.92711	1	0.336	18.2029	5.73888	5.79954	5.90437

```
   Endogenous:  gfcfgdp
    Exogenous:  _cons
. varsoc cit, maxlag(3)

   Selection-order criteria
   Sample:  1973 - 2014                        Number of obs      =        42
```

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-130.49				30.6786	6.26143	6.2766	6.30281
1	-95.6701	69.64*	1	0.000	6.12975*	4.65096*	4.68129*	4.73371*
2	-95.5867	.16699	1	0.683	6.4043	4.6946	4.7401	4.81872
3	-95.4369	.29954	1	0.584	6.67115	4.73509	4.79575	4.90058

```
   Endogenous:  cit
    Exogenous:  _cons
. varsoc tii, maxlag(3)

   Selection-order criteria
   Sample:  1973 - 2014                        Number of obs      =        42
```

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-90.1353				4.49024	4.33977	4.35494	4.38115
1	-45.5346	89.201*	1	0.000	.563124*	2.26355*	2.29388*	2.3463*
2	-45.5318	.00553	1	0.941	.590612	2.31104	2.35653	2.43516
3	-45.3356	.39237	1	0.531	.613863	2.34931	2.40997	2.51481

```
   Endogenous:  tii
    Exogenous:  _cons

. varsoc inflation, maxlag(3)

   Selection-order criteria
   Sample:  1973 - 2014                        Number of obs      =        42
```

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-212.069				1492.62	10.1462	10.1613	10.1875
1	-188.556	47.027*	1	0.000	510.95*	9.07408*	9.10441*	9.15682*
2	-187.874	1.3642	1	0.243	518.833	9.08921	9.13471	9.21333
3	-187.28	1.1864	1	0.276	529.159	9.10859	9.16925	9.27408

```
   Endogenous:  inflation
    Exogenous:  _cons
```

```
. varsoc logopeness, maxlag(3)

   Selection-order criteria
   Sample:  1973 - 2014                        Number of obs      =        42
```

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	23.4381				.020114	-1.06848	-1.05332	-1.02711
1	38.033	29.19*	1	0.000	.010529*	-1.71586*	-1.68553*	-1.63311*
2	38.3744	.68283	1	0.409	.010866	-1.6845	-1.639	-1.56038
3	39.0717	1.3945	1	0.238	.011027	-1.67008	-1.60942	-1.50459

```
   Endogenous:  logopeness
    Exogenous:  _cons

. varsoc nrrgdp, maxlag(3)

   Selection-order criteria
   Sample:  1973 - 2014                        Number of obs      =        42
```

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-142.689				54.8413	6.84231	6.85748	6.88368
1	-127.177	31.024	1	0.000	27.4801	6.15127	6.1816	6.23401*
2	-126.932	.48881	1	0.484	28.4918	6.18725	6.23274	6.31137
3	-124.158	5.5489*	1	0.018	26.192*	6.10275*	6.16341*	6.26824

```
   Endogenous:  nrrgdp
    Exogenous:  _cons

. varsoc fdigdp , maxlag(3) exog(cit tii logopeness gfcfgdp lngdp nrrgdp inflation) noconstant

   Selection-order criteria
   Sample:  1973 - 2014                        Number of obs      =        42
```

lag	LL	LR	df	p	FPE	AIC	HQIC	SBIC
0	-81.0455				3.88803	4.19264	4.2988*	4.48225*
1	-80.1451	1.8008	1	0.180	3.91266	4.19738	4.3187	4.52837
2	-78.7432	2.8037	1	0.094	3.84633	4.17825	4.31473	4.55061
3	-77.6427	2.2011	1	0.138	3.83781*	4.17346*	4.32511	4.58719

```
   Endogenous:  fdigdp
    Exogenous:  cit tii logopeness gfcfgdp lngdp nrrgdp inflation
```

Appendix C: ADF-test for Unit Root in Variables

```
. dfuller cit,trend lags(1);

Augmented Dickey-Fuller test for unit root         Number of obs   =        43

                              ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -2.536           -4.214            -3.528           -3.197
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.3100

. dfuller gfcfgdp,trend lags(2);

Augmented Dickey-Fuller test for unit root         Number of obs   =        42

                              ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -0.955           -4.224            -3.532           -3.199
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9499
```

```
. dfuller logopeness,trend lags(3);

Augmented Dickey-Fuller test for unit root         Number of obs   =        41

                              ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -2.155            -4.233            -3.536           -3.202
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.5152

. dfuller lngdp, trend lags(3);

Augmented Dickey-Fuller test for unit root         Number of obs   =        41

                              ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -0.978            -4.233            -3.536           -3.202
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.9471


. dfuller inflation, trend lags(1);

Augmented Dickey-Fuller test for unit root         Number of obs   =        43

                              ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -2.291            -4.214            -3.528           -3.197
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.4388

. dfuller nrrgdp, trend lags(1);

Augmented Dickey-Fuller test for unit root         Number of obs   =        43

                              ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -2.675            -4.214            -3.528           -3.197
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.2466


. dfuller tii,trend lags(1);

Augmented Dickey-Fuller test for unit root         Number of obs   =        43

                              ---------- Interpolated Dickey-Fuller ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -1.841            -4.214            -3.528           -3.197
------------------------------------------------------------------------------
MacKinnon approximate p-value for Z(t) = 0.6846
```

Appendix D: Dickey Fuller tests of Differenced variables

```
. dfuller fdcit,drift lags(1);

Augmented Dickey-Fuller test for unit root         Number of obs   =        42

                              ---------- Z(t) has t-distribution ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -5.273            -2.426            -1.685           -1.304
------------------------------------------------------------------------------
p-value for Z(t) = 0.0000
. dfuller fdgfcfgdp,drift lags(2);

Augmented Dickey-Fuller test for unit root         Number of obs   =        41

                              ---------- Z(t) has t-distribution ----------
                 Test         1% Critical       5% Critical      10% Critical
               Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)            -3.852            -2.431            -1.687           -1.305
------------------------------------------------------------------------------
p-value for Z(t) = 0.0002
```

```
. dfuller fdlogopeness,drift lags(3) ;

Augmented Dickey-Fuller test for unit root         Number of obs   =        40

                                 ------------ Z(t) has t-distribution ------------
                   Test          1% Critical       5% Critical      10% Critical
                 Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -5.515            -2.438            -1.690           -1.306
------------------------------------------------------------------------------
p-value for Z(t) = 0.0000

. dfuller fdlngdp,drift lags(3);

Augmented Dickey-Fuller test for unit root         Number of obs   =        40

                                 ------------ Z(t) has t-distribution ------------
                   Test          1% Critical       5% Critical      10% Critical
                 Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -3.174            -2.438            -1.690           -1.306
------------------------------------------------------------------------------
p-value for Z(t) = 0.0016

. dfuller fdinflation,drift lags(1);

Augmented Dickey-Fuller test for unit root         Number of obs   =        42

                                 ------------ Z(t) has t-distribution ------------
                   Test          1% Critical       5% Critical      10% Critical
                 Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -5.544            -2.426            -1.685           -1.304
------------------------------------------------------------------------------
p-value for Z(t) = 0.0000

. dfuller fdnrrgdp,drift lags(1);

Augmented Dickey-Fuller test for unit root         Number of obs   =        42

                                 ------------ Z(t) has t-distribution ------------
                   Test          1% Critical       5% Critical      10% Critical
                 Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -7.181            -2.426            -1.685           -1.304
------------------------------------------------------------------------------
p-value for Z(t) = 0.0000

. dfuller fdtii, drift lags(1);

Augmented Dickey-Fuller test for unit root         Number of obs   =        42

                                 ------------ Z(t) has t-distribution ------------
                   Test          1% Critical       5% Critical      10% Critical
                 Statistic           Value             Value            Value
------------------------------------------------------------------------------
 Z(t)             -5.050            -2.426            -1.685           -1.304
------------------------------------------------------------------------------
p-value for Z(t) = 0.0000
```

Appendix E: Long-run VECM estimation process

a. Johansen-Fisher Max Eigen Test for Co-integration

Johansen tests for cointegration

Trend: constant — Number of obs = 44

Sample: 1971 - 2014 — Lags = 1

maximum rank	parms	LL	eigenvalue	trace statistic	5% critical value
0	8	-625.84747	.	173.8040	156.00
1	23	-599.48822	0.69825	121.0855*	124.24
2	36	-578.2114	0.61983	78.5318	94.15
3	47	-564.43933	0.46528	50.9877	68.52
4	56	-553.37259	0.39531	28.8542	47.21
5	63	-547.491	0.23459	17.0910	29.68
6	68	-541.78039	0.22862	5.6698	15.41
7	71	-538.9763	0.11967	0.0616	3.76
8	72	-538.94548	0.00140		

maximum rank	parms	LL	eigenvalue	max statistic	5% critical value
0	8	-625.84747	.	52.7185	51.42
1	23	-599.48822	0.69825	42.5536	45.28
2	36	-578.2114	0.61983	27.5441	39.37
3	47	-564.43933	0.46528	22.1335	33.46
4	56	-553.37259	0.39531	11.7632	27.07
5	63	-547.491	0.23459	11.4212	20.97
6	68	-541.78039	0.22862	5.6082	14.07
7	71	-538.9763	0.11967	0.0616	3.76
8	72	-538.94548	0.00140		

Cointegrating equations

Equation	Parms	chi2	P>chi2
_ce1	7	131.771	0.0000

Identification: beta is exactly identified

Johansen normalization restriction imposed

beta	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
_ce1						
fdigdp	1	.	.	.	.	.
lngdp	-5.953362	.9003279	-6.61	0.000	-7.717973	-4.188752
gfcfgdp	.45834	.0824578	5.56	0.000	.2967257	.6199543
cit	1.301783	.1578596	8.25	0.000	.9923843	1.611182
tii	-3.236198	.5649561	-5.73	0.000	-4.343492	-2.128904
inflation	-.0625817	.0163312	-3.83	0.000	-.0945903	-.030573
logopeness	-25.32678	5.832562	-4.34	0.000	-36.75839	-13.89517
nrrgdp	.1781551	.0503897	3.54	0.000	.0793931	.2769171
_cons	-30.5417	.	.	.	.	.

Appendix F: Short Run VECM Estimates

Vector error-correction model

Sample: 1973 - 2014	No. of obs	=	42
	AIC	=	27.44887
Log likelihood = -425.4262	HQIC	=	29.73876
Det(Sigma_ml) = .0867587	SBIC	=	33.6962

Equation	Parms	RMSE	R-sq	chi2	P>chi2
D_fdigdp	18	1.28957	0.8659	155.0133	0.0000
D_lngdp	18	.136447	0.6680	48.28725	0.0001
D_gfcfgdp	18	4.12453	0.4276	17.93169	0.4602
D_cit	18	2.82598	0.2333	7.304172	0.9873
D_tii	18	.560176	0.6724	49.25711	0.0001
D_inflation	18	23.1074	0.4033	16.22092	0.5771
D_logopeness	18	.093757	0.5600	30.543	0.0325
D_nrrgdp	18	4.8759	0.5361	27.73609	0.0662

	Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
D_fdigdp						
_ce1						
L1.	-.4717576	.1025309	-4.60	0.000	-.6727145	-.2708007
fdigdp						
LD.	-.4070563	.118335	-3.44	0.001	-.6389887	-.1751239
L2D.	-.5205738	.1067929	-4.87	0.000	-.729884	-.3112636
lngdp						
LD.	2.085792	1.806042	1.15	0.248	-1.453985	5.625569
L2D.	3.629828	1.849	1.96	0.050	.0058556	7.253801
gfcfgdp						
LD.	.2401065	.0866297	2.77	0.006	.0703154	.4098976
L2D.	.2435291	.0748798	3.25	0.001	.0967674	.3902908
cit						
LD.	.4692347	.1878053	2.50	0.012	.101143	.8373263
L2D.	.7257534	.1640841	4.42	0.000	.4041544	1.047352
tii						
LD.	-.3382826	.367717	-0.92	0.358	-1.058995	.3824296
L2D.	.6060842	.4073222	1.49	0.137	-.1922527	1.404421
inflation						
LD.	.0187089	.0121636	1.54	0.124	-.0051314	.0425491
L2D.	.0015625	.0121497	0.13	0.898	-.0222505	.0253755
logopeness						
LD.	-11.5469	3.211972	-3.59	0.000	-17.84225	-5.25155
L2D.	-9.415713	3.100646	-3.04	0.002	-15.49287	-3.338559
nrrgdp						
LD.	.0223739	.0579383	0.39	0.699	-.0911832	.135931
L2D.	-.0023822	.0539959	-0.04	0.965	-.1082122	.1034478
_cons	-.6650881	.3047877	-2.18	0.029	-1.262461	-.0677151

Appendix G: Post-Estimations

a. Lagrange Multiplier test for Auto Correlation

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. veclmar, mlag(4)
```

Lagrange-multiplier test

lag	chi2	df	Prob > chi2
1	64.1454	64	0.47138
2	76.4821	64	0.13636
3	59.2666	64	0.64424
4	78.5121	64	0.10478

H0: no autocorrelation at lag order

b. Jarque-Bera, Skewness and Kurtosis Test

```
. vecnorm
```

Jarque-Bera test

Equation	chi2	df	Prob > chi2
D_fdigdp	0.032	2	0.98404
D_lngdp	2.718	2	0.25687
D_gfcfgdp	5.394	2	0.06740
D_cit	64.196	2	0.00000
D_tii	0.639	2	0.72656
D_inflation	2.503	2	0.28612
D_logopeness	0.242	2	0.88584
D_nrrgdp	4.584	2	0.10108
ALL	80.308	16	0.00000

Skewness test

Equation	Skewness	chi2	df	Prob > chi2
D_fdigdp	-.00188	0.000	1	0.99602
D_lngdp	.61296	2.630	1	0.10486
D_gfcfgdp	.8056	4.543	1	0.03305
D_cit	-1.2922	11.689	1	0.00063
D_tii	-.2837	0.563	1	0.45290
D_inflation	.5891	2.429	1	0.11909
D_logopeness	-.00942	0.001	1	0.98011
D_nrrgdp	.37849	1.003	1	0.31664
ALL		22.858	8	0.00355

Kurtosis test

Equation	Kurtosis	chi2	df	Prob > chi2
D_fdigdp	3.1356	0.032	1	0.85767
D_lngdp	3.2247	0.088	1	0.76629
D_gfcfgdp	3.6975	0.851	1	0.35617
D_cit	8.4776	52.506	1	0.00000
D_tii	2.7923	0.075	1	0.78352
D_inflation	3.2048	0.073	1	0.78641
D_logopeness	2.6283	0.242	1	0.62290
D_nrrgdp	4.4305	3.581	1	0.05844
ALL		57.450	8	0.00000

c. Eigen Value Stability Test

Eigenvalue stability condition

Eigenvalue	Modulus
1	1
1	1
1	1
1	1
1	1
1	1
1	1
-.5323367 + .5624689*i*	.774438
-.5323367 - .5624689*i*	.774438
.1416479 + .7570397*i*	.770177
.1416479 - .7570397*i*	.770177
-.3275639 + .683881*i*	.758282
-.3275639 - .683881*i*	.758282
.00726543 + .7546533*i*	.754688
.00726543 - .7546533*i*	.754688
.4556095 + .5845383*i*	.741124
.4556095 - .5845383*i*	.741124
-.5856373 + .2834482*i*	.650626
-.5856373 - .2834482*i*	.650626
.5925122 + .1835094*i*	.620279
.5925122 - .1835094*i*	.620279
.05368496 + .4528852*i*	.456056
.05368496 - .4528852*i*	.456056
-.3874765	.387476

The VECM specification imposes 7 unit moduli.