EXPLORING THE RELATIONSHIPS BETWEEN FOREIGN DIRECT INVESTMENT, FOREIGN AID AND ECONOMIC GROWTH: EVIDENCE FROM AFRICA

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ABSTRACT

Focusing on African economic panel data from 1990-2018, this study set out to analyse the relationships between foreign direct investment (FDI), official development assistance (ODA) and economic growth. Specifically, the study sought to evaluate the deterministic relationships between FDI, ODA and economic growth in African countries; to examine the long-run cointegrating relationships between FDI, foreign aid and economic growth in Africa; and to determine causality between FDI, foreign aid and economic growth in Africa, and the robustness thereof. By using the dynamic two-step system Generalised Method of Moments approach to panel data, the study confirmed that a significant positive deterministic relationship exists between FDI and economic growth. In addition, the results of the ARDL (Pooled Mean Group) bounds test approach towards cointegration on the panel data showed that there were significant positive long-run relationships between ODA and economic growth; between economic growth and FDI, and a significant negative long-run cointegrating relationship between FDI and ODA. Furthermore, by using the ARDL and Error Correction Model (ECM) estimators, the study inferred causality between the key variables of economic growth, FDI and ODA, and the robustness thereof. The study concluded that there is uni-directional long-run causality between economic growth and FDI, between FDI and ODA, and between ODA and economic growth. Also, the only uni-directional short-run causality was established between economic growth and FDI, implying that economic growth causes an increase in FDI in the long, as well as in the short run. The causality findings confirm the initial doubt, that FDI and ODA are not necessarily complementary forms of economic growth funding, but rather that ODA in the long run causes economic growth, and economic growth, in turn, causes an increase in FDI in both the long and short run in the selection of African countries in the study. The findings of the study lead to various scholarly and policy implications and recommendations for academics, researchers, African countries' governments, donors and investors alike. Indicating the need for African countries to align their national strategies to their foreign and domestic policies for sustainable development.

KEY TERMS: Foreign direct investment; Official development assistance; foreign aid; economic growth; Africa; cointegration; causality.

OPSOMMING

Deur op Afrika se ekonomiese paneeldata van 1990 tot 2018 te fokus, het hierdie studie gepoog om die verwantskappe tussen direkte buitelandse belegging (DBB), amptelike ontwikkelingshulp (AOH) en ekonomiese groei te ontleed. Meer spesifiek, het die studie gepoog om die deterministiese verwantskappe tussen DBB, AOH en ekonomiese groei in Afrikalande te evalueer; die mede-integrerende langtermynverwantskappe tussen DBB, buitelandse hulp en ekonomiese groei in Afrika te ondersoek; en die kousaliteit tussen DBB, buitelandse hulp en ekonomiese groei in Afrika (en die robuustheid daarvan) te bepaal. Deur gebruikmaking van die dinamiese tweestap-stelsel Algemene-Metode-van-Oomblikke-benadering tot paneeldata het die studie ’n betekenisvolle positiewe deterministiese verwantskap tussen DBB and ekonomiese groei bevestig. Daarbenewens het die uitslae van die Outoregressiewe Verspreide Vertraging (ORVN) (Gepoolde Gemiddelde Groep) grenstoetsbenadering tot die mede-integrering van die paneeldata betekenisvolle positiewe langtermynverwantskappe tussen AOH en ekonomiese groei en tussen ekonomiese groei en DBB, sowel as ’n betekenisvolle negatiewe mede-integrerende langtermynverwantskap tussen DBB en AOH, aangedui. Deur gebruikmaking van die ORVN en foutkorreksiemodel-beramers het die studie kousaliteit tussen the sleutelveranderlikes van ekonomiese groei, DBB en AOH (en die robuustheid daarvan) afgelei. Die studie het tot die gevolgtrekking gekom dat daar ’n eenrigting-langtermynkousaliteit bestaan tussen ekonomiese groei en DBB, tussen DBB en AOH, en tussen AOH en ekonomiese groei. Verder is daar vasgestel dat die enigste eenrigting-korttermynkousaliteit tussen ekonomiese groei en DBB was, wat impliseer dat ekonomiese groei tot ’n verhoging van DBB oor die langtermyn en oor die korttermyn lei. Die kousaliteitsbevindings bevestig die aanvanklike twyfel dat DBB en AOH nie noodwendig komplementêre vorms van befondsing vir ekonomiese groei is nie, en eerder dat AOH oor die langtermyn tot ekonomiese groei lei en ekonomiese groei op sy beurt ’n verhoging van DBB oor beide die langtermyn en die korttermyn in die geselekteerde Afrikalande van die studie teweeggebring het. Die bevindings van die studie het verskeie wetenskaplike en beleidsimplikasies, sowel as aanbevelings vir akademici, navorsers, die regerings van Afrikalande, skenkers en beleggers. Dit dui aan dat Afrikalande hul nasionale strategieë in lyn moet bring met hul buitelandse en binnelandse beleide vir volhoubare ontwikkeling.

SLEUTELTERME: Direkte buitelandse belegging; amptelike ontwikkelingshulp; buitelandse hulp; ekonomiese groei; Afrika; mede-integrasie; kousaliteit

ISIFINQO

Ngokugxila kudatha yephaneli yezomnotho yase-Afrika kusukela ngonyaka we-1990-2018, lolu cwaningo luhlose ukuhlaziya ubudlelwano phakathi kokutshalwa kwezimali okuqondile kwamanye amazwe (eyaziwa kafuphi ngokuthi yi-FDI/UZO), usizo lokuthuthukiswa okusemthethweni (UTM) nokukhula komnotho. Ngokuqondile, ucwaningo lwalufuna ukuhlola ubudlelwano obunqunyiwe phakathi ko-UZO, UTM nokukhula komnotho emazweni ase-Afrika; ukuhlola ubudlelwano obudidiyelwe isikhathi eside phakathi ko-UZO, usizo lwangaphandle kanye nokukhula komnotho e-Afrika; kanye nokunquma imbangela phakathi ko-UZO, usizo lwangaphandle kanye nokukhula komnotho e-Afrika, kanye nokuqina kwayo. Ngokusebenzisa indlela yezinyathelo ezimbili eziguquguqukayo Indlela Eyinjjwayelo Yesikhashana kudatha yephaneli, ucwaningo luqinisekise ukuthi kukhona ubudlelwano obubalulekile bokunquma obukhona phakathi ko-UZO nokukhula komnotho. Ukwengeza, imiphumela ye-ARDL (i-Pooled Mean Group) yokuhlola indlela yokuhlola imingcele ekuhlanganiseni kwedatha yephaneli ibonise ukuthi kwakukhona ubudlelwano obuhle besikhathi eside phakathi ko-UTH nokukhula komnotho; phakathi kokukhula komnotho kanye ne-UZO, kanye nobudlelwano obubi obubalulekile obunesikhathi eside obuhlanganisayo phakathi ko-UZO ne-UTM. Ngaphezu kwalokho, ngokusebenzisa izilinganiso ze-ARDL ne-Error Correction Model (ECM), ucwaningo luveze imbangela phakathi kokuhluka okubalulekile kokukhula komnotho, UZO no-UTM, kanye nokuqina kwakho. Ucwaningo luphethe ngokuthi kunendlela eyodwa ethatha isikhathi eside eyimbangela phakathi kokukhula komnotho kanye no-UZO, phakathi ko-UZO no-UTM, naphakathi ko-UTM nokukhula komnotho. Futhi, okuwukuphela kwendlela yendlela emfishane neqondile ecezile yasungulwa phakathi kokukhula komnotho kanye no-UZO, okusho ukuthi ukukhula komnotho kubangela ukwanda ko-UZO ngokuhamba kwesikhathi, kanye nangesikhathi esifushane. Okutholiwe yisifundo kudale ukuqinisekisa ukungabaza kokuqala, ukuthi UZO no-UTM akuzona ngempela izinhlobo ezihambisanayo zokuxhasa ukukhula komnotho, kodwa kunalokho ukuthi UTM ngokuhamba kwesikhathi kudala ukukhula komnotho, futhi ukukhula komnotho, nakho, kubangela ukwanda ko-UZO kukho kokubili isikhathi eside nokwenza kancane ekukhethweni kwamazwe ase-Afrika ocwaningweni. Okutholwe kulolu cwaningo kuholela emiphumeleni ehlukahlukene yezifundo nenqubomgomo kanye nezincomo zezifundiswa, abacwaningi, ohulumeni bamazwe ase-Afrika, abaxhasi kanye nabatshalizimali ngokufanayo. Ukukhombisa isidingo sokuthi amazwe ase-Afrika aqondanise amasu awo kazwelonke nezinqubomgomo zawo zangaphandle nezasekhaya ukuze kube khona ukuthuthuka okusimeme.

AMAGAMA ABALULEKILE: Ukutshalwa kwezimali okuqondile kwamanye amazwe; Usizo lwentuthuko Olusemthethweni; usizo lwangaphandle; ukukhula komnotho; i-Afrika; ukuhlanganisa; imbangela.

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey-Fuller
AfCFTA	African Continental Free Trade Area
AIC	Akaike Information Criterion
AR	Arellano and Bond
ARDL	Autoregressive Distributed Lag
AU	African Union
B&R	Belt and Road
BIC	Bayesian Information Criterion
BRICS	Brazil, Russia, India, China and South Africa
COMESA	Common Market For Eastern And Southern Africa
DFE	Dynamic Fixed Effect
DS	Domestic Savings
ECM	Error Correction Model
ECT	Error Correction Term
EDU	Education
ELEC	Access To Electricity
FDI	Foreign Direct Investment
FEM	Fixed Effects Model
GDP	Gross Domestic Product
GDPG	GDP Growth
GDS	Gross Domestic Savings
GMM	Generalised Method Of Moments
GNI	Gross National Income
HC	Human Capital
HDI	Human Development Index

ICT	Information and Communications Technology
IPS	Im, Pesaran and Shin
LEXP	Life Expectancy
LLC	Levin, Lin and Chu
MENA	Middle-East and North Africa
MG	Mean Group
MNEs	Multinational Enterprises
NATR	Natural Resource Rents
NODA	Nett Official Development Assistance
NR	Natural Resources
ODA	Official Development Assistance
OECD	Organisation For Economic Cooperation And Development
OECD DAC	Development Assistance Committee
OEEC	Organisation For European Economic Cooperation
OFDI	Outward Foreign Direct Investment
OLI	Ownership, Location And Internalisation
OLS	Ordinary Least Squares
PC	Physical Capital
PMG	Pooled Mean Group
POP	Population Growth
PP	Phillips-Perron
REM	Random Effects Model
SADC	Southern African Development Community
SBC	Schwarz Bayesian Criterion
SDGs	Sustainable Development Goals
SSA	Sub-Saharan Africa

UN	United Nations
US	United States of America
WDI	World Development Indicators
WTO	World Trade Organisation
WWII	Second World War

CHAPTER 1:
BACKGROUND TO THE STUDY

1.1 INTRODUCTION

This chapter provides a brief overview of and background to the current study. It sets the tone for the identified problem, and provides a comprehensive problem statement, which coupled with the research questions and research objectives to be answered and met, will solve the identified problem. It further amplifies the contribution of the thesis to the existing body of knowledge.

1.2 BACKGROUND CONTEXT

The current discussions regarding the role played by international aid allocations as a funding method, in the economic development, growth and prosperity on the African continent are characterised by varying emotions and conflicting views from scholars, industry experts and the general public, both in Africa and abroad (Osakwe, 2007; Driffield & Jones, 2013; Nwaogu & Ryan, 2015). The findings of empirical studies differ considerably from each other, thus adding to the policy confusion when countries need to make decisions (Burnside & Dollar, 2000; Easterly, 2002; Blaise, 2005). Including foreign direct investment (FDI) as a funding mechanism for development, adds to the uncertainty regarding the effectiveness of the two international funding methods that are employed as a means of increasing the African continent's economic growth. Funding economic growth and development through either official development assistance (via government institutions), or through the use of private sector capital (FDI), will have a profound effect on the future and independent development objectives of African states (Kelsall, 2008).

The available literature presents opposing views about the effectiveness of foreign aid in developing countries. The opposing views have led to a variety of political think tanks promoting, sustaining and even increasing aid to developing countries (Burnside & Dollar, 1997, 2000, 2004; Riddell, 2007; Wright & Winters, 2010). The view that foreign aid increases economic growth was also echoed by the authors, Sachs, McArthur, Schmidt-Traub, Kruk, Bahadur, Faye and McCord (2004), who concluded that foreign aid is essential to release Africa from the poverty trap that many African countries find themselves in. Teunissen and Akkerman (2006), similarly, argued that the poverty trap suggests that many African countries are too poor to either cause, or to finance their own development and subsequent economic growth.

Easterly (2002, 2003, 2009) opposed the views held by those supporting aid for Africa, and argued that aid does not lead to substantial economic growth in African countries. Easterly (2002, 2003, 2009) asserted that FDI should substitute foreign aid in most cases, as the benefits of FDI outweigh the associated risks related to economic growth. Accordingly, Easterly supported the view that proclaims that FDI will lead to sustainable long-term progress in Africa (Kosack & Tobin, 2006). These debates are extremely important, as African countries are of the most disadvantaged and most underdeveloped regions in the world, and finding a solution to some of the problems these countries face will have a significant impact on future development endeavours (Taylor, 2016).

Throughout history, official development assistance (ODA), typically known as foreign aid, has significantly influenced economic progress. According to Niyonkuru (2016), ODA aids in the development of countries. Such assistance may also include social and economic infrastructure, assistance to the service sector, and assistance to the manufacturing industry. For these purposes, social infrastructure comprises education, water supply and sanitation, all of which aim to enhance human development, and ultimately, to contribute to long-term sustainable economic growth (Addison & Tarp, 2015). Economic infrastructure assistance helps recipient nations enhance their energy, transportation, and communications networks. Assistance to the production industry is targeted at agriculture, forestry, and fishing, as well as industry, mining, and building, aside from commerce and tourism. Additionally, it may attract FDI, which contributes favourably to development.

Over the last half century, Africa has failed to attract the needed FDI to be able to generate a sustainable economic growth rate over the long and medium term (Asiedu, 2004), which would affect the even, moderate growth rate needed to achieve a certain level of development. Naudé and Krugell (2007) concluded that the failure to attract FDI inflows is a consequence of the continent's exceptionally high-risk profile for FDI, in terms of the institutional failures and environmental features of many African states.

As a result of the substantial financial limitations, the dependence on external funding sources, such as ODA and FDI, have only increased the continent's reliance on factors from outside to stimulate economic growth (Adams, 2015). Sub-Saharan Africa (SSA) has received a lion's share of both FDI and ODA since the 1970s in order to assist with infrastructure development, healthcare, education and electricity generation (Prizzon, Greenhill & Mustapha, 2017). From the literature review that follows it will become clear that FDI offers resource poor countries with an important source of funding and leads to the transfer of technologies, skills and many more positive changes given that the funds are used effectively. The impact of FDI on job creation is believed to be one of the many reasons why policy-makers promote investments in their respective countries (Anyanwu, 2013). In turn, FDI leads to economic growth and has a positive spillover effect on the development of the specific country. It is therefore important to plan for a mix of economic growth methods that will allow countries, especially in Africa, to take advantage of as many endeavours as possible to grow their economies to its fullest potential, with the right mix of inputs.

Official development assistance (ODA) used as a denotation for foreign aid, has provided funding for many socio-economic development initiatives in Africa, but has shown mixed results. This, coupled with the continent's inability to attract FDI, has led to a point where SSA is losing out on many development opportunities which are being taken by other countries, notably in Latin America and Central Asia (Asiedu, 2002). This constant quest to attract FDI and to increase volatile and conditional ODA inflows has provided countries with severe developmental challenges, and has provided scholars and professionals with a whole range of problems that need solving.

In most instances, ODA to developing countries is given with specific conditions, such as, that the funds would be used for the improvement of basic infrastructure, human capital development, and for the enhancement of governance issues that would lead to macro-economic stability (Alesina & Dollar, 2000).

Anyanwu (2012) argued that the similarities between ODA and FDI can be summarised based on the joint and opposing outcomes of the two variables. These outcomes are:

- the vanguard effect that Anyanwu (2012) described as a situation where an aid-providing country also undertakes FDI within the recipient country;

- the Dutch disease effect, wherein prices on goods and services are reduced by aid providers, leading to a reduction in trade by multinational enterprises (MNEs);
- the negative rent-seeking effect, where ODA reduces FDI incentives, thus leading to unproductivity; and finally,
- the positive joint infrastructure effect that leads to increased socio-economic infrastructure (Anyanwu, 2012).

From an economic and developmental point of view, the gross domestic product (GDP) is the standard measure of the added value created through the production of goods and services in a country during a certain period. Internationally, GDP is accepted as the main measure of a country's economic well-being or economic status. As such, it also measures the income earned from production, or the total amount spent on final goods and services (less imports). While GDP is the single most important indicator to capture economic activity, it falls short of providing a suitable measure of people's material well-being (OECD, 2019).

According to the Organisation for Economic Cooperation and Development (OECD) (2008), FDI is defined as an investment in the form of controlling ownership (that is 10% ownership or more, based on host country legislation) acquired by an entity from one country of an entity in another country. In terms of the OECD's (2008) benchmark definition, FDI would typically include involvement in management by multinational enterprises (MNEs), joint ventures between MNEs and host country enterprises, and the transfer of skills and technology not locally available in host countries. Furthermore, the definition includes mergers and acquisitions, direct infrastructure investments, investment of retained earnings by MNEs, and intercompany loans.

Foreign aid, or ODA, is consistently defined in the literature according to the purpose for which it is going to be used, or according to the donors' original intent. As a result of the differences in intent, different development objectives are to be met. For example, ODA given to enhance economic growth through infrastructure development, would be expected to have a more significant long-term development effect on the recipient country's GDP, as opposed to providing military aid (Hansen & Tarp, 2000, 2001). Considering the discrepancies between the different forms of ODA, a distinction is made between two wide-ranging categories of aid, for example, bilateral and multilateral aid, and their different levels of effectiveness (Biscaye, Reynolds & Anderson, 2017).

From the definition of the OECD Development Assistance Committee (OECD DAC, 2019), the consensus is that ODA includes all official flows distributed from bilateral donors or multilateral institutions to developing countries listed as per the DAC's (Development Assistance Committee's) list of recipients. The main purpose, according to the definition, is the promotion of the economic development and social well-being of the recipient country. Furthermore, to be considered as ODA, the aid flow needs to include the following fundamentals:

- It needs to be commenced by the official (government) sector.
- The aid has to include the advancement of economic development and welfare as its main objective.
- It also needs to be on concessional financial terms.
- With respect to the provision of loans, the loan should include a grant element of at least 25%.

The definition therefore includes non-financial flows, such as technical cooperation between countries, but excludes all forms of military collaboration or assistance in any form whatsoever, be it between private individuals or between governments. In contrast to the OECD DAC (2019), China refers to ODA as external assistance on many forms such as financial grants, loans and a combination of diplomatic and business orientated assistance (Brautigam, 2011).

As per the conventional definition of ODA, this study uses ODA as the preferred measure of foreign aid. Nevertheless, the current study is aware of the shortcoming in the definition, as professed by Chang, Fernandez-Arias and Serven (1998), and Lomoy (2014) who lamented that the definition includes either too many or too few elements of official development aid. Chang *et al.* (1998) argued that including official technical assistance as part of official ODA inflows might distort the actual ODA measurement of foreign aid, whereas Lomoy (2014) noted the importance of the roles that various non-governmental organisations play in the development objectives of DAC recipient countries. Regardless of the noted objections to the measurements of ODA according to the OECD DAC's (2019) definition, it remains the most widely accepted and accurate means of accessing the collected data on foreign aid flows from traditional donor countries.

Given the different outcomes on the FDI–ODA–economic growth nexus alluded to in the introduction, as well as the empirical findings on the relationships, or lack thereof, as per the available literature; the following section provides a clear problem identified in the prevailing scholarly literature. It is important for policy-makers and foreign investors alike to be familiar with the relationships between FDI, ODA and economic growth, and to understand how these variables interact. This knowledge is important, not only from a financial risk perspective, but also from a policy-planning perspective in terms of bilateral aid decisions, and for foreign trade relations between countries, as well as for each country’s individual, respective economic development plans.

1.3 PROBLEM STATEMENT

Many African and other developing countries have depended on FDI and ODA to grow their economies and improve the lives of their citizens (Araki, 2007; Kumi, Ibrahim & Yeboah, 2017). Moreover, ODA and FDI have become an essential part of African countries’ in-country development objectives (Amusa, Monkan & Viegi, 2016). Research on the motivations behind, and outcomes of FDI and ODA has focused on development objectives that have been measured through the lens of developed countries and donor agencies (Fehling, Nelson & Venkatapuram, 2013). However, despite the efforts of both African countries and their development partners to attract ODA and FDI to grow economically, the continent remains home to the least developed countries (Maksimov, Wang & Luo, 2017), rendering development endeavours fruitless.

In the FDI-ODA-economic growth literature, the relationship between these variables is every so often characterised by conflicting outcomes (Svensson, 2003; Riddel, 2007; Driffield & Jones, 2013; Chorn & Siek, 2017). To obtain a thorough understanding of the effects of FDI and ODA on economic performance, an in-depth quantitative, and African country-specific outlook is required. This study thus aims to fill this knowledge gap on the interrelatedness and relationships over long periods of time between FDI, ODA and economic growth for African countries.

Some studies (Remmer, 2003; Karras, 2006; Hansen & Rand, 2006; Asongu & Odhiambo, 2020) examined the relationship between ODA and economic growth, or FDI and economic growth within the developing country and African context. However, these studies ignored the interaction between both the ODA and FDI variables and their combined effect on economic growth. Most of the literature that investigated this phenomenon used other developing countries, and different units or variables in their analyses (Carro & Larru, 2010; Wang & Balasubramanyan, 2011; Garriga & Phillips, 2014). It is important to investigate this phenomenon in Africa, a developing continent, to develop policy solutions that will lead to a sustainable growth path. Developing countries are structurally, fundamentally and technically different from developed countries, so much so, that their structural policies are unique from those of well-developed countries (Marozva & Magwedere, 2021).

Kragelund (2008) warned about the long-term consequences that African countries might face when accepting foreign aid from various foreign donors. Kragelund (2008) noted that accepting aid from non-DAC members may lead to the donors having strategies that are in opposition of the DAC, whose aim it is to unify ODA objectives. Testing Kragelund's (2008) proposition against the backdrop of the newly available data presented by the current study may add significant insight into the ODA-FDI theoretical framework for all African states and their economic development objectives.

According to Asiedu (2004), Sub-Saharan Africa (SSA) has lost ground in attracting FDI, despite policy improvements and the growth noted in other developing countries. Asiedu (2004) argued that although SSA has made progress in terms of policy reforms and has shown advances in infrastructure development, the changes to its regulatory framework and investment reforms lags behind that in other developing countries. Thus, the current study seeks to augment the existing knowledge through the provision of guidelines on how to improve African countries' attractiveness with regard to FDI inflows, particularly from a policy perspective.

The study analysed the ODA–FDI nexus on economic growth for 29 African countries under different economic conditions (that is, pre-, during and post the 2007-2008 global economic crisis) spanning a period of 28 years. The current study extended on, and aimed to find a new hypothesis that explains the nexus between the independent variables (FDI and ODA) and the dependent variable, economic growth (GDP). For example, the questions to be asked are: Will economic growth for African countries be more, given an increase or a decrease in FDI, ODA, or both? Determining the direction of causality between these three variables, and how robust these relationships are, will also bring new perspectives to policy-makers as they will now be guided by empirical evidence in proposing, formulating and adopting policies which have an impact on external funding and domestic economic development plans.

Furthermore, this study aims to provide the continent with options to consider when countries need to improve their economic performance, and which will lead to the development of the region. Effective strategy formulation with prosperous economic objectives will become a reality, assuming the correct mix of capital (foreign and domestic) can be raised to drive infrastructure development.

The current study is unique in its use of the GMM estimation model to regress economic growth against independent variables: FDI and foreign aid (ODA), under different, specific economic conditions. The GMM model accounts for endogeneity bias between the dependent and independent variables which can lead to result inconsistency, questionable conclusions and unsuitable theoretical interpretations when not accounted for. In addition, the study is continent-specific, contributing to new knowledge where similar studies only focused on SSA or other regional economic clusters (Mistry, 2005; Nhamo, 2017). As a result of the many different countries in Africa, and the overall level of development of each country, many could be seen as unique cases, finding themselves functioning as an industrialised country on a developing continent. Furthermore, most African countries are signatories to the United Nations 2030 Agenda for Sustainable Development, as well as the African Union Agenda 2063, and therefore, need proper, well-researched policy guidelines to build their roadmaps to achieving the ambitious goals.

The current study sought to build upon the available literature by exploring the relationship between FDI, ODI and economic growth within the African context. In doing so, this study envisions that structural and policy adjustments will be made by governments to provide and guide African countries towards a suitable and sustainable economic growth path.

1.4 RESEARCH OBJECTIVES

The main objective of this study was to examine the relationships between foreign direct investment, foreign aid, and economic growth within the African context, under various economic conditions.

The following specific research objectives were formulated for this study:

- To evaluate the deterministic relationships between foreign direct investment, foreign aid, and economic growth in African countries;
- To examine the long-run, cointegrating relationships between foreign direct investment, foreign aid, and economic growth in Africa;
- To determine causality between foreign direct investment, foreign aid, and economic growth in Africa, and the robustness thereof.

1.5 RESEARCH QUESTIONS

The following research questions were formulated for this study:

- What deterministic relationships exist between foreign direct investment, foreign aid, and economic growth in African countries?
- What long-run, cointegrating relationships exist between foreign direct investment, foreign aid, and economic growth in Africa?
- What is the direction of causality between foreign direct investment, foreign aid, and economic growth in Africa, and how robust are these relationships?

1.6 CONTRIBUTION TO THE EXISTING BODY OF KNOWLEDGE

The current study aims to research the relationships between FDI, ODA, and economic growth for a selection of 29 African countries under different economic conditions. The existing body of knowledge around economic growth research consists of various dimensions, the bulk of which originate from macro-economic studies and the finance theories that underpin those assumptions. This section presents a series of arguments on how this thesis differs from the existing body of knowledge and how it adds to a significantly less explored area in financial economic and development research.

This study seeks to highlight the importance of endorsing, elaborating and increasing FDI, ODA and economic growth research in Africa specifically. Furthermore, understanding how these variables interact with one another over time will add significant value to guide future policy directives. The thesis seeks to highlight new significant facts, suggest relationships that were previously unrecognised, and will challenge prevailing assumptions. In addition, it will present new insight into unknown occurrences, or recommend new explanations of known facts that can alter policy directives around African countries.

The thesis offers an alternative analytical and methodological approach to FDI and ODA disbursements for African countries, both in terms of development as well as an in-country assessment of such needs. The thesis combines the synchronised assessment of the impact that the variables FDI, ODA and economic growth, have on economic development policy conditions. Moreover, knowing how these variable interactions affect individual countries and how the relationships interact over long periods of time, might help to answer the research questions. Drawing insight from the literature review, it became clear that original, country and continent-specific research is needed to solve the complex FDI, ODA and economic growth nexus.

The motivation for the research stems from the contradictory findings of recent similar studies on developing countries (Amoa, 2020; Rao, Sethi, Dash & Bhujabal, 2020; Twerefou, Turkson, Frimpong-Wiafe & Darkwah, 2020). Thus, the thesis provides new and accurate results that will allow for proper policy development for aid agencies, investors and recipient countries to stimulate economic growth. The prevailing 'makeshift African policy development' does not adequately address the differences between the various African countries, nor does it take into account the different levels of development across the continent.

Moreover, foreign development aid and FDI from developed countries arrange their policy objectives differently and these might not be in line with the persistent population needs of other countries (Lee, 2020; Ayomitunde, Ololade Moses & Babatunde, 2020). Such policies and a 'one size fits all' approach thwart coordination endeavours, as each country has different characteristics, cultures and social systems. For example, a study by Dong and Fan (2020) does not address the significance of a single-country approach to development, even after accounting for China's significant role in Africa. Therefore, the uncertainty around aid, growth and investment remains.

As reported by Adams and Ellesal (2020), the monetary, fiscal and organisational complexities related to identifying and finding the records of FDI and ODA, and data related to economic growth in this field of research are limited in many African states. Presently, reasonably little data is available on the direct economic impact that ODA and FDI have on African countries, as most datasets overlook this dimension. To unravel the impact of these variables on policy development, this thesis applied accurate data over a unique time-period and under unique economic conditions, to assess its impact on a selection of African countries.

Although there is currently an increase in the literature on comparative policy directives between different aid providers, investors and sovereign states, they show conflicting results (Sarnholm, 2020; Gakpa, 2020). These studies fail to provide answers as to how and when to approach ODA, FDI and growth initiatives, and for which African countries, during what time. This thesis aims to provide the answers to those questions. Thus, it will provide a way of effectively implementing development and finance policies into specific African countries.

This thesis focuses on a sample of 29 African countries and provides a unique methodological approach which will answer important developmental questions. This study aims to contribute to new literature in the field of applied development finance by providing comparative country-specific policy guidelines through the incorporation of different dimensions, such as the unique economic realities encountered pre-, during and post-economic crises. In doing so, this research offers an innovative practice in measuring the desired outcomes in a development finance setting by investigating the simultaneous impacts in other developing countries.

The originality of the thesis also lies in its methodology and estimation technique. The Generalised Method of Moments (GMM), as an estimation technique has not been used in such a combination to model ODA, FDI and economic growth for the selection of African countries, neither has it been used in a country-specific manner. Seminal works by Burnside and Dollar (2004) and Easterly (2003) all used the OLS (Ordinary Least Squares) regression models to provide financial development roadmaps. The use of the novel methodology will also add to the growing area called ‘transborder statistics’ between African development blocks such as SADC and COMESA. In addition, the chosen methodology will make the data comparable to other similar studies going forward. Moreover, the independent variables chosen for the analysis, to act as proxies for ODA and FDI, are in themselves unique, given the estimation technique.

Developmental and financial economics are characterised by a range of logical and policy-oriented research studies that deliver instant resolutions on how to improve the economic well-being of African countries. Yet these rich resources fail to enable policy-makers to improve the ordinary lives of the people in the African countries in which they operate. They do not offer researchers or industry participants with concrete insights and instruments (such as data) on how these policies affect the various facets of ordinary people's lives.

1.7 CONCLUSION

Chapter 1 set out the significance and importance of the study and its possible implication for policy development in the FDI and ODA decision-making process in terms of economic growth trajectories that African countries embark on. The chapters that follow will elaborate on the introductory chapter and will focus on both theoretical, empirical studies done before, and narrow the study down to solve the problem identified via the answering of and meeting the research questions and objectives in order to draw conclusions and make recommendations.

CHAPTER 2:
LITERATURE REVIEW

2.1 INTRODUCTION

The main purpose of this literature review section of the thesis is to build on the introduction and to address the problem statement. The literature review is divided into the following sections and uses a funnelled approach to structure the literature. The first section provides an in-depth theoretical background to the economic growth literature that forms part of the core of the study. The second section provides and in-depth review of FDI literature, which includes the determinants of and means that MNEs use to invest in the different host countries. While the literature summarises the main economic, FDI and ODA theories, the objective was to assess the theories and identify their relevance to the current study.

The third and fourth sections provide an in-depth review of ODA literature and explain why ODA might be needed to further a country's developmental agenda. Section four concludes the literature review and critiques the outcome of the current available literature, and clearly identifies the gap in the current literature which will solve the problem identified in the problem statement. The literature will focus on developing countries, and the theoretical models will be tested against empirical literature.

2.2 ECONOMIC GROWTH MODELS

This section presents the main economic growth theories relevant to the current study. These theories include the Malthusian theory, the classical growth theory, the Solow-Swan model of economic growth, the endogenous growth theory, and the unified theory of economic growth. Through the explanations, the literature review will provide a wide range of insights into the various models and the linkages to FDI and ODA decisions.

2.2.1 The Malthusian theory on economic growth

The Malthusian (1798) theory suggests that the major reason for an increase in population growth can be directly attributed to advancements in technology. The Malthusian theory further states that despite these advancements in technology in a country, it has a limited and short-lived impact on the per capita income, and therefore, only increases the population. Malthusian (1798) elaborates by saying that no difference in the per capita income between societies with different levels of technology advancements over time can be observed. It should be noted that the assumption were made with data from the pre-industrial era.

A study by Quamrul and Galor (2011) supported the Malthusian theory. Quamrul and Galor (2011) found that although increases in productivity in terms of the use of land (agriculture) and advancements in technology had a significant positive effect on population growth, it had no effect on the per capita income for the reviewed period. Furthermore, the study stated that the various geographical variables (such as access to trade routes) and the availability of and access to technology may have played a significant role in the economic growth outcome.

Also, in support of the Malthusian theory, Madsen, Robertson and Ye (2019) argued that continuous productivity growth makes it possible to calculate the stationary steady-state equilibrium using a simple Malthusian growth model. Using the well-known notion of convergence, Madsen *et al.* (2019) demonstrate that linearisation around the steady state provides an experimentally tractable model of the Malthusian wage and population behaviour. Moreover, the model identification and inconsistent parameter estimate issues that have been raised in the literature, are dissected, and solved by the empirical approach towards these issues. Madsen *et al.* (2019) developed wage and population growth models for up to 17 countries based on freshly generated demographic data. The finding suggests there was a significant Malthusian trap in place before the industrial revolution across countries and during historical periods.

2.2.2 The classical growth theory

Classical growth theories represent a school of thought in economics characterised by the belief in the law of variable proportions. The theory implies that if one factor of production (labour) increases by one unit, the economic output (land) will increase whilst holding the advancements in technology constant. The increased output will be limited to the time it takes for the variables to reach a state of equilibrium.

Classical economics argued that a country’s economic performance is based on its ability to produce with the limited resources available. Smith (1776) and Ricardo (1815) argued that increasing the factors of production, such as an increase in capital or labour, will lead to an increase in output, given that technology advances remain constant. The gains will be short-lived and return to normal over time. Opposed to the classical growth theory, Bjork (1999) critiqued the classical growth theory because technology (which is kept constant) is in fact an economic growth enabler, and the economies of scale should not be ignored.

By building and expanding on the classical growth theory, Rosenstein-Roden (1943) explained that for a developing country to leapfrog from being underdeveloped to becoming developed, requires substantial, but targeted investments in many industries simultaneously. Rosenstein-Rodan (1943) argued that large investments into developing countries should be seen and managed in the same manner as large industrial complexes in developed economies. These investment efforts, according to the Rosenstein-Rodan (1943), require the involvement of the state as well as the private sector. The big push model, as it is often referred to, and later elaborated on by Murphy and Shleifer (1989:1024) states that a combined effort across sectors is needed for industrialisation and growth.

Industrial policy debates have traditionally concentrated on supply side influences, and have focused on establishing industry ties, mobilising funds for investment, and building up technical expertise; factors which all played an important role as components of industrialisation (Cohen-Setton, Hausman & Wieland, 2017). The classical growth theory implied that the industrialisation process was anticipated to bring about structural change, and aggregate demand was intended to accept and even assist that transition.

However, failed attempts at industrialisation in Southeast Asia, Latin America, and Africa have shown that poor demand management undermines industrial strategy, and has the potential to impede or halt progress toward modernisation (Fessehaie & Rustomjee, 2018; Attiah, 2019). Storm (2020) examined the disagreements and complementarities between macro-economic and industrial policies by using an open-economy development model of a late industrialising country that includes cumulative causation and long-run balance-of-payments constraints. Storm (2020) identified important macro factors that hinder industrialisation processes and emphasised macro-economic policies that promote industry diversity, structural changes and improvements by concluding that the premise of labour regulations merely being an indulgence that emerging countries simply cannot afford is incorrect. Therefore, provided there is sufficient macro-economic policy backing, labour regulations and greater real wage growth may be used to promote industrialisation in Africa.

2.2.3 The Solow-Swan Model: Exogenous growth model

The Solow-Swan model was independently theorised and promoted by Solow (1956) and Swan (1956) into what became known as the Solow-Swan model. The model was developed as a result of the shortcomings of the Harrod-Domar model (Harrod, 1939; Domar, 1946). The Harrod-Domar model did not account for production factors, such as the population of labour or labour-force growth, and only explained output growth through investments and savings (Solow, 1956:65).

As a result of population growth being a demographic phenomenon (exogenous from an economic perspective), the model assumes that economic growth is exogenic (Solow, 1956:57). Solow (1957) argued that efficiency was only applicable to long-term economic prosperity as far as technology was concerned, and that savings behaviour became irrelevant for long-term economic growth. The economic policy direction (whether favourable or unfavourable) was not considered to be a driver for economic growth. However, Solow maintained that saving and efficiency play an important role for growth over the medium term. Solow (1956:75) demonstrated how the capital/output ratio can be studied as an endogenous variable that changes and eventually achieves long-run equilibrium, as opposed to the Harrod-Domer model that views the variable as exogenous and inelastic. Furthermore, the long-run equilibrium is consistent with a steady capital/output ratio, as well as with a steady output per capita growth rate, interest rates, and the distribution of national income between labour and capital (Solow, 1956).

Solow (1956) found that the capital/output ratio is exogenous and it is therefore plausible to perceive growth as being an endogenous variable, thus growth changes or corrects to the exogenous given the capital/output ratio. Solow (1956) reversed the roles of the rate of growth and the capital/output ratio, and treated the capital/output ratio as an endogenous variable that adjusts over time to the exogenous growth rate of output. Due to the main exogenous elements that cause growth, namely advancements in technology and population growth, growth is considered exogenous.

Solow (1956) and Swan (1956) concluded that the availability of local physical capital in combination with FDI can only influence economic growth over the short term. Swan

(1956) compared the influx of FDI into a recipient country to the addition of foreign savings being expropriated from one country to the other. Thus, paving the way for the developments in the endogenous growth theory (Akcigit, 2017).

2.2.4 Endogenous growth theory

The endogenous growth theory argues that technology advancements are endogenous, and therefore, lead to economic growth in host countries. Furthermore, technology depends on economic factors such as the amount of capital available per worker or the capital-labour ratio (Romer, 1986). The assumptions are that the neo-classical growth models failed to explain core ideas surrounding economic growth, such as why rich countries sometimes grow faster that poor countries.

Romer’s (1986) model on endogenous growth found that long-term growth is possible by increasing human capital (namely, education). Human capital is argued to be the skills and knowledge workers possess that make them more productive. The study argues that human capital has the ability to increase the rate of return. Romer (1989:40) found that the initial level of a country’s literacy may be important for understanding successive growth. In addition, the findings state that literacy has no “additional explanatory power in a cross-country regression of growth rates on investment and other variables, but consistent with the model, the initial level of literacy does help predict the subsequent rate of investment, and indirectly, the rate of growth” (Romer, 1989:40). Therefore, economic growth is free to respond to changes and interactions in, for example, population growth rates, market efficiency, savings and taxation over the medium, as well as long term (Peretto, 2018).

2.2.5 The unified growth theory

The unified growth theory was developed in light of the failures of the endogenous growth and other theories, as mentioned in the literature above. In essence, the unified growth theory proposes that over time technological progress was offset by population growth (Mokyr, 2018). As a result, the global living standards were viewed as being at a subsistence level. The pace of technological advancements, the theory argues, was as a result of the interaction between different populations, thereby enhancing the level of education and adaptability to changing environments. The increase in the distribution of resources towards education increased birth rates, enabling economies to allocate a larger share of technological progress to a stable increase in income per capita (Galor & Weil, 2000; Galor, 2011; Lueger, 2019).

2.3 REASONS FOR AND APPROACHES TO FOREIGN DIRECT INVESTMENT

The reasons and approaches used by MNEs to justify and execute FDI decisions are important, as it allows decision-makers to clarify the variances in FDI inflow or outflows from one country into another. A study by Dunning (1993) with regards to the privatisation of Eastern European businesses by MNEs identified four wide-ranging reasons for FDI. These reasons or motives for FDI are widely accepted as: efficiency-seeking, market-seeking, resource-seeking, and strategic asset-seeking motives. Dunning (1993) further explained that strategic asset-seeking MNEs were MNEs that take cognisance of FDI because it encourages and improves their global competitiveness, whereas efficiency-seekers embrace FDI to improve their operational and functional abilities, and to exploit the cost advantages when production can be increased while lowering costs. Other factors include the benefits of varying costs such as that of labour and taxes between and across countries as a result of trade agreements and labour laws (Ross, 2019; Ahmed, Jones & Temouri, 2020).

According to Dunning (1993), four dominant reasons drive market-seeking MNEs, namely:

- Firstly, to reduce the cost of their products or services in their local market by operating from or manufacturing in a non-resident market.
- Secondly, MNEs intend to guarantee their presence in the highly profitable and sought-after global markets in which their competitors function in order not to lose global market share.
- Thirdly, MNEs intend to efficiently and effectively transform its products or services to adhere to the needs and tastes of the locations from where they operate, and therefore, ensuring a foreign presence in the local market enables them to do so.
- Lastly, they intend to follow their supplier or customers who may have relocated and expanded into other territories.

Dunning (1993) further found that resource-seeking MNEs mainly invest in countries where the advantages and costs related to factors such as labour, physical resources and technological expertise, outweigh the related risks. Dunning (1993) noted that the strategic asset- and efficiency-seeking motives for FDI usually follow the resource and market-seeking motives, and explains the additional FDI into those recipient countries.

According to Markusen (1995), vertically integrated MNEs embark on FDI opportunities to expand and grow their resource base. These expansions might be in the form of constructing foreign production facilities to take advantage of lower operational costs and the efficiency of foreign processes (efficiency-seeking motives). Having a physical presence in foreign markets might also enable MNEs to access these markets quickly and seamlessly (market-seeking motives). Bitzenis, Tsitouras and Vlachos (2007) found that resource-, market- and efficiency-seeking motives were the dominant reasons for FDI into a country. However, in contrast with the findings of Bitzenis *et al.* (2007), a study done in Turkey by Tatoglu and Glaister (1998) determined that market development and access were the main determinants for FDI decisions.

MNEs contemplate FDI mostly to cut cost or grow their revenue base, or a combination of the two (Madura & Fox, 2014). In doing so, MNEs increase profitability, and ultimately, create and sustain shareholders' wealth. Madura and Fox (2014) revised and changed Dunning's (1973) eclectic paradigm hypothesis regarding the main reasons why MNEs invest in other non-resident countries. These adjustments embrace the safeguarding and advancement of the MNE's unique competitive advantages (protectionism), the advantages of having an existence in multiple jurisdictions, in comparison to either the exportation of products and services, or franchising from the resident country, and lastly, to exploit the host country's beneficial investment environment (Madura & Fox, 2014).

According to the findings of Gorynia, Nowak and Wolniak's (2005) Polish study, there are three main approaches to FDI. These approaches include: (1) the creation of a foreign subsidiary, (2) the establishing of a joint venture with a foreign enterprise, and (3) by means of an acquisition of a foreign enterprise (thus acquiring a controlling stake). All three approaches, Gorynia *et al.* (2005) noted, have their own accompanied advantages and disadvantages, with greenfield developments usually being the more expensive approach as it entails large and risky capital layouts for the establishment of production facilities. Gorg (2000) defined an FDI joint venture as a venture where an MNE and a domestic enterprise combine their resources to form a single entity hosted in the FDI recipient country, and in which ownership is shared.

Many MNEs looking to expand their global footprint find that choosing the FDI approach that is most suitable to their needs remains a mystery in the global environment. According to Jermakowicz and Bellas (1997), the FDI approaches that were considered by MNEs in central and eastern Europe included greenfield projects, if the MNE has a well-established brand and product in the host country. The founding of a new enterprise on foreign soil is the more affordable alternative, given that the production methods require rigorous labour. In contrast to the establishing of a new enterprise, MNEs tend to favour FDIs via the acquisition approach, given that the enterprise they are acquiring has an established market with well-functioning distribution channels and a well-recognised brand name (Virzi & Parrington, 2019). Joint venture establishments were favoured where the competitive advantage lies in the pooling of local and international competencies to achieve long-term sustainability (Minbaeva, Park, Vertinsky & Cho, 2018).

2.4 FOREIGN DIRECT INVESTMENT THEORIES

This section presents the theoretical framework for FDI. The FDI theories are divided into two dominant factors or schools of thought. These factors are referred to as the pull and push factors, as most FDI theories are derived from either the one or the other, or a combination of the two. The section below aims to provide a clear understanding on the gaps in the FDI theories and how the current study will contribute to new knowledge on the FDI, ODA and economic growth nexus.

2.4.1 Push factor-driven FDI theories

The production-cycle hypothesis was propelled by Vernon (1966) through the study of FDIs made by American manufacturing firms in Western European countries. Vernon (1966) describes the production cycle of manufacturing firms in five main categories, as follows:

- The first stage is the introduction or innovation stage, where production and product concepts are developed and entered into the market.

- The second stage, known as the growth stage, is where the demand for the new products increases.
- The third stage is the maturity stage. This stage is characterised by a mature local market, and therefore, presents export opportunities for MNE as their products and technologies are still new outside of their local markets (Vernon, 1966:191).
- The fourth and fifth stages are sometimes interlinked, and are commonly referred to as the saturation and decline stage, characterised by declining sales and reduced market share.

The theory noted that as soon as the local competitors in foreign markets become aware of the products and technologies being sold in their home country, the competition increases and producers will start to formalise and standardise their products (Vernon, 1966:195-198). As the production cycle moves toward the mature and decline stages, the MNE's competitive advantage decreases and becomes less apparent. It is during the last stage that MNEs favour a footprint in a local market to take advantage of the economies of scale built up during the entire production life cycle (Vernon, 1966:197).

Contrasting with Vernon (1966), Solomon (1979) and Denisia (2010) argued that the production cycle hypothesis does not always hold true. Solomon (1979) argued that manufacturers do not always follow a rigid sequence when developing products, nor do they wait for a product to reach a certain stage before deciding on FDI into a host country for production purposes. With support from Solomon (1979), Denisia (2010) noted that the production lifecycle theory should not be generalised, and that the theory fails to account for FDI in countries where the production and supply chains are close to each other. Through criticising Vernon's (1966) assumptions, it should be noted that it is both dangerous and unrealistic to assume that innovation and development can only originate from developed countries.

In conclusion, the production cycle theory failed to account for the following characteristics:

- It could not be generalised as the theory was narrowly focused and country specific;
- It disregards other FDI theories and focuses only on push factors;

- It did not account for factors, such as FDI in Information and Communications Technology (ICT), and the technology collaboration between and among recipient and investor, and the advancement thereof; and
- It also failed to account for the ODA nexus from an economic growth perspective.

The internalisation theory founded by Buckley and Casson (1976) contended that the cost-benefit advantage of performing firm-specific tasks in a foreign country should always be more than the associated risk from operating in those countries before FDIs are made. The theory further states that MNEs arrange their affairs in such a manner that they can compete at an advantage within the foreign countries; be it in the production of goods or the delivery of services. The theory was later expanded on by Hymer (1979) and commented on by Moosa (2010).

Parry (1985) criticised the internalisation theory as a form of FDI by stating that the theory should be clearer on the various market activities that should be internally absorbed as a result of the prevailing market imperfections in the foreign country. In support of Parry (1985), Rugman (1980) also noted that internalisation is a mere generalist approach to FDI activities, and that all the other FDI theories could be seen as addendums to the theory. Rugman (1980) noted that all the other FDI theories have one common thread running through them, namely, the existence and exploitation of market imperfections.

In summary, the internalisation theory did not account for the effect that FDI has on the host country, nor was it tested on African countries, specifically. The theory did not provide the minimum level of FDI needed to influence and benefit the host country. The theory did not account for in-country advantages when FDI decision are made, and merely noted the imperfect market conditions as the sole reason for FDI decision-making.

The oligopolistic reaction theory developed by Knickerbocker (1973) stated that FDI decisions can largely be attributed to the reactions and behaviours of oligopolistic enterprises in existing and new markets. Knickerbocker (1973), in his study of manufacturing MNEs in the United States of America (US), found that there is significant complicity in the behaviour of oligopolistic firms to keep competition out and to allow them to remain dominant players in local as well as foreign markets. Knickerbocker (1973), supported by Moosa (2010) and Gardberg, Genc and Xiaoli

(2017), found that oligopolistic firms follow their competition with their own FDI into the same foreign countries in order not to lose market share.

2.4.2 Pull factor-driven FDI theories

Dunning (1973) alluded to the fact that ownership, location and internalisation (OLI) advantages are some of the fundamental requirements that lead to FDI inflows into a host country. This framework was developed following a study by Dunning (1973), and later elaborated on in follow-up studies (Dunning, 1977, 1979, 1980, 1988). The framework is known as the eclectic paradigm or the OLI framework.

Wahid, Sawkut and Seetanah (2009) found that the advantages required by MNEs to compete successfully in a foreign market, includes a well-known brand name, locally registered patents, as well as local knowledge of available technologies. These elements, Wahid *et al.* (2009) stated, will allow for superiority over competitors. This finding is supported by Dunning's (1973) finding that an MNE that owns good technology, or who has a monopoly and can leverage large economies of scale to its advantage, can enjoy higher profits if it decides to globalise.

According to Denisia (2010), the political, economic and social benefits all add up to the location advantages that an MNE can enjoy, and which influence FDI decisions. Favourable government policies, the size of the market, technology infrastructure and transport cost, and travel distances between the host and the resident country all have an influence on FDI outcomes. Furthermore, Denisia (2010) noted that trade openness should be considered as a political location advantage and could be influenced by well thought through government policies. Denisia (2010), like Dunning (1973), argued that the state of the micro- and macro-environment, the level of infrastructure development and the political stability of the host all form part of the location advantage within the OLI paradigm.

Furthermore, Moosa (2010) found that as a result of the immobility and nature of certain elements of production and the availability of scarce resources in different locations, MNEs are forced to expand their operations outside their resident country. Moosa (2010) states that these factors lead to FDI inflow into host countries and allows an MNE to operate in areas where labour is relatively inexpensive and natural resources are abundant, or where skilled labour is available, in support of the OLI paradigm.

Dunning (1980) found that internalising an MNE’s core competencies and assets will allow the firm to take advantage of existing market imperfections, and it will protect the MNE’s reputation through the provision of aftersales service and maintenance in host countries. In addition, internalisation empowers MNEs to take advantage of its combined operational abilities to decrease the overall costs of the associated goods and services which already form part of its core business.

Criticising the eclectic paradigm hypothesis, Dunning (2001) referred to the paradigm as being too static in its approach. Dunning (2001) stated that the variables are too interdependent, and it is seen as a mere checklist of variables which act as pull factors. Dunning elaborates on the issue by stating that the paradigm does not propose to offer a complete account of why MNEs choose to shift or expand production over different territories. Accordingly, it should only be seen as a set of variables with the necessary components needed to allow for an explanation as to why MNEs decide on FDI in terms of production in certain territories, and not in others. Dunning (2001) conceded that although the eclectic paradigm is a valid method for explaining international production decisions, it is not suitable enough to explain FDI location decision-making.

It could be argued that the eclectic paradigm clarifies global production choices by MNEs, however, it does not sufficiently justify the reasoning behind the location decisions taken by these same MNEs (Dunning, 2001). Through the concessions made with regards to the eclectic paradigm, it could be suggested that the theory did not account for the effect FDI has on the recipient, nor did it indicate the significance of the different OLI variables on FDI. There is thus no existing industry-accepted OLI advantage minimum level that will allow for changes in FDI inflows (Tsaurai, 2017).

The output and market size hypothesis states that there is a positive relationship between the increase in FDIs in response to the higher production outputs and accompanied sales, with increased GDP levels in the receiving country’s economy (Jorgenson, 1963). The market size theory states that the larger the market size, the more FDI it attracts, while the output theory implies that the better the production output of a country, the more likely it is to attract FDI. These findings were reinforced by Moosa (2010) and again by Sajilan, Islam, Ali and Anwar (2019).

An earlier study by Goldberg (1972), in contrast to Jorgenson (1963) and later Moosa (2010), found that while FDI inflows from one country to another could not be determined by size, it could be determined by the market growth rate. However, Jorgenson (1963) and Moosa (2010) noted the limitations of focusing on only a few variables which attract FDI and excluding various OLI variables.

Aliber (1970) developed the currency areas theory that implies the devaluation of a country's currency attracts FDI inflows and makes it a more attractive trade partner, while the opposite is true for countries or areas with stronger currencies. Aliber (1970) mentioned the availability and the cost of debt in one country versus the other, as a possible reason for his argument. Aliber (1970) noted that countries with a weaker currency are at a disadvantage because countries with a stronger currency will exploit the higher interest rates charged in those countries, as opposed to the local enterprises that need to compete in the same market. The theory explains how MNEs from foreign countries known for their relative robust and stable currencies, have a cost advantage in the new investment destination because of a favourable capital structure when compared to the local firms. Barseghyan and Baghdasaryan (2019) supported the argument, and found similar results based on country and currency-specific assumptions in former Soviet countries.

In contrast to the work done by Aliber (1970) and Moosa (2010), Nayak and Choudhury (2014) found that the currency areas hypothesis rejects the reasons for FDI between countries with similar currency characteristics. Nayak and Choudhury (2014) argued that the currency areas hypothesis fails to clarify situations where the opposite is true. That is, where the weaker countries (in currency terms) invest in countries where currencies are substantially stronger. In addition, the theory refrained from divulging the effect that FDI has on the host country, as well as determining the minimum level of currency value necessary for FDI inflows.

The variance in the investment rate of return theory suggests that FDI is the consequence of intercontinental differences in the investment return rates between various global destinations (Popkin, 1965). The theory states that FDI inflows increase into destination that investors consider as providing higher rates of return on investments, as opposed to countries with low growth and lower yields. US firms investing in Europe is a classic example of the theory in practice and was confirmed by Mundell (1957). Against the backdrop of the theory, Fedderke and Romm (2006) examined the FDI decisions for MNEs in South Africa. The results confirmed the rate of return theory that a relative higher rate of return, coupled with the associated risks led to an increase in FDI. The study used data from 1956 to 2003, and was analysed by running a vector error correlation model with the different variables.

Hymer (1976), in contrast to Mundell (1957), Popkin (1965) and later Fedderke and Romm (2006), indicated that there are inconsistencies with the rate of return hypothesis. Firstly, Hymer (1976) argued that the rate of return hypothesis failed to account for the FDI inflow and outflow between US and Europe simultaneously, and secondly, he argued that MNE subsidiaries leverage the FDI through increasing their debt obligation via the local financial institutions in which they operate. Caves (1982) agreed with this notion, and stated that there are more reasons for FDI decisions than merely linking FDI with the rate of return theory. Moreover, the theory fails to explain the influence that FDI has on the overall rate of return, and what is needed to increase the one with the other.

The liquidity theory developed by Barlow and Wender (1955) explains the capital structure decisions by MNEs. The study found that the US tends to re-invest excess funds in host countries to bolster capital growth. In contrast to Barlow and Wender (1955), Severn (1972) found that MNE subsidiaries of US registered firms tend to transfer all their profits to the holding company and to retain none of their earning in the foreign subsidiary. This according to Severn (1972), is to provide investors with the impression that the enterprise is financially healthy. Severn (1972) concluded that the liquidity theory does account for foreign earnings positively affecting local investments, and that retained earnings available to the MNE were stable and based on the need of the entire company.

In contrast to the view held by Severn (1972), Moosa (2010) indicated that the liquidity theory shows that there is a positive relationship between internally generated cash flow and the re-investment of the retained earnings. Moosa (2010) argued that the internal cost of capital is lower than external debt, but failed to account for factors such as lost opportunity cost. In addition, Moosa (2010) concluded that the liquidity theory is the most suitable theory in explaining FDI in developing economies because the theory is characterised by exchange control restrictions and inefficient markets.

From the discussions above it seems as if the liquidity theory is the main host country variable needed to influence FDI.

The imperfect market hypothesis developed by Hymer (1976), indicates that FDI is the result of the existence of imperfect market conditions, such as the absence of sufficient rivalry between firms in the host country. The theory suggests that due to the imperfect markets in other global destinations, there is a distinct possibility that an MNE will have some sort of a competitive advantage over local firms (Hymer, 1976). The competitive advantage and monopolistic nature that MNEs have over local enterprises in terms of product differentiation and the marketing efficiencies is proof of FDI inflows in imperfect markets (Kindleberger, 1969).

The imperfect market hypothesis, as illustrated by Hymer (1976), shows that due to the market imperfections and tough trading conditions that MNEs experience, coupled with the associated foreign currency risks, they ought to have some kind of competitive advantage over the host country's enterprises. The view of having a competitive edge when entering a foreign market was also supported by Moosa (2010). However, the opposite view is held by Nayak and Choudhury (2014), who indicated that the imperfect market theory unsuccessfully offered an explanation of why, when and where FDI occurs and when it can be anticipated.

These types of shortcomings in the theory were adequately addressed by Buckley and Casson (1976), Vernon (1966) and Dunning (1977, 1979, 1988). In addition, Robock and Simmonds (1983) found that the ownership element of FDIs from MNEs did not automatically lead to FDI in other countries, as licensing and exporting as a means of entering a foreign market are also good examples of FDI, with lower associated risks.

By critiquing the imperfect market theory, it becomes clear that the hypothesis failed to explain the location advantage that exists when MNEs are attracted to a foreign market. Furthermore, the theory does not examine the impact of ownership on FDI, which will provide the MNE with a sustainable competitive advantage when making investment decisions. The theory failed to account for ODA as an FDI enabler.

2.5 DETERMINANTS OF FDI: EMPIRICAL LITERATURE

Against the backdrop of the various reasons for and approaches to FDI, it is important to examine the literature which tested the various push and pull factors that contribute to FDI decisions by MNEs. In this section, factors affecting FDI decision will be tested against empirical studies and real-world circumstances. The review of the relevant literature will aim to provide a balanced approached as to what certain countries have done or should do to attract FDI into their economies from MNEs who want to expand and grow beyond their current resident market.

Good financial market developments, access to and levels of infrastructure development, social and environmental capital, and strong institutional capabilities were found to be some of the factors that attract FDI from MNEs into developing countries (Kinda, 2010; Makoni, 2021). Kinda (2010) concluded that the OLI framework (Dunning, 1973) holds true for countries who improve any or a combination of the variables in the framework. Kinda (2010) examined the impact of these OLI variables on MNEs in 77 developing countries.

In line with Kinda’s (2010) study, an earlier study by Buthe and Milner (2008) expanded on the OLI theory, and found that developing countries that aggressively partake in the World Trade Organisation’s (WTO) trade agreements between member states tend to attract more FDI. Buthe and Milner (2008) cited the additional costs associated with non-compliance to the host country’s agreements as a form of advantage when investing. Furthermore, the study found that participating WTO members attract more FDI than those who are not part of the WTO.

The rate of return on FDI investment has a positive relationship with FDI inflows in Sub-Saharan Africa (SSA) as well as other non-Sub Saharan African countries (Asiedu, 2002; Sabir, Rafique & Abbas, 2019). The rate of return approach to FDI was found to be a main factor for MNE decision-making, coupled with good infrastructure, especially in SSA countries. This view was supported by Kahai (2004), who indicated that good economic growth rates (GDP and GDP per capita), trade openness, high levels of national income and free market policies attract FDI inflows in developing economies. In addition, Kahai (2004) elevated the need for good monetary policies, affordable labour and strong institutions that have a significant positive relationship on developing countries’ ability to attract FDI by MNEs.

Oladipo (2010) found that market size, trade openness, human capital, and factors such as the general macro-economic environment, played a significant role in FDI attractions. By duplicating Johansen and Juselius’s (1990) co-integration, and Granger’s causality test that was used to predict the outcomes of OLI on FDI, Maduka (2014) concluded that financial sector development had a positive relationship with

FDI in Nigeria, but that the relationship was insignificant. In addition, economic growth indicated a significant positive impact on FDI inflows into the same country. Thus, these findings are in contrast with the location advantages of the OLI framework.

Variables, such as natural resource availability, the level of infrastructure developments, strong financial markets and the size a host country's government was shown to influence FDI inflows in the MENA (Middle East and North Africa) region (Mohamed & Sidiropoulos, 2010). Through the use of a multiple OLS regression model, as opposed to the panel regression model, Rogmans and Ebbers (2013) concluded that GDP per capita, trade openness and the price of oil had a significant positive influence on FDI inflows in the MENA region. It is further noted that the eclectic paradigm with regards to the location advantage does not hold where natural resources are concerned.

The market size theory was supported by Alam and Shah (2013), in a study examining the factors determining FDI inflow for OECD country members. Alam and Shah (2013) used a regression analysis to test the panel data collected over 24 years. The results indicated that infrastructure quality, labour costs and market size had a significant influence on FDI. The study also confirmed the assumptions made in Dunning's (1973) eclectic framework.

US manufacturing firms favoured politically stable countries for FDIs, according to Kwack (1972), and Loree and Guisinger (1995) concurred. Loree and Guisinger (1995) noted that GDP per capita, as well as the levels of infrastructure development all played a significant role in influencing FDI flows. Villaverde and Maza (2012) also supported the notion of infrastructure availability. Economic growth rates, market competitiveness, labour cost and infrastructure were found to be the main determinants from US FDI into Spain from 1995 until 2005. The results support the eclectic paradigm hypothesis.

According to Cristina and Cantemir (2012), in eastern and central Europe, the notion of improved labour market fundamentals, strong institutions and levels of infrastructure development has a significant positive relationship with FDIs. The findings support Piteli's (2010) study and the eclectic paradigm theory as determinants for FDI choices, with the addition of productivity outputs by host countries. The golden thread that follows both FDI in developed and emerging markets was found to be, levels of governance, institutional capacity and good infrastructure. The exception of taxation in developed countries was noted by Timothy, Jorge and Li (2011) and again by Baker (2018).

In terms of BRICS (Brazil, Russia, India, China and South Africa) countries, a study by Ranjan and Agrawal (2011) indicated that the FDI determinants, market size motive, and the market-seeking hypothesis hold. Thus, the bigger the market, the more FDI it attracts. In addition, the efficiency-seeking motive with regards to the openness of trade and cost of labour, were significant in attracting FDI. Similar findings were noted by Saini and Singhania (2018) in a developing and developed country context.

Jadhav (2012) found that economic growth (GDP per capita) was the most significant predictor of FDI inflows into BRICS countries. Furthermore, the study noted that the market size theory and market-seeking motive are supported therein (Jadhav, 2012). The results of the regression analysis done by Jadhav (2012) showed that the rule of law, openness of trade and accountability are significant factors in explaining the increase or decrease in FDI. Natural resources, as a proxy, had no significant relationship with FDI, except if seen as a location advantage of FDI for MNEs in BRICS countries, in contrast to the eclectic paradigm theory.

The location advantage, as an FDI decision, focuses on the local population of the non-resident country (Jakobsen, 2011) before an MNE makes a decision about moving forward with the proposed investment. In contrast, Broto, Diaz-Cassou and Erce (2011) concluded that market stability and macro-economic policies have a significant influence on FDI stability in developing economies. In support of Ranjan and Agrawal's (2011) findings, Amal, Thiago and Raboch (2010) found that GDP, economic stability, openness of trade and a favourable business environment were important determining factors of FDI decisions in eight Latin American countries. The study collaborates the findings and supports the eclectic paradigm theory.

In terms of European Union member states, FDIs into eastern and central Europe were dominantly found to be related to the efficiency-seeking motive (Resmini, 2000; Park & Roh, 2018). The affordability of labour seems to be a major determinant, as well as the level of economic development in those countries. The findings by Resmini (2000), supported the findings of Bevan and Estrin (2004), as well as that of Park and Roh

(2018), who concurred with what was found by the efficiency-seeking motives of FDI. Bevan and Estrin (2004), in line with the market-seeking motive and market size theory, maintained that GDP and per capita GDP were positively correlated to FDI for Central and Eastern European member states.

A study by Castiglione, Gorbunova, Infante and Smirnova (2012) found that in Russia the availability of good infrastructure was the main determinant for regional FDI in the country. In Latin America, Angelo, Eunni and Fouto (2010) found that for Brazil, in-country consumer sales had a significant positive relationship with FDI and was responsible for the highest influx on FDI in the country. In addition, Angelo *et al.* (2010) stated that consumer finance cost had a negative impact on FDI. These finding support the output size theory. However, in Mexico, Jordaan (2008) found that consumer demand, cost and quality of labour and ICT infrastructure had a significant influence on FDI.

The rate of return hypothesis is supported and explained by the FDI decisions made by MNEs operating in China (Ali & Guo, 2005). Ali and Guo (2005) noted that the location decisions made by MNEs investing in China, originated in other Asians countries. The return on FDIs by MNEs attracted funds from Taiwan, Korea, Hong Kong, and even from Japanese MNEs operating in the region. The analysis indicated that the rate of return theory holds. The Korean Peninsula attracted FDI based on the availability, skills and cost of labour, in line with the OLI framework. However, Na and Lightfoot (2006) observed that the influence of the Chinese government on MNEs had a negative effect on FDI inflows. Salazar, Wang, Rauniar and Wang (2017), supported by the earlier studies of Na and Lightfoot (2006), found similar results for MNEs' commitments towards operating in China.

A Turkish study done by Dumludag (2009) to test the institutional strength of the Turkish government on FDI, found that GDP and per capita GDP influenced the FDI inflow by MNEs into Turkey. Dumludag's (2009) study supports the outcomes of the output and market size theories. Furthermore, the study amplified the need for low corruption levels, government stability and the rule of law in order to increase FDI. Efficiency-seeking MNEs focused on the prevailing lower labour cost in Turkey and the in-country cost of living and in-country risk to investments (Bilgili, Tuluce & Dogan, 2012).

According to Vijayakumar, Sridharan and Rao (2010), infrastructure, labour cost, currency valuation, market size and capital formation played a significant part in FDI inflows into BRICS countries. In addition, the results indicated that economic stability, trade openness and in-country growth perspectives had an insignificant effect on FDI inflows into the said countries. The study analysed the BRICS countries over a period of 32 years (1975-2007), using a panel data analysis. Furthermore, Vijayakumar *et al.* (2010) argued that the value and stability of a country's currency needs to be protected due to the fact that inflation and industrial production were found to be crucial factors in attracting FDI.

Notwithstanding the institutional reforms by many African governments over the last few years, FDI inflows remained slow, and to a sense, disappointing. Onyeiwu and Shrestha (2004) analysed the conventional determinants of FDI into Africa and found that economic growth, inflation, trade openness, international reserves and natural resource availability are the main variables attracting FDI into Africa. In support of Vijayakumar *et al.* (2010), the study concluded that political rights and infrastructure were insignificant indicators for FDI inflows. Vijayakumar *et al.* (2010) analysed 29 African states over a period from 1975 to 1999, applying both fixed and random effects models to the collated panel data, in order to explore the effects of the variables on FDI inflows into the African states.

Kang and Jiang (2012) concluded that Chinese MNEs making FDI decisions related to East and Southeast Asia, regarded institutional factors, such as economic freedom and FDI restrictions, as major determinants for FDI location choices. Furthermore, the study found that the FDI location choices of Chinese MNEs are dynamic, and that these choices change according to the needs and wants of these multinationals over different times and over different economic circumstances.

2.6 THE IMPACT OF FDI ON ECONOMIC GROWTH: EMPIRICAL LITERATURE

The relationship between FDI and economic growth has inspired a large amount empirical literature focusing on both developed and developing countries. The neoclassical models of economic growth, as well as the endogenous growth models as discussed in the previous section, provide the basis for most of the empirical work done on the FDI and economic growth relationship. The relationship has been studied by explaining the following four main areas of focus:

- the determinants of economic growth;
- the determinants of FDI;
- the role of MNEs in host countries; and
- the direction of causality between the FDI and certain economic indicators around growth enablers.

According to De Mello (1997, 1999), the eventual impact of FDI on the economic growth of recipient countries depends on the level and efficiency of technology and knowledge transfers in the domestic enterprise (De Mello, 1997:31). De Mello (1997) further stated that FDI leads to an increase in the returns of domestic production and increases in the value-added content of FDI-associated production. FDI is therefore an important source of capital, and if matched by domestic private investment, is usually associated enhanced technology transfer and employment, and increases in the overall economic growth in host countries (Mody & Murshid, 2002; Lammarino, 2018). In contrast, Carkovic and Levine (2003) found limited evidence of the transfer or spillover effect of FDI in terms of host country benefits, especially in developing countries (Hanson, 2001; Gorg & Greenaway, 2004; Demena & Bergeijk, 2018).

The United Nations Conference on Trade and Development (UNCTAD) (2017) estimated that that recent FDI inflows between countries have led to a significant increase in economic growth and development. Findings such as these are consistent with research done by Adams (2009a, 2009b). Many developing countries see FDI as a key determinant for in-country economic growth, and develop policies according to such requirements. Adams ((2009a, 2009b) found that FDI causes economic growth in SSA countries by enlarging domestic capital and efficiency by means of new technologies and skills between countries. In addition, Adams ((2009a, 2009b) noted that FDI is necessary but not adequate as a single factor variable for economic growth. These findings corroborate the findings of the proponents of endogenous growth, the modern as well as the neoclassical theories. As Calvo and Sanchez-Robles (2002) stated, economic growth needs capital investment, a fundamental principle in economics. Calvo and Sanchez-Robles (2002), moreover, explained that FDI via technology transfers are necessary, especially in developing countries because the socio-economic conditions in those countries do not promote innovation.

For their part, Romer (1986) and Lucas (1988) argued that long-term economic growth in a host country is the result of FDI via the transfer of technology, skills and the training of the local labour force in the host countries. Cumulatively, these proponents of endogenous growth contended that technological progress will lead to economic growth. Furthermore, Kumar and Pradhan (2002:42) identified six collective resources that seemed to followed FDI inflows. These are resources, such as institutional capacity, physical capital, market intelligence and access to specific markets that all seem to follow FDI and are essential factors that improve economic growth in developed and developing countries.

According to Ekanayake and Ledgerwood (2010), FDI has a significant positive effect on economic growth in developing countries. Ekanayake and Ledgerwood (2010) concluded that the additional capital FDI inflows that are needed to diversify the economy could be the major factor assisting with the increase economic growth activities, thus supporting the neoclassical growth theory. Ekanayake and Ledgerwood's (2010) study used annual data from 85 developing countries from 1980-2007. The findings of their study accounted for regional differences such as income differences between countries in Africa, Latin America, Asia and the Caribbean.

A study by Chakraborty and Nunnenkamp (2008) found that a positive relationship exists between FDI and output growth in India. Furthermore, the study showed that the impact between the variables hold over the short, as well as over the long term. Their study found no fundamental relationship between FDI and economic growth within the primary sectors of the Indian economy. However, the study noted that the impact of FDI on output growth was restricted to the manufacturing industry that was tested. Chakraborty and Nunnenkamp (2008) used a vector error regression model to test the relationship between the variables. Chakraborty and Nunnenkamp (2008) concluded that for the sample of Indian firms, the data showed that output growth-led efforts to attract FDI, as opposed to FDI-led efforts, have a bigger impact on economic growth in India.

In Pakistan (a developing country), foreign financial remittance and FDI play a positive developmental role in economic acceleration and growth (Tahir, Khan & Shah, 2015).

Furthermore, the increases in the foreign exchange reserves being invested in the domestic economy of developing countries via financial remittances have led to an increase in FDI allocation in the form of advancements to the much-needed manufacturing sector in these developing countries. Using econometric panel data spanning a period of 14 years, Meyer and Shera (2017) indicated that financial remittance plays a substantial role in bolstering and balancing the budgets of some countries. Also, foreign exchange reserves increase the earning potential, and therefore, economic growth of developing countries over the long term.

The positive economic policy reforms that have been initiated in Zambia since the early 1990s have introduced a lasting prosperity that Zambians enjoy until today. Firms and land that the state had previously expropriated were returned to competent management teams, who almost immediately increased agricultural, manufacturing and mining output (Bull, Jerve & Sigvaldsen, 2006). Structural economic reforms were executed, for example, moving away from a command-driven economy to a freer market-orientated system where supply and demand forces soon reached some form of equilibrium. Soon after adapting the economic system, the government introduced prudent fiscal measures, and reduced the red tape for businesses to trade and operate freely, resulting in a decrease in government wages and a monetary system that more or less stabilised the local currency (Mungule, 2004).

A study by Lyroudi and Apergis (2008) on the impact of FDI on economic growth in emerging economies indicated that FDI had a significant positive impact on economic growth. Using different datasets, it was noted that the successful implementation of economic reforms (such as the privatisation of industry) and income size in emerging markets were important elements which affect the ability of FDI to influence economic growth. The relationship between FDI and economic growth was found to be significant in high-income economies in contrast to low-income countries where the impact of FDI on economic growth was limited due to poorly implemented reforms (Lyroudi & Apergis, 2008).

The scholars, Tanggapantnam, Geetha, Mohidin and Vincent (2011) found that FDI had an insignificant direct positive effect on economic growth in Malaysia. Tanggapantnam *et al.* (2011) noted that human capital development and environmental condition had a negative relationship with economic growth for the same Malaysian dataset. In contrast, the findings suggest that the minimum levels of human capital development, financial development and environmental conditions were found to be important prerequisites for FDI to have a positive influence on economic growth in terms of the location advantage theory.

A study by Vita and Kyaw (2009) found that in-country economic development and a high level of absorption capacity are prerequisites for economic growth from FDI inflows. Their study used data from 126 developing countries across various income levels.

In support of the endogenous growth theory, Azam and Ahmed (2014) detected that FDI played an enabling role in inducing economic growth in host countries of the CIS (Commonwealth of Independent States), and that sustainable economic policies and an investment supportive atmosphere guaranteed that FDI was able to facilitate economic growth in those countries. In support of Azam and Ahmed (2014), it was found that a favourable business environment was needed in CIS countries to attract and to benefit from FDI inflows (Pegkas, 2015).

According to Adams (2009a, 2009b), the ability of SSA countries to benefit from FDI inflows depends on the following three factors: (1) a favourable and business-friendly economic policy environment, (2) good infrastructure across various sectors, and (3) the opportunities to build links between FDI and domestic investments. Adam's (2009) findings are supported by Alguacil, Cuadros and Orts (2011:495) who found that the accessibility of a well-formulated investment outline and a constructive macro-economic and institutional environment in the host country were all necessary to improve the economic growth originating from FDI inflows.

Developing countries need to meet the following conditions to benefit from the FDI originating from technology sector MNEs (Fu, Pietrobelli & Soete, 2011):

- improved governance,
- strong institutions, and
- well-functioning host country innovation programmes.

Zhang, Li, Li and Zhou (2010) determined that the transitional differences in technology between local firms and MNEs in China and the FDI country mix were some of the circumstances that led to a positive relationship between FDI and economic growth in local Chinese enterprises.

Furthermore, the ability of emerging markets to take advantage of the impact of FDI varied according to the various industries that the MNEs originated from or that the FDIs consisted of (Gorodnichenko, Svejnar & Terrell, 2007). Gorodnichenko *et al.* (2007) noted that FDI spillover from trade between local and MNEs were significant for enterprises in the services industry, especially for the resident countries. The opposite seems to be true for the manufacturing industries in 17 emerging market countries. Such findings seem to echo those of Buckley, Wang and Clegg (2007) who found that the impact of FDIs was positive and significant in industries where technology is concentrated (services industry), if compared to labour intensive industries (manufacturing) in emerging markets, and in China specifically.

A study by Peter, Svejnar and Terrell (2012) found that acquisition, as a form of FDI by an MNE, increased the resident country's (in the case of their study, Russia and the Czech Republic) production and efficiency levels. This is due to its ability to leverage the expertise of the MNE in its domestic operations. In addition, in-country macro-economic governance systems should ensure that MNEs do not exclude domestic firms from their own financial sector, and should rather include the spillover effects to ensure that FDI leads to economic growth (Bailliu, 2000; Adeoye, 2007).

2.7 THE HISTORY OF OFFICIAL DEVELOPMENT ASSISTANCE AND AID FLOWS

The concept of foreign development aid, or official development assistance (ODA), as we know it today, has its origins in the era directly after World War II. Following the economic and infrastructure disaster the war left behind, war-torn Western Europe faced a serious shortage of capital and a desperate need for the physical reconstruction of damaged infrastructure, as well as the recovery of their economies. As a result, the US initiated the European Recovery Program, commonly referred to as the Marshall Plan, which is widely believed to be one of the most successful foreign aid programmes ever initiated (De Long & Eichengreen, 1991).

The Marshall Plan was a bilateral financial aid programme that led to the inflow of $13 billion (donated by the US) over a four-year period (1948-1951) into various Western European countries that had joined the Organisation for European Economic Cooperation (OEEC) to administer the Marshall Plan from a European perspective (Gordon, 1956). The OEEC later became the OECD (Organisation for Economic

Cooperation and Development). Building on the platform set by the Marshall Plan, the OECD has duplicated the idea of foreign aid for development with mixed results, and according to stringent conditions.

To the benefit of most developing countries, non-OECD donors, such as China, have provided unconditional aid to a variety of developing countries, especially in Africa (Tan-Mullins, Mohan and Power, 2010). Tan-Mullins *et al.* (2010) argue that many of China's aid is tied to preferential energy deals, and is sometime even considered as being 'rogue aid' (Tan-Mullins *et al.,* 2010). Such a statement usually results from foreign policy differences between the traditional DAC member states and China. Both Chinese and Western donors, however, have a history of employing aid as foreign policy tool to conceal their differences in ideology and in self-interest on the African continent.

2.8 RELATIONSHIP BETWEEN ODA AND ECONOMIC GROWTH

This section discusses the theoretical literature on the relationship between ODA and economic growth.

Following WWII and the aid flows to Western Europe, most of the economic growth–ODA nexus was based on financing gap models (Rosenstein-Rodan, 1943, 1961). These models emphasised that a country's economic growth was subject to its ability to overcome the difficulties surrounding the accumulation of physical capital. Capital investments were viewed as key ingredient to stimulate economic growth (Rosenstein-Rodan, 1961:57). Rosenstein-Rodan (1961) notes that due to capital investment being a necessity for economic growth, and the limited ability of developing countries to generate savings, foreign financing inflows are needed to fill the savings gap. ODA became the form by which the deficit could be adjusted. In theory, filling the shortfall would lead to an increase in investment, and therefore, output growth. This outlook on economic growth and the need to fill the saving gap via aid allocations was in essence similar to the Harrod-Domar model.

As a result of the shortcomings, such as the long-term growth effectiveness in the Harrod-Domar model and other gap financing models (Chenery & Strout, 1966; Bacha, 1990; Taylor, 1993), the neo classical theories and their corresponding aid effectiveness became more prominent. Pack and Pack (1990) argued that as a result of recipient countries using aid for unintended purposes, or rather the fungibility of aid, the consequence is that the financing gap models are ineffective in testing the relationship between economic growth and foreign aid. Easterly (1999) noted that these models also view aid as being an indefinite financing inflow, something it should not be (Blackburn & Forgues-Puccio, 2011). The outcome of these theories is therefore that aid and savings would lead to an increase in investment, and therefore, economic growth.

2.8.1 Poverty trap models (The Big Push)

The arguments for the poverty trap, or rather big push models, have its origins in four significant variables that, while they may differ from country to country, are especially evident in African states (Sachs *et al.*, 2004). These variables, or rather traps or states that developing counties find themselves in, are: (1) the natural resource trap, (2) the bad governance trap, (3) the land-locked trap, and (4) the internal conflict trap (Collier, 2008:11). The poverty trap models further argue that as a result of their structural history, many developing countries might find themselves in low level of economic growth from which they cannot escape without foreign aid assistance.

2.8.2 The Solow Swan Model and ODA

The supporters of the Solow-Swan growth model argue that ODA should offer an initial start to a momentarily advancement in investment, that will make an immediate difference to the recipient country. This would, in theory, allow the recipient country to operate from a minimum level of capital where the fundamental efficiency of capital is high enough to inspire additional investment. Or it could lead to scenarios where domestic earnings will be sufficient to permit and justify additional savings that will help to bring economic growth to a level where mortality rates are reduced (and the opportunity cost of having children elevated), and to encourage a decrease in the size of families (Blackburn & Forgues-Puccio, 2011:4). Therefore the need and disbursement of aid will lead to a big enough developmental impact (that is, to leapfrog from a low level of development) that should stimulate household savings, capital accumulation, and ultimately, sustainable economic growth for the recipient country.

From the literature above, it becomes clear that earlier schools of thought viewed economic growth as the result of a combination of exogenous factors. These empirical studies were, however, duplicated in modern times and it was found that very little evidence suggests that the Solow model still holds value for the modern-day economic growth nexus.

2.8.3 Endogenous economic growth and ODA

Given the shortcoming in the exogenous growth models, scholars have argued that factors affecting growth in developing countries could be endogenous. For example, technology and its ability to stimulate growth, was but one such factor that the new models had to account for (Romer, 1990; Crossman & Helpman, 1994).

The re-introduction and improvement of the endogenous growth models (Arrow, 1962) lead to questions as to why different counties (especially developing countries) display apparent desperate growth paths over long periods, despite aid intervention. Grossman and Helpman (1994) found that variables, such as economic, social and government policies, play a direct role in the economic growth outcome.

Romer’s (1986) model became the most widely used endogenous growth model. The model could be summarised in that economic growth is the result of internal forces, as opposed to exogenous factors. Investment in human capital, technological innovation and education are significant contributors to the economic growth argument. The model gave rise to the knowledge-based economy and the need for government policy adjustments in terms of research and development.

2.9 FUNDAMENTAL DETERMINANTS FOR ECONOMIC GROWTH AND FOREIGN AID

In both schools of thought (exogenous and endogenous), the differences between the models all show a similar trend. Per capita income differences are explained by increases in capital or savings, and the growth in output results from increased investment in technology. As a result, ODA has since been treated as an endogenous factor affecting economic growth in developing countries (Romer, 1994).

This section presents and discusses empirical evidence on ODA and its effectiveness against the fundamental factors effecting economic growth in developing countries. Factors such as the relationship of ODA towards development country policies, level of corruption and the political landscape will be examined against a sustainable economic growth path.

2.9.1 Foreign aid and economic growth nexus

Over the last couple of years, various empirical studies have attempted to either support or reject the aid effectiveness notion. However, a study done by Hansen and Tarp (2000) formed the backbone of many follow-up studies. Hansen and Tarp (2000) conducted a meta-analysis involving more than 90 empirical studies on the economic growth–ODA nexus. More than a 130 growth regressions from various different studies were analysed and summarised into three different categories. These groups can be classified as the first, second and third generation of aid studies.

The initial literature of the first and second category was based on the idea that the accumulation of physical factors (capital) would automatically lead to economic growth. In contrast, the third generation of aid studies focused on the interaction between ODA and in-country policies, which should create an environment suitable for economic growth. The different generation of categories summarised the different empirical studies and the different outlooks used by Moreira (2005) and Doucouliagos and Paldam (2008, 2009, 2013).

2.9.2 First and second generation of foreign aid

The first generation of aid studies focused on aid as a mechanism to stimulate domestic savings, which is seen as a variable constraining economic growth in developing countries. As a result thereof, the Harrod-Domer theory on economic growth will hold true, giving rise to the idea that one unit of ODA would lead to a unit in savings and investment in economic growth (Hansen & Tarp, 2000). The relationship between the variables was believed to be linear. However, minimum evidence was found that ODA would lead to an increase in economic growth.

Papanek (1973) argued that an increase in savings or investment as a result of ODA should rather be viewed as a direct link. That is, the impact of ODA should not merely focus on the effect it has on savings, but rather the direct growth impact it has on the economic growth variables. Papanek (1973:129) alluded to the idea that ODA should be seen as a discrete foreign financing mechanism towards growth. These second-generation studies argued that there is a linear relationship between ODA and economic growth.

In support of the capital accumulation school of thought, Sachs *et al.* (2004) argued that the original idea behind the distribution of ODA should be modified. Furthermore, Sachs *et al.* (2004) stated that the fundamentals of capital accumulation and savings in developing countries led to them falling into the poverty trap. That refers to a scenario where there is an increase in population growth without the needed savings (or investment), coupled with capital depreciation that leads to decline in per capita GDP. Sachs *et al.* (2004) found that the ODA that funds public infrastructure and assists the private sector with micro-finance initiatives led to economic growth and improved household finances. Similarly, Arndt, Jones and Tarp (2010) determined that aid remains a significant instrument for enhancing development in poor countries.

In contrast to the supporters and proponents of the capital accumulation models, many authors have also argued against the use of aid as an economic growth enabler. Seminal authors, such as Friedman (1958) and Bauer (1971), argued that providing aid to developing countries is a waste of money, and in many cases it does more harm than good. Using time series data for the period 1965-1995, Easterly (2001) tested the financing gap models against empirical data. Using the multiple OLS regression estimation on 88 ODA recipient countries, the study found a positive correlation in only six countries between savings/investment and ODA. In addition, the study found only a single country in which there was a direct link between ODA and economic growth.

As a result of the differences in the findings between the proponents arguing either for or against the use of aid as a capital accumulations enabler, the following observations and the fundamental shortcomings in the model were noted. Easterly (2001, 2003) found that a negative relationship exists between aid and domestic savings, thus challenging the core idea on which the capital accumulation models are based. Furthermore, the assumption that ODA is only directed at growth encouraging investment is inherently flawed. Doucouliagos and Paldam (2009) found that aid is sometimes used to increase public consumption, as opposed to using it to stimulate savings to ultimately, increase growth. Lastly, the second-generation studies introduced the problem of aid becoming an endogenous factor of economic growth.

It is these shortcomings that led to the conditional growth models or third generation studies related to the ODA economic growth relationship.

2.9.3 Conditional growth models: 3rd generation of aid

Conditional growth models are based on the essential determinants of economic growth. These types of studies all have a similar theme, and that is to focus on the role that institutions have (expressly, in country legal, economic and socio-political) on the aid allocation decision of donor countries and the corresponding economic growth nexus.

Dollar and Lant (1998) set the stage for the idea that aid should be conditional, and as a result, should be awarded based on proper policy developments in the host countries. The study further notes that ODA assistance is effective in countries that value good governance, as opposed to those that do not. Burnside and Dollar (1997) noted that aid can only reduce poverty and inequality through economic growth, if there are good policies in place and where aid recipients actively engage in the appropriate behaviour.

In contrast, Boone (1996) found that ODA led to increased government consumption, as opposed to an increase in economic growth or benefits aimed at the less fortunate. Boone (1996) found no evidence that there was a variation in the ODA impact on economic growth (in all its forms) among the various governments. The study was conducted analysing data from 91 countries over 20 years.

A study by Burnside and Dollar (2000), which formed the basis for many modern-day aid allocation decisions, conducted an analysis using data from 1970-1993 from 56 aid-receiving countries. The results of the study indicated that there is a positive relationship between ODA, a good policy framework and economic growth in developing countries.

The research outcomes and discussions surrounding the millennium, and later, the sustainable development goals (SDGs) and the impact of official development aid on these goals in combination led to an increase in donor confidence connected to the seminal literature and the findings associated with the direct link between economic growth and aid or development inflows. ODA, according to the research outcomes of the associated authors, functions as a catalyst that induces growth and development.

Earlier studies, and the subsequent progress and outcomes of the different studies, seemed to be explicit in virtually all pragmatic and empirical studies directed at solving the aid–growth nexus. However, this should emphasise the right to suggest or criticise the use of, or the request for, a suspension in ODA commitments, given that certain conditions are being met (in the case of conditional aid). From the literature, it seems as if the donor-recipient country relationship and the accompanying policy differences are among the main reasons for the misalignment between the envisioned outcomes and the practical outcomes. The reasons contemplated in the literature should, however, not be seen as the basis for why ODA has failed, but rather as causes and explanations as to why ODA has fallen short in delivering its aid objective as effectively as it should have. Thus, the argument for ODA policy improvements could be made to allow for development to accelerate.

Addison, Mavrotas and McGillivray (2005), and Shorrocks and Van der Hoeven (2004) argue that development aid that focuses on poverty alleviation among the financial disadvantaged sectors of society can lead to an increase in productivity and the country's human development indicators (HDIs). Addison *et al.* (2005) noted a possible link between development aid and GDP growth when ODA was utilised to invest in physical infrastructure and employment-related spending such as small businesses and agriculture.

The motives surrounding the macro-economic impact of ODA on GDP growth, and why there is a sudden rise in interest remains unclear, considering the disagreement between those for, and those against ODA as a development financing mechanism. It could be that factors, such as modern analysis methods, the revisitation of empirical studies, and the availability of accurate and accessible data, have led to a renewed interest in the ODA–economic growth nexus, given the economic uncertainties facing different countries (McGillivray, 2003; Asongu & Odhiambo, 2020; Amoa, 2020).

Furthermore, having access to modern technology and the ability to observe the impact of certain variables on others might imply that ODA has always been an effective tool to use to stimulate economic growth, but that previous empirical studies were not able to observe this phenomenon with the technology available at the time of the study.

Table 2.1 (on the next page) presents a summary of earlier empirical studies on the effectiveness of ODA and its impact on the recipient country's development.

Table 2.1: ODA effectiveness and its developmental impact

EARLIER EMPIRICAL STUDIES ON ODA'S EFFECTIVENESS AND ITS IMPACT ON THE RECIPIENT COUNTRY'S DEVELOPMENT.	
ODA works, given the right policy interventions.	Burnside & Dollar, 1997, 2000, 2004; Collier & Dollar, 2001, 2002; Collier & Dehn, 2001; Collier & Hoeffler, 2002; Benn, Sangaré & Hosrom, 2017
ODA works irrespective of any interventions.	Amavilah, 1998; Durbarry *et al.*, 1998; Hansen & Tarp, 2000, 2001; Lensink & Morrissey, 2000; Lensink & White, 2001; Dalgaard & Hansen, 2001; Guillaumont & Chauvet, 2001; Hudson & Mosley, 2001; Lloyd *et al.*, 2001; Lu & Ram, 2001; Dalgaard *et al.*, 2004; Gounder, 2001, 2002; Mavrotas, 2002; Gomanee *et al.*, 2002, 2003; Ram, 2003, 2004; Economides, Kalyvitis, & Philippopoulos, 2004; Feeny, 2005; Ouattara & Strobl, 2004; Almasifard, 2019.

Source: Author's own compilation

The empirical literature cited in Table 2.1 does not necessarily attribute the low economic growth rates in SSA to the effectiveness of aid allocation, thus arguing that aid is indeed effective, regardless of the outcomes of the macro-economic growth rates of these countries. The studies listed in Table 2.1 rather noted the diversity between the studied countries or regions related to their fundamental differences, post-war circumstances, economic outlooks following global downturns, and other HDI indicators. Besides, the majority of the listed studies indicated that given the overall economic growth, be it country or region-specific, a positive relationship exists between ODA and GDP growth.

A decline in poverty rates within countries and an increase in other HDIs could be achieved through alternative measures, instead of purely stimulating macroeconomic growth interventions (Adhikari, 2013). For example, Gomanee, Morrissey, Mosley and Verschoor (2002) found, almost a decade before Adhikari's study, that ODA is an effective development enabler that can advance the plight of the disadvantaged sectors of society through targeted spending on infrastructure and social services. Similar empirical studies indicate that ODA, as a targeted conditional infrastructure enabler, assists countries in reaching certain SDGs, such as improved education, healthcare and a reduction in inequality (Haga & Hoybraten, 2019; Brolan, McEwan & Hill, 2019).

Despite the evidence presented by Burnside and Dollar (2000, 2004), Easterly (2008) and Moyo (2009) maintain that as a result of the lack of accountability in the aid delivery mechanism by project implementers, combined with widespread corruption in the recipient countries, ODA has done more bad than good. Easterly (2008) and Moyo (2009) argue that the results of aid should rather be seen as a vicious sequence that nurtures corruption and disregards the rule of law. The cumulative effect of ODA is therefore that it generates an environment where FDI is unsustainable, inducing increased poverty and no job creation or economic growth for the recipient country.

2.10 CHAPTER CONCLUSION

From the literature review presented in this chapter, it is clear that there are contrasting findings regarding the ODA–FDI–economic growth nexus. The prevailing literature is contradictory, with many empirical studies contradicting one another. The literature lacks substance specifically due to the fact that the relationships between the variables in this study have not been tested together, or over different economic conditions. Furthermore, no previous studies tested the economic growth nexus between ODA and FDI over different economic conditions. The following chapter provides an econometric estimation technique that will do just that. In knowing what the relationships between these variables are, the thesis will answer the research questions and meet the different objectives, whilst solving the research problem.

CHAPTER 3:
CONCEPTUAL FRAMEWORK OF THE FDI–ODA–ECONOMIC GROWTH NEXUS IN AFRICA

3.1 INTRODUCTION

The preceding chapter provided the necessary background information and set the scene for the current study. Focusing on literature specific to this study, with the intention to amplify the empirical work done on developing countries, and specifically Africa, this chapter does just that. Building on the literature reviewed in Chapter 2, this chapter reports on the dynamic nature of FDI, ODA and economic growth within developing countries, and Africa specifically.

3.2 FDI AND ODA INTERACTIONS IN SUB-SAHARAN AFRICA

According to Kimura and Todo (2010), there is a direct link between FDI inflows from MNEs, following ODA decisions from donor countries. The increase in FDI inflows can be seen as a positive sign for future business development opportunities, for example, risk is reduced, and there are enhanced confidence levels in the business environment in which the MNE is investing. Furthermore, Carro and Larru (2010) indicated that increased ODA allocations may indicate a period of low FDI inflows, essentially safeguarding developing countries against possible volatile FDI inflows. Harms and Lutz (2006) argued that the ODA–FDI nexus is positively correlated with the infrastructure effect of FDI, but negatively correlated with that of the rent-seeking effect of FDI. Seen in isolation, the correlations explain the production increases in employed capital, the FDI inflows from MNEs, and the decline in FDI as a result of the rent-seeking effect which triggers the competition among MNEs for aid rents (Anyanwu, 2012).

Good governance levels and a high level of financial sector development are indicated to be among the main factors affecting the positive relationship between ODA and FDI inflows (Karakaplan, Neyapati & Sayek, 2005). Furthermore, ODA that has a human developmental objective leads to advancements in attracting FDI inflows and also leads to an overall increase in production outputs. The study could find no evidence that ODA drives out or eliminates private sector spending, and as suggested by

Bhavan, Xu and Zhong (2011), the improvements associated with effective aid implementation result in an increase in HDIs in the recipient countries.

In contrast, Selaya and Sunesen (2012) determined that the financing of complementary inputs, in combination with a mixture of ODA and FDI, results in a marginal increase in the efficiency of the employed capital, but in cases where physical capital is merely transferred from one donor country to a recipient (for example, cash transfers), there is a distinct reduction in private FDIs into developing countries.

3.3 POLICY OBJECTIVES: ODA AND FDI DEPENDENCY FOR GROWTH IN AFRICA

According to Hudson (2015), a limited number of studies have examined the origins of the aid volatility dilemma that many African countries find themselves in. Furthermore, not knowing what these causes are and how to limit them, has led to severe developmental failures in the past (Brooks, 2018). Hudson and Mosley (2008) found that there is high uncertainty about aid allocations in countries where the ODA reliance centres on aid commitments from one or more large OEDC-DAC members. Hudson and Mosley (2008) affirmed that ODA disbursements were partially based on the short-term needs of recipient countries (leading to volatile ODA disbursements), and partially due to the uncoordinated efforts between development agencies.

Complementing previous literature, Eifert and Gelb (2008) contended that with the help of donors, aid recipients could manage the risk posed by unpredictable ODA. They proposed that aid obligations should be met and supported based on a set of requirements that will be managed and monitored for fund disbursements, or aid retraction, following the recipient country’s continuous progress and its overall performance. The remedy for the ODA uncertainty dilemma that Eifert and Gelb (2008) proposed was supported by Agenor and Aizenman (2010) who found solutions in terms of making provisions for aid allocations (via tax allocations), as well as providing practical implementation guidelines on how aid could be financed and insured against.

Using a two-sector general equilibrium model as an estimation technique, Arellano, Bulir, Lane and Lipschitz (2009) studied ODA uncertainties, and the developmental impact these uncertainties have on the levels of recipient country development indicators, such as in-country production models and consumption, FDI and inward investment. Arellano *et al.* (2009) concluded that a decrease in investments and an increase in consumer consumption are supported by the constant increases in ODA inflows. The outcomes of the study imply that the recipient governments do not necessarily possess the technical or financial ability to adjust their revenue streams to counter the impact of aid uncertainty. This inability it was noticed, led to a reduction in government expenditure on essential infrastructure, social welfare and inward investment. Furthermore, the poor absorptive capacity of ODA recipients and limited fiscal and monetary policy changes, led to poor planning, whilst aid disbursements declined (Rodic, 1990; Mosley & Suleiman, 2007).

Recipient countries should manage the uncertainty surrounding large donor commitments through effective policy changes. Even though aid could be seen as an effective way of financing development, good and implementable structural reforms remain vital for long-term economic growth impact and the success of a stable country (Chauvet & Guillaumont, 2009; Hudson & Mosley, 2008; Hudson, 2015).

From the outset, aid advocacy has always promoted the need for policy changes in recipient countries in order to achieve the planned developmental impact of the aid allocations. However, limited empirical studies have investigated the effectiveness or the need for policy changes by OEDC-DAC member, as well as other aid agencies. Aid policy alignment is a necessary tool to ensure that the combined efforts by donors lead to effective development aid in the quest to enhance GDP growth in developing countries (Minasyan, Nunnenkamp & Richert, 2017).

ODA effectiveness is directly influenced by the internal politics and foreign policies of donor countries. Bermeo (2011) concluded that democratically infused aid, will most likely flow from democratic countries that will promote their own view of democracy and ensure that it is implemented in the same way as in their respective home countries, in contrast to those from opposite electoral systems.

Asymmetrical ODA policy objectives between foreign aid providers and recipient governments lead to a decrease in GDP growth, and a breakdown in the bilateral trust relationship between countries (Dreher, Minasyan & Nunnenkamp, 2015). The mismanagement could therefore render aid both ineffective and expensive for the taxpayers of the respective countries (Dolan, 2020). Regardless of the difference in policy objectives, Minoiu and Reddy (2010), and also Kilby and Dreher (2010) concluded that only ODA with a specific development goal in sight, will have the desired effect on GDP growth within developing countries, as opposed to aid tied to the needs and objectives of the donor itself.

Research has shown that the efforts of donors to strategise the aid allocation decisions based on geopolitical affiliations hinder the effectiveness of aid to stimulate GDP growth in countries or regions that are willing to align their foreign policies with those of the donors with the biggest purse, and who are essentially buying influence (Headey, 2008; Bearce & Tirone, 2010; Bermeo, 2016). Strengthening the argument around aid for favours is the conclusions drawn by Dreher, Klasen, Vreeland, and Werker (2013) and supported by Dreher, Eichenauer and Gehring (2014) when examining UN Security Council member's decisions and the World Bank project nexus that followed.

Nunn and Qian (2014) made similar conclusions and stated that official development aid provided by the US is based on their national economic and manufacturing constraints. Particularising results from findings based on donor favouritism, coupled with the strategic assets, such as the natural resources that aid recipients have, shows that there is a direct relationship between US bilateral financial and military aid disbursements towards domestic terrorism in recipient countries (Kuziemko & Werker, 2006; Werker, Ahmed and Cohen, 2009; Nunn & Qian, 2010).

Studies have identified donor policy stability and in-country policy alignment as the main contributors towards improving the effectiveness of development aid. Factors such as remittance between countries, and dedicated aid policy decisions all led to the increase in economic growth of the recipient country (Gary & Maurel, 2015; Minasyan & Nunnenkamp, 2016; Donou-Adonsou, Pradhan & Basnet, 2020).

Clemens, Radelet, Bhavnani and Bazzi (2012), and more recently, McArthur and Sachs (2019) argued that differentiating various forms of assistance or aid according to their intended usage remains challenging. Especially when aid effectiveness literature points to contradictory results (public infrastructure versus welfare spending) on the aid–growth nexus, over the short, medium and long term (Roodman, 2014). McArthur and Sachs (2019) developed an econometric model where a mixture of official development aid coupled with investments directed into agricultural production in African countries could lead to sustainable, long-term economic changes. They argued that due to the overwhelming rural populations in Africa who are reliant on agricultural production, targeted aid interventions, such as technology transfers in agriculture, may lead to an exponential increase not only in agricultural output, but also other economic indices, such as increased employment (labour), especially within rural populations.

Osabutey and Okoro (2015) concluded that a decrease in domestic political risk, as a major factor affecting FDI inflows into SSA, has the potential to attract FDIs into developing countries. In addition, the results indicate that an investment-promoting environment, with accountably in the countries where the general rule of law is followed, and with strong institutions, tend to attract FDI inflows; thereby advancing the arguments brought forward by Frackleton, Wright and Graigwell (2012).

In contrast, Okafor, Ujah, Elkassabgi and Ajalie (2011) found a significant positive correlation between FDI inflows and countries with a high political risk environment, when FDI location decisions are made. Advancing the idea of higher and riskier investments should ultimately result in higher returns.

3.4 CHINA'S AFRICA: THE ROLE OF CHINA IN AFRICA'S AID-INVESTMENT–GROWTH NEXUS

Economist constantly battle with the arguments brought forward that the correct choice of a foreign funding mix (FDI and ODA) should deliver and encourage the desired GDP growth, whilst building nations and expanding their regional and international influence.

Considerable arguments for and against the performance of international financial mechanisms, such as ODA and FDI within the financial advancement of a country, have led to the arguments around the rise of China and its African continental influence, via aid allocation and direct investments into infrastructure and natural resource developments on the continent. Initially, as a type of resources influx, the empirical literature on ODA (Guillaumont & Chauvet, 2001; Herzer & Morrissey, 2013) tended to indicate a favourable outcome on the overall development of the receiving countries, with a noticeable increase and growth in investments as well as asset allocation and accompanying growth indicators. It was therefore assumed that by increasing the commercial infrastructure spend via ODA, countries would strengthen their economies and create an environment that is conducive and attractive to foreign investors who would make investments and assist with the growth and advancement of the countries' economies (Hirano & Otsubo, 2014).

However, Alesina and Weder (2002) had concluded, more than a decade earlier, that an increase in ODA boosted in-country consumption through an increase in government spending on everything, except on the infrastructure needed to accelerate development. Rather, Alesina and Weder (2002) suggested that ODA boosts the corruption levels within receiving countries, considering that some federal governments make use of and abuse ODA to retain political power and to strengthen their grip over the populations that they set out to 'serve'. Feyzioglu, Swaroop and Zhu (1998) indicated that countries need to promote and enhance their institutional capacities to be able root out those ineffective institutional settings that allow the abuse of ODA and other funds that might adversely influence the economic climate.

Trevino and Upadhyaya (2003) demonstrated that FDI (as a GDP growth enabler) is a crucial and reliable instrument that countries can use in their efforts to transfer skills and technology, and therefore, substantiate the transition towards innovation that will allow the country to grow organically, create meaningful employment, improve levels of education, and accelerate development.

Ado and Su (2016), and Wang and Hong (2020) indicated that because of China's Belt and Road Initiative (B&R), the African continent is one of China's biggest international construction trading partners, and an important market for its finished products. Thus, the continent accounts for a large portion of China's outward foreign direct investment (OFDI), in accordance with its technology and market-seeking motives and how these motives relate to its B&R initiatives. Most of China's OFDI flowed into areas related to the extractive and natural resources industries, energy generation (for example, solar) and the development of industrial capabilities. As Dong and Fan (2020) noted, China offers African countries an alternative and different foundation for funding its development ambitions than that of Africa's typical Western allies.

Zhao, Liu, Wei and Andreosso-O'Callaghan (2017) concluded that along with the advancement within the Chinese economic development and the increased sophistication of its financial markets, OFDI towards Africa has increased considerably since 2003, however, with a slight downturn as a result of the 2008-2009 global financial and monetary crisis. The economic impact that African countries have felt in relation to China could be attributed to the decreased demand indicators from Africa's largest natural resource consumer and buyer, China.

Du and Zhang (2018) indicated that there are an expanding number of studies that focus on the durability effects of China's direct investment into Africa, specifically in terms of GDP growth, and the overall impact on skills development, market dominance, labour relations and market links between the countries and the advancements of the recipient country's development policies. In addition, these advancements and investments towards Africa are accepted by most African governments as a win-win Sino-Africa relationship.

In accordance with suggestions made by Clemens, Radelet, Bhavnani and Bazzi (2012), and also by Hirano and Otsubo (2014), the authors Dong and Fan (2020) studied the growth effects of China's development finance structure on the GDP of a sample of African countries. Table 3.1 provides a brief summary of the outcomes and how they relate to China's development aid, compartmentalised for different categories and uses of aid.

Table 3.1: China's development finance and Africa's growth

Aid categories	China's aid effect on GDP growth in Africa	Comparative findings
Social infrastructure aid **(for example, education and healthcare spending)**	Positive	Alesina & Weder (2002); Clemens *et al.* (2012); Arndt *et al.* (2015).
Economic infrastructure aid **(for example, energy, telecoms and transport spending)**	Positive	Ouattara & Strobl (2008); Hirano & Otsubo (2014).
Aid in the form of physical capital contribution towards productive sectors **(for example, unconditional monetary contribution)**	Negative	Wako (2018)
Budget supporting aid **(for example, funding supplied to balance fiscal policy spending)**	Positive	Pack & Pack (1993); Feyzioglu *et al.* (1998); Burnside & Dollar (2000); Momah (2018).

Source: Author's own compilation

The outcomes indicate that the spending of aid funds could be aligned between different categories to strengthen the development and GDP growth for each country. Table 3.1 indicates the four development aid categories and their impact on the aid–growth nexus. The results indicate the need for African countries to improve their institutional capacity before GDP growth-enabling aid could influence the macro-economic indicators of the various African countries. Also, for the B&R Initiative to achieve its desired economic objectives, countries should get their affairs in order to attract FDI from Chinese MNEs into the region (Yu, Qian & Lui, 2019).

Aid literature from India suggests that ODA can only stimulate FDI from donor countries, and that none of the funding mechanisms have a positive influence on GDP growth for the recipient country (Sahoo & Sethi, 2017). Moreover, ODA encouragement leads to additional economic exclusion, and MNEs and FDI experiencing challenges in specific industries (Oladi & Beladi, 2007).

The result of limitless development aid distributions is a form of wealth distribution, instead of wealth creation within the industrious sectors of the economy (Economides, Kalyvitis & Philippopoulos, 2008). In contrast, ODA, as complementary finance towards specific development in terms of power generation or healthcare, is expected to have an encouraging impact on production outputs (Selaya & Sunesen, 2012).

According to Rao *et al.* (2020), noticeable ODA objectives led to an increase in economic development, and also the regional integration of South Asia and South East Asia. As a result of the infrastructure developments initiated by China in other Asian countries, Rao *et al.* (2020) mentioned the possibility and probability that ‘unofficial aid’ from China directed at less developed Asian economies, may lead to increased FDI from other developed countries. Through an analysis of a dataset of Asian countries, spanning over 17 years, the analysis exhibited a favourable relationship between aid and attracting foreign capital into the region over time (Quazi, 2014).

It seems as if other direct financial inflows via foreign remittances do not lead to economic growth in the recipient country, albeit not in isolation (Dastidar, 2017). The GDP growth effect is also not always significant or large enough to make a noticeable difference (Tahir, Estrada and Afridi, 2019). Variables, such as the dominant institutional strengths and a constructive and positive economic environment, still dominate the investment and growth ecosystems.

3.5 CAPITAL FORMATION STRUCTURES AND GROWTH IN AFRICA

The issue of government budgetary and financial structuring as an economic growth element has led to different theories and empirical research studies with contradictory findings, even among the same economic schools of thought. With regard to economic history, the neoclassical and structuralist theories attach a large amount of importance to the resources' relocation initiative and the influence such investments have on domestic savings and the theoretical financial and economic developments that should theoretically follow.

According to Summers (2000), the neoclassical theory, in its quest to facilitate domestic savings through investment, leads to an increase in FDI into countries with policies and exchange controls that facilitate the free movement of capital from one to another, increasing not only national savings but also improving and stabilising currency valuations. As such, the benefits to welfare and GDP growth that result because of overseas direct investment flows, far outweigh the associated costs (Fisher, 1998).

Disputing arguments raised by neoclassical theorists and structural economists, such as Klobodu and Adams (2016), and the seminal author Furtado (2020), argue that FDI could crowd out domestic savings within recipient countries and have a damaging effect on their GDP growth ambitions. Discussions as far back as those raised by O'Rourke and Williamson (1999) raised concerns about FDI and its ability to increase income inequality and social cohesion within developing countries. Also, the unintended consequence of such economic policies (free movement of capital) could result in unimaginable increases to the levels of corruption as developing countries motivate their fiscal spending on inappropriate technology to deal with structural problems.

A study by Nketsiah and Quaidoo (2017) reviewed the impact of FDI on GDP growth in Ghana using time series data over 29 years. The study employed the OLS framework and observed the presence of a considerable good correlation between

FDI and GDP growth. Moreover, international trade had a positive influence, and fiscal spending by the host government indicated a negative influence on Ghana's GDP growth desires. Still, the rising cost of living in the country revealed a hostile and also a considerable negative influence on economic progress. Comparable conclusions were drawn on the variables influencing Ghana's economic growth by Tee, Larbi and Johnson (2017) with the exception that government fiscal spending positively influenced GDP growth over a period of 32 years.

Appiah-Konadu, Junior, Eric and Twerefou (2016) employed an ARDL model over 40 years to study the aid–growth nexus for Ghana. The results (over both the short- and long-run relationships) disclosed that ODA and debt interest payments had an unfavourable and substantially negative impact on GDP growth over the entire period. It is interesting to note that the labour market and government fiscal spending on capital formation was found to positively correlate to GDP growth. Additionally, the outcomes disclose that the rate of interest settlements on foreign debt applies undue pressure on the country's economic growth.

Given the empirical studies of, for example, Yanikkaya (2003) and Lopez (2017) that indicate that trade openness accelerates economic growth, Egyir, Sakyi and Baidoo (2020) studied the magnitude of the effect that gross capital inflows (debt, FDI and FPI) have on trade openness, and thereby, its influence on GDP growth. Employing a dynamic Generalised Method of Moment (GMM) as an econometric estimation technique, and using data spanning over 24 years from 45 African countries, the outcomes revealed that World Development Indicators (WDI), such as government institutional quality and capacity, fiscal spending, domestic investments and exports, indicate a substantial beneficial impact on GDP growth. In contrast, additional data analysis indicated that remittances from citizens in one country to their home country do indeed have a positive but insignificant correlation towards GDP growth. A negative correlation transpired between FDI and debt (measured as a form of capital flow) and GDP growth. The results present the possibility that the interaction of capital flows being the main variables affecting exports, in turn, affect economic growth in both positive and negatives ways within the studied African countries.

Ho and Iyke (2020) established that the cause-and-effect relationship between the factors of production from an adjusted Solow growth model indicate that output growth was negatively correlated to debt servicing cost (increase in debt levels), overall price increases (inflation) and labour (as a human capital element) over the long and short term. Ho and Iyke (2020) applied the autoregressive distributed lag (ARDL) model to single country data collected over 39 years. These findings are in contrast to the empirical work by Fosu (1996), but nonetheless, supported the works of Sach and Warnet (1997), Bertocchi and Canova (2002) and Artadi and Sala-I-Martin (2003) who all touched on the importance of the political influence that governments have on the growth of SSA combined, the regional-specific GDP growth, and overall levels of development.

Various economists, such as Romer (1990), Bal, Dash and Subhasish (2016), and Obeng, Akoto and Acquah (2018) advocate for the positive influence that global trade has on all fronts of economic growth. They mention that various factors, such as technological dissemination through export and import regulations, and the importance of taking advantage of economies of scale, should encourage all governments to strengthen and enhance their competitive advantage to realise the needed GDP growth plans.

Studies into the importance of a well-developed financial sector to aid and support GDP growth have resulted in contrasting outcomes. Some studies (De Gregorio & Guidotti, 1995; Aghion, Bacchetta & Banerjee, 2004) argued that advanced financial sector developments in the wrong format, and within states with questionable monitoring and evaluation controls, could potentially lead to a complete collapse of an envisioned and intended stable financial market. Also, Schneider and Tornell (2004) noted a weakening in a country’s economic stability as a result of poorly formulated economic growth elements, which can result in an over-exposed banking or financial sector and uneven and erroneous credit allocations, exposing domestic savings. In contrast, Raheem (2017), with support from previous studies (Bencivenga & Smith, 1991), elaborated on the ability of the endogenous growth model to advance GDP growth by means of an increase in savings or investments via financial sector developments.

3.6 THE ROLE PLAYED BY FDI AND ODA IN ECONOMIC GROWTH VIA AGRICULTURE

There appears to be higher international support, whether from direct international investments or via donor funded projects (via multi and bilateral institutions) aimed at cultivating agricultural land within the global environment. However, farming and the accompanying manufacturing capabilities that lead to the primary production of agricultural goods, continues to decline (Dhahri & Omri, 2020). Given the fact that agricultural production is declining, it is important to achieve an understanding of exactly how the different kinds of international resources (financial and non-financial) impact global food production.

Utilising agricultural output and aid data for a sample of developing countries over a period of 20 years, Dhahri and Omri (2020) determined that both financial and non-financial resources given in support of agricultural production, was positively correlated towards an increase in agricultural outputs. The importance of determining the influence of different forms of aid on agricultural outputs, could lead to a better understanding and a combined effort to alleviate global hunger (Demir & Duan, 2018).

Similarly, the finding by Kaya, Kaya and Gunter (2013) illustrates that aid directed specifically towards to the improvement of agricultural production outputs could lead to an increase in GDP growth rates. Furthermore, Kaya *et al.* (2013) alluded to the downstream advantages of an increase in agricultural improvements, for example, a noteworthy improvement in the determinants or factors affecting of FDI decisions (Ben Slimane, Bourdon & Zitouna, 2015).

3.7 ECONOMIC GROWTH AND POVERTY REDUCTION THROUGH TRADE: THE ROLE OF FDI AND ODA

The signing of the African Continental Free Trade Area (AfCFTA) agreement by the majority of countries in Africa, which led to trade as a poverty reducer receiving more attention, has captured the attention of business and academia alike. Although the phased implementation of the agreement is still in its infancy, the World Bank (2021) estimates that substantial trade increases between member states and the broader economy are finally within grasp, and will benefit developing African states. After all, Gunby, Jin and Reed (2017) showed that global trade has lifted millions of people out of extreme poverty, in the case of China and its rise towards becoming a global economic superpower.

The phenomenal developments in technology have impacted international trade on all fronts. From e-commerce to improvements in production methods, to name a few, have effectively led to an integrated, borderless world where countries interact and where a combined effort is made to produce and deliver better quality goods at more affordable prices to consumers. Empirical literature (Anetor, Esho & Verhoef, 2020) suggest that international trade is viewed as a more favourable instrument to increase or improve a country's GDP than other forms of funding (ODA or FDI). Evens and Kelikume (2018) famously argued for international trade integration, because it leads to in-country technology transfers and job creation, thereby providing first movers (local firms) with a global, as well as local competitive edge, over its competitors.

In contrast to Anetor *et al.*'s (2020) findings, similar studies on underdeveloped countries in Africa indicated an insignificant relationship between trade openness and its effect on economic growth (Were, 2015; Zahonogo, 2016). Singh and Huang (2011) even went as far as to say that an increase in international trade from developed to least developed countries might lead to an increase in inequality and poverty. It is thus important to note that trade openness should only be seen as a single factor, that in combination with determinants such as developed financial markets, could affect a deduced poverty index (Le Goff & Singh, 2014).

3.8 FUNDING FOR GROWTH: FDI AND ODA CAPITAL STRUCTURE

The empirical literature surrounding developmental finance has always identified inadequate levels of domestic savings as a variable that hinders the prospect of large-scale investment endeavours (Bakari, 2018) in assisting with the achievement of the SDGs and a stable economic growth rate. Chenery and Strout (1966) argued for an increase in foreign debt, in accordance with the Harrod-Domar economic growth model, to effectively reach the equilibrium levels that would sustain GDP growth paths. However, Gourinchas and Jeanne (2013) showed that the rate-of-return effect and the cost of debt from foreign sources or return levels, lead to contrasting and unique outcomes between developing countries.

Furthermore, Combes, Kinda, Ouedraogo and Plane (2019) demonstrated how unforeseen changes in consumer demand can deteriorate the ability of sectors to remain viable and competitive. Also, indications suggest that low levels of financial sector development lead to an increase in ODA, which crowd out local portfolio investment opportunities, and therefore, organic growth. Combes *et al.* (2019) conclude that a suitable exchange rate needs to be aligned with the sector that promotes it, and that supports the largest sector of a country's GDP to be able to affect the needed growth.

To achieve the desired effect of the FDI mostly relies on the kind of projects its financial resources are directed at. As Wooster and Diebel (2010) noted, FDI influences various economic clusters in a variety of ways, and even within the exact same economic clusters different growth outcomes were observed between and among various financial growth indicators. For example, in resource-abundant African countries where FDI is directed towards extractive industries, the FDI might hamper the diversification of the local beneficiation industry, and in doing so, hamper GDP growth and development as a result of the overreliance on the specific form of resources where FDI is directed to. In contrast, FDI focused towards the productive sectors and in conjunction with the mineral beneficiation policies of Asian countries, may boost development through leveraging a low-priced, proficient, and productive labour force.

Stiglitz and Ocampo (2008), and also Bruno and Campos (2013) emphasised that failing to differentiate between various types of FDI, and the channels through which FDI affects growth, as a feasible explanation for the problems faced by countries with determining the function FDI plays in the participation towards GDP growth. By employing a meta-analysis of various studies (100+), Bruno and Campos (2013) confirmed the positive role FDI plays in the, sometimes obscure, FDI–GDP growth nexus.

3.9 AID FOR TRADE: AFRICA'S CONDITIONAL AID DILEMMA

Egyir *et al.*'s (2019) investigation into the economic and financial theories underpinning international ODA pay-outs and effective international trade relationships, indicated that a donor country directs its ODA towards the business connections it has established with the recipient country. Furthermore, for the most established and developed countries, this revolves around opening up its domestic borders to facilitate direct trade routes. For this compromise, an official donor might compensate the recipient country by importing its items, or might even choose to combine products, and also increase its own market share within the recipient country's economy. Similarly, ODA might influence overall imported quantities, either immediately or even in an implicit way via indirect trade. In this way, an overt influence is exerted if overseas help is essentially provided on condition that items are bought from the donor country, whereafter the aid is going to boost the recipient's imports (Spratt, 2018).

When the ODA is conditionally tied to resources and product imports from donor countries, these discounted imports might warrant manufacturing and export expansion capabilities from the recipient country. Nevertheless, the secondary influence that foreign assistance might have, is due to the fact that it causes economical and financial spillovers (Jeetoo, 2020). A wide-ranging view suggests that overseas assistance supplements the recipient countries' concentrated residential savings and also internationally earned profits, propelling the investments into better quality assets and top-quality establishments.

Social infrastructure projects (such as roads and rail) that utilise aid as a funding mechanism, boost the supply source of the recipient country in in terms of exports. On the contrary, if development assistance ends up being regarded as interchangeable, or even guided to non-industrial applications, a common situation within several developing nations, it might lead to absolutely zero positive associations with exports (Savin, Marson & Sutormina, 2020). In addition, due to the ODA payments being provided in a foreign currency, some argue that the increase in local currency values as a result thereof, lead to a decrease in export competitiveness for recipient countries.

The effect on GDP growth is certainly not entirely different when one thinks about raising external debt in a currency different from the borrowers' own. Empirical literature suggests that a symbiotic relationship exists between foreign debt as a development finance tool and an increase in global trade. The one factor seems to lead to an increase or decrease in the other. As Rose (2005) noted, the more open a country is towards trade, the better its chance or repaying and honouring it debt obligations.

The openness to trade stimulates the exports capability of a country as it makes sure that there is a reliable adoption of efficient information and the distribution of beneficial economic assets (Raghutla, 2020). In addition, trade increases overseas act as substitutes for profits, thereby reducing the financial obligation and payment abilities of indebted countries (Feenstra, 2018). In a similar way, imported items coming from the improved and developed international producers (such as industrial machinery) could accelerate industrialisation in the recipient country, which will boost financial development within the residential economic situation (Kuznetsova, Kuznetsova & Podoliak, 2020).

It is ultimately essential to examine and communicate the result of an export-orientated economy in terms of the financial and economic growth effect on developing economies. It is important to consider the interrelatedness between export, debt and GDP growth (Rao & Takirua, 2010; Olubiyi, 2014) because it seems as if omitting trade as a factor that affects GDP growth, might lead to the misguided belief that trade via FDI only directly affects growth in African countries (Sala & Trivín, 2014).

3.10 CHAPTER CONCLUSION

This chapter provided an in-depth overview of the prevailing empirical studies on FDI, ODA and economic growth in Africa and a few other developing countries. The literature is clear on the opposing outcomes, as well as the cited recommendations. The focused empirical literature that was discussed in this chapter provides a well-balanced view on the theoretical framework discussed in Chapter 1. The literature review identified the shortcoming in the current debates and critiqued the earlier works. Additionally, the literature review amplified the problem statement and the ability of this thesis to contribute to new and original knowledge in the development finance arena.

CHAPTER 4:
RESEARCH METHODOLOGY

4.1 INTRODUCTION

Chapter 4 presents a detailed approach to the methodologies and estimation techniques implemented in this study. The chapter starts with an overview of the data sources that were used, followed by a discussion of the population and the chosen sample of African countries in the study. All the relevant variable definitions used in the analysis for the study are defined in this methodology chapter and their use is justified by empirical literature. This chapter provides a discussion of the econometric models and estimations techniques that were employed to address the defined research objectives. The preliminary diagnostics tests that were employed to justify the use of the different methodologies and estimation techniques are also presented and discussed.

4.2 QUANTITATIVE RESEARCH

This study selected a quantitative research methodology to measure the relationship between economic growth (GDP) (dependent variable), and foreign direct investment (FDI) and official development assistance (ODA) in Africa. The methodology is based on the model that Bezuidenhout (2009), Amusa *et al.* (2016) and Vijayakumar *et al.* (2010) used to ensure analogous outcomes. However, the current study involved significant differences in terms of analysis, as well as different analysis periods (1990-2018).

The empirical models that were chosen aim to address the research objective and answer the research questions. The selected methodology provided an overview around the data, the sources of the data, the chosen sample and the analysis of the said data, as well as a comprehensive discussion around the econometric model specifications.

4.3 DATA SOURCES

The study made exclusive use of secondary non-experimental data. The data is quantitative by nature and the datasets have distinctive statistical values linked to it.

The data was exclusively acquired from the secondary data repositories at the World Bank's online databank for economic growth, and FDI and ODA data on aid disbursements, as well as the various control variables used in this study. These secondary databanks are amongst the best and most complete datasets available for this type of study. All the available data was collected by the various institutions, such as the OECD DAC, and could be presumed to be accurate.

The data for the study was extracted from the databases on the World Bank's research domain. The primary data available on the data repository is in the form of standardised development and economic indicators, which includes the selected countries' GDP growth, FDI and ODA data, and the proxy variables used in the models. In certain instances, the data provider did the ratio calculations through the use of an automated analytical system which automatically merges the required data so that the appropriate variables can be extrapolated and analysed so that the results can be interpreted. In circumstances where the data is unavailable, additional information is supplied, coupled with a possible reason for the deviations.

The World Bank's World Development Indicators (WDI) dataset was the only source from where the data was extracted. However, the World Bank collected the data from numerous primary sources, or the primary sources gave the econometric data to the World Bank. These types of secondary data sources are well received and have been successfully used by researchers to complete various studies, given the time constraints of collecting such data on a primary basis.

4.4 POPULATION AND SAMPLE

Using the available country specific data, convenience sampling, as a non-probability sampling technique, was used to select the identified variables needed for the analysis. The contributors to this study (the analysed countries) were selected, and the data that was required to perform the data analyses over the unique and specific time periods (1990-2018) was obtained from the data providers.

Based on the availability of the data, the 29 countries selected for the current study are listed in Table 4.1 (on the next page).

Table 4.1: Data analysis population sample of selected African countries

POPULATION SAMPLE FROM 55 AFRICAN COUNTRIES	
Algeria	Malawi
Angola	Mali
Botswana	Morocco
Burkina Faso	Mozambique
Chad	Namibia
Democratic Republic of the Congo	Niger
Egypt	Nigeria
Equatorial Guinea	Rwanda
Ethiopia	Senegal
Gabon	Sierra Leone
Ghana	South Africa
Ivory Coast	Tanzania
Kenya	Uganda
Libya	Zambia
Zimbabwe	

Source: Author's own compilation

Salkind (2012:104) explained that the convenience sampling technique is appropriate when the elements of the population, for example, the African countries in this study, are convenient to sample. For this study, the World Bank provided all the needed information required for the sample to be taken. In addition, the convenient sampling technique is inexpensive and suitable for a study with a limited or no budget.

4.5 DATA COLLECTION

As a result of the quantitative approach chosen for the study, some data-collection methods were not appropriate for this study. This study sampled the 29 countries in Africa through the use of the convenience sampling approach. The extracted data spanned the period from 1990 to 2018. The data was extracted using the World Bank's own online data mining platform by selecting the required (data) fields to initiate the data analysis in support of the study. These World Bank databanks were chosen for the study because of their prominence in the literature, and because the World Bank is a reliable and recognised data provider, especially for economic and African country data.

The use of secondary data from data providers, such as the World Bank, has the advantage that it saves time, and it allows the researcher additional time to explain the datasets and the accompanying analysis. Saunders *et al.* (2012) recommended the use of available secondary data to allow for additional and comparable research which would strengthen the legitimacy, transparency and integrity of current and future follow-up research.

It is to be expected that the World Bank adhered to ethical research practices when collecting, collating and distributing data. On top of the service provider's attempts, the researcher made sure that there was no identifiable information of the different African countries in the study. The researcher ensured that under no circumstances would any confidential information be released or used that would jeopardise the safety or well-being of any of the countries because of the research or the collected data. No identifiable names were mentioned and only globally respected opensource data was used.

Furthermore, there were no interviews between the researcher and respondents, and there was zero collaboration, as the data used in the study is of a secondary nature and is accessible to the general public for scrutiny. The summarised data collection from the World Bank's platforms was done in the following manner:

- The research platforms were accessed through the internet;
- The Data Tabs of the various databanks was selected,
- The necessary indicators and variables were selected and extracted for the years 1990-2018.

This data-collection method was fitting for the study, because it would normally take an immense amount of time to collect and analyse such as big set of data. The vast majority of the required data was extracted in a well-organised and controlled approach and in real time, thereby eradicating the time restrictions experienced by other approaches, such as consultations with participants and surveys between investigators and contributors.

4.6 VARIABLE DEFINITIONS

This section summarises the variable definitions and the model specifications that were chosen for the specific study. Clearly defined definitions are provided and distinctions made between the independent and proxy variables and dependent variable, economic growth.

4.7 DEPENDENT VARIABLE DEFINITION

$GDPG_{it}$ represents the annual economic growth percentage of country *i* over period *t*.

According to the Organisation for Economic Cooperation and Development (OECD, 2019):

> Gross domestic product (GDP) is the standard measure of the value added created through the production of goods and services in a country during a certain period. As such, it also measures the income earned from that production, or the total amount spent on final goods and services (less imports). While GDP is the single most important indicator to capture economic activity, it falls short of providing a suitable measure of people's material well-being.

Thus, economic growth can be defined as an increase in GDP. GDPG therefore represents an economic measure (market value) of all the final goods and services produced in a country over a specific time period.

4.8 INDEPENDENT AND PROXY VARIABLE DEFINITIONS

The independent and proxy variable definitions as applicable to the current study are provided below.

Foreign direct investment (FDI_{it} % of GDP)

FDI_{it} represents the foreign direct investment variable of country *i* over period *t* as a percentage of GDP. FDI was defined according to the Organisation for Economic Cooperation and Development (OECD, 2008) definition. Thus, FDI is defined as an investment in the form of controlling ownership (10% ownership or more based on host country legislation), acquired by an entity from one country in an entity in another country. According to the OECD’s (2008) benchmark definition, FDI would typically include involvement in the management by multinational enterprises (MNEs), joint ventures between MNEs and host country enterprises, and the transfer of skills and technology not locally available in host countries, as stated in the introductory section of the current study. Furthermore, the definition includes mergers and acquisitions, direct infrastructure investments, investment of retained earnings by MNEs and intercompany loans.

The neoclassical theory (Solow, 1956) argues that FDI encourages economic growth by adding capital and technology into recipient or host countries. In addition, the theory argues that FDI is one of the main drivers in the distribution of knowledge (know-how) and technology across countries. As a result, the reasons for attracting and increasing FDI originate from the idea that FDI has a positive effect on economic growth through the productivity gains that arise from the technological advances provided by MNEs in the local markets, and many other advantages which bring about positive structural change and future sustainability.

According to Biglaiser and DeRouen (2006), net FDI inflows (that is, FDI as a percentage of GDP) off a better measure of FDI, as a result of its ability to indicate a country's capacity to attract FDI. Biglaiser and DeRouen (2006) further state that net FDI inflows (% of GDP) captures an MNE's change to the investment situation in the host country. Regardless, it should be noted from the literature that the gross FDI inflows (% of GDP) (Wang & Wong, 2009) and FDI to gross fixed capital formation (Aizenman & Spiegel, 2006) ratio have also been used with success in empirical studies.

Official development assistance ($\mathbf{ODA_{it}}$ % of GNI)

$\mathbf{NODA}_{it}$ represents the official development assistance, or foreign aid, received by country *i* over period *t* as a percentage of GNI*.* As noted in the introduction section of the study, foreign aid or official development assistance (ODA) is consistently defined according to the donor's intent.

From the OECD DAC (2019) definition, ODA comprises of all official inflows distributed from bilateral donors or multilateral institutions to developing countries listed as per the DAC's list of recipients. It should be noted that ODA in this regression only includes funds dispersed from OECD DAC countries, and not foreign aid provided by other countries outside of the OECD DAC definition, such as China (Woods, 2008). The official definition used in this study remains the most widely accepted and accurate means of accessing the collected data on foreign aid flows from traditional donor countries.

The nexus between ODA and economic growth is not decisive, and it is clear from the literature that additional research is needed. As Munemo, Bandyopadhyay and Basistha (2007) stated, the traditional defence for foreign aid argues that the aid inflows will reduce the resource constraints that developing countries face.

Gross domestic savings (GDS_{it} % of GDP)

GDS_{it} represents the domestic savings variable for country *i* over period *t* as a percentage of GDP. According to Solow (1956), domestic saving or investment as a ratio of GDP is a key determinant of economic growth. Solow (1956) and Swan (1956) concluded that an increased domestic savings ratio raises the steady-state level of output per unit of labour and economic growth.

Population growth (POP_{it} annual %)

POP_{it} represents the population growth variable for country *i* over period *t* as an annual growth percentage. From the literature review, there are two different positions in this regard, and are both considered valid arguments for the growth in populations and its influence on economic growth.

Position 1 argues that population growth enlarges the labour force, and therefore, has a positive impact on economic growth.

Position 2 indicates that an increased population size leads to an increase in the domestic demand for goods and services (Quamrul & Galor, 2011), and therefore, economic growth.

Such findings contradict with that of Alexandratos (2005) who found that a big population growth is associated with food problems, and also limits a country's development, thereby providing ambiguous outcomes between population size and economic growth.

Human capital presented by Education (EDU_{it}) and Life Expectancy ($LEXP_{it}$)

Romer (1986, 1989) argued that human capital is the main determinant of economic growth. Lucas (1988:39) concludes that human capital and a constant effort to improve will produce constant economic growth. The seminal authors, Mankiw, Romer and Weil (1992) concluded that education and health (denoted as life expectancy) are the main variables for human capital, and this has since been widely used as the indicators for human capital.

Education

EDU_{it} represents the net enrolment rate of secondary education for country *i* over period *t* as a percentage of the population for the corresponding official school age. Barro and Lee (2001) found that education, as a human capital indicator, is an important determinant for economic growth. Factors, such as research and development, are the result of high levels of education. Improvements in education lead to an increase in production outputs, an increase in labour efficiency, and to an increased absorption capacity of new technologies which increases economic growth.

Life expectancy

$LEXP_{it}$ represents the life expectancy (expressed in years) for country *i* over period *t.* The variable indicates the number of years that a newborn baby would live in the specific country, given the prevailing morality rate. Good health and a high life expectancy are considered to be positively correlated to economic growth, and could be improved by capital investments (Lopez-Casasnovas, Rivera & Currais, 2005). As such, the life expectancy of a newborn child is considered a good indication of health as a human capital variable.

Access to electricity ($ELEC_{it}$) as an infrastructure indicative variable

$ELEC_{it}$ represents the infrastructure variable, and is defined in this study as the percentage of the population with access to electricity for country *i* over period *t.* Infrastructure in Africa, especially electrical infrastructure, significantly increases economic growth. Therefore, the variable, as an infrastructure indicator is included to test the significance of the dependent variable.

Natural resource rents ($NATR_{it}$ % of GDP)

$NATR_{it}$ represents the total natural resource rents variable, defined in this study as the sum of oil, natural gas, coal, minerals and forest rents as a percentage of GDP for country *i* over period *t*. The influence of natural resources on economic growth in Africa is undoubtedly one of the biggest contributors to, or lack of, economic stability on the continent. Natural resource rents contribute to many resource-rich African countries' developmental projects, and policies surrounding natural resource management remain important (Dwumfour & Ntow-Gyamfi, 2019).

Assumptions between the dependent and independent variables

As a result of the reviewed and quoted literature in the preceding sections of this thesis, the empirical evidence suggests there might be correlations between the various variables, thus it is necessary to do all the necessary diagnostic tests for endogeneity, fixed and random effects, collinearity and heteroskedasticity.

4.9 ECONOMETRIC MODEL SPECIFICATIONS

A panel data analysis was adopted to achieve Research objective 1 and to evaluate the deterministic relationships between FDI, foreign aid and economic growth in the 29 selected African countries. A panel data analysis is performed using the Generalised Method of Moments estimation technique (GMM). Using the GMM estimation on panel data will account for possible endogeneity between the dependent and independent variables (Nor & Ahmad, 2015). The GMM estimation technique is based on the Arellano-Bond methodology which will account for "all the linear moment restrictions that follow from the assumption of no serial correlation in the errors, in an equation which contains individual effects, lagged dependent variables and no strictly exogenous variables" (Arellano & Bond,1991: 277).

The different economic periods over which the analysis was done may lead to more advanced considerations when policy and investment decisions need to be made based on the relationship between the variables. In addition, the model will indicate what the difference between the variables is and how they differ, given the different economic conditions, for example, the global financial crisis early in the 21st century.

This section discusses the model specifications which were used to examine the relationships between the dependent (economic growth) and independent variables (FDI and ODA). The empirical model for estimating the relationship between FDI and ODA on economic growth is based on similar economic growth literature (Alemu & Lee, 2015) and development studies.

The literature in the previous section provided information on which variables were included in this study. Consequently, in developing the econometric estimation models to test the relationship between the said variables, it should be noted that:

$$GDPG_{it} = f(PC_{it}, HC_{it}, NR_{it}, Z_{it})$$

Where:

$GDPG_{it}$ signifies economic growth, that is GDPG for country *i* at time *t*.

Physical Capital (PC_{it}) is a vector of physical capital sources of country *i* at time *t*.

HC_{it} is a vector of human capital of country *i* at time *t.*

NR_{it} is a vector of natural resources of country *i* at time *t*, and

Z_{it} is a vector of other economic growth determinants and variables as explained in the empirical literature in the literature review.

The need for human as well as physical capital was underscored by the endogenous growth model. Capital coupled with a good policy framework and institutional factors are needed in promoting economic growth.

However, the needed sources of physical capital for economic growth in developing countries comprise FDI, ODA and domestic savings or investments (DS).

$$Thus, PC = f(FDI, ODA, DS)$$

Where:

ODA represents foreign aid, which is net official development assistance (ODA) as a share of GDP.

DS represents domestic savings or investment which is the gross capital formation in terms of savings as a percentage of GDP, and

FDI represents FDI as a percentage of GDP.

In addition, the human capital (HC) component presents: (1) education, which is presented by the secondary school enrolment rate of the population; and (2) healthcare, which is estimated by the life expectancy of a country’s population.

$Thus, HC = f(education, health)$

$Natural\ resources\ (NR) = f(ores\ and\ metals\ exports)$

$Z = f(Policy, Institutions) = f(\ quality\ of\ infrastructure)$

Given the above, equation 1.1 can be specified in the study's generic GMM model as:

$$\Delta Y_{it} = \beta_0 + \beta_{1i}\Delta Y_{i,t-1} + \sum_i \lambda_{it}\Delta X_{it} + \mu_i + \Delta\varepsilon_{it} \qquad \textbf{1.1}$$

Where:

Y_{it} is the dependent variable into country *i* for time *t*;

Y_{it-1} is the lag of the dependent variable into country *i* for time *t-1;*

β_0 denotes a constant term;

μ_i is the time invariant country specific effect, and

ε_{it} is a random error term for country i for time t.

The generic model specified in equation 1.1 poses several estimation challenges when using the ordinary least squares (OLS) or the static panel estimation methods (pooled OLS). In addition, fixed and random effects models may lead to biased estimates due to the fact that the random effects models do not control for omitted variables in the equation (Judson & Owen, 1999; Verbeek, 2000, Cameron & Trivedi, 2009; Greene, 2012). Thus, as a result of the omitted variables, the lagged dependent variable might have correlation problems with the error term, and therefore the autocorrelation will lead to misleading results (Greene, 2002).

Other problems associated with the use of OLS in estimating equation 1.1, is the autoregressive nature of the data generation process and the inconsistent estimates related to the model's use in such circumstances. The restrictive assumptions in pooled OLS imply that heterogeneity between individuals is not taken into account (Greene, 2012). Fixed and random effects models will lead to endogeneity problems and a disregard for the long and short-run relationships between the variables (Arellano, 2003).

The use of OLS, pooled OLS, fixed effects model (FEM) or random effects model (REM) will therefore lead to problems of endogeneity, measurement errors and to model specification bias in estimating equation 1.1.

To address these challenges, the system GMM discussed in the following section was adopted.

4.9.1 Generalised Method of Moments

To address the problems faced by OLS, pooled OLS, FEM and REM, and to account for endogeneity the generalised method of moments (GMM) as an estimation technique was adopted. The chosen method was specifically designed to account for specification errors and endogeneity in panel data which could not be solved using the traditional OLS method (Holtz-Eakin, Newey & Rosen, 1988; Arellano & Bond, 1991).

By adopting the dynamic panel GMM estimator, the study was able through the creation of a matrix of internal instruments, to capture the endogeneity between the lagged dependent and independent variables in this study (Blundell & Bond, 1998; Arellano & Bond, 1999; Andrews, 2018).

The generic GMM model estimated in this study is specified in equation 1.2

$$Y_{it} = \alpha Y_{it-1} + \beta X_{i\,t-1} + \mu_i + \varepsilon_{it} \qquad \textbf{1.2}$$

Where:

Y is economic growth (GDPG),

X is a matrix of explanatory or independent variables (other than lagged GDPG),

μ is an unobserved country-specific effect,

ε is the error term, and

the subscripts i and t represent country and time period, respectively.

The nature of the $\varepsilon_{it} = u_t + u_i$.

Taking the first difference of equation 1.2, the model can be specified as

$$\Delta Y_{it} = (\alpha - 1)\, \Delta Y_{it-1} + \beta \Delta X_{i\,t-1} + \Delta\varepsilon_{it} \qquad \textbf{1.3}$$

The difference, as opposed to the system GMM estimator, removes unobserved time-invariant country-specific properties (Bond, Hoeffler & Temple, 2001). Given the difference, the GMM estimator has potential autocorrelation, individual specific heteroscedasticity and omitted variable bias problems (Blundell & Bond, 1999), the differenced error term in equation 1.3 ($\Delta\varepsilon_{it}$) becomes correlated to ΔY_{it}, since the error term (ε_{it}) is now included in both variables. Therefore, the estimates of equation 1.3 using either OLS or FEM will be inconsistent and biased, due to the dynamic characteristics of the model.

To achieve efficient and consistent estimations on the effect of FDI and ODA on economic growth, the system GMM model was used (Arellano & Bover, 1995; Blundell & Bond, 1998; Bond *et al.*, 2001).

As the study theoretically sought to examine the country-specific effect of FDI and ODA on economic growth, removing the country-specific effect via a difference GMM estimator would not solve the study's research objectives and answer the research questions. The system GMM includes in a system, the difference GMM estimator regressions and the regressions of the lagged level variables which are included as instrument variables, providing for an improved level of accuracy and which reduces the finite sample variable biases (Blundel, Bond & Windmeijer, 2001).

In addition, the Sargan and Hansen test to test for over-identifying restrictions was performed to validate the use of the system GMM and to test for the validity of the instruments (as suggested by Arellano & Bond, 1991; Arellano & Bover, 1995; Blundell & Bond, 1998).

The general model specification under the system GMM is summarised in equation 1.4 as follows:

$$Y_{it} = \alpha Y_{it-1} + \beta X_{i\,t-1} + \mu_i + \varepsilon_{it} \qquad \textbf{1.4}$$

Where:

Y_{it} is the dependent variable of country *i* for time *t*.

Y_{it-1} is the lag of the dependent variable,

X is a vector of the explanatory variables, and

μ_i captures the time invariant country specific effect.

The error term is captured by ε_{it}.

In order to estimate equation 1.4 for panel data, the study needed to determine whether the fixed effects model (FEM) or the random effects model (REM) would be an applicable estimating model. The Hausman test (Hausman, 1978) was therefore used to decide between the need for FEM and/or REM.

FEM assumes that differences across countries (units) can be captured in differences in the constant term (Green, 2002), thus the individual-specific effect is a random variable, where correlation with the explanatory variable (FDI and NODA) is permitted (Baltagi, 2008). Conversely, the REM assumes that the differences across countries are random and uncorrelated with the independent variables (Baltagi, 2008).

The general system GMM equation in 1.1 was therefore respecified in a dynamic two-step system GMM that accounts for all the variables in the study's analysis as:

$$GDPG_{it} = \alpha GDPG_{it-1} + \beta_1 FDI_{it} + \beta_2 NODA_{it} + \sum_{n=1}^{i} \beta X_{i\,t} + \mu_i + \varepsilon_{it} \qquad \textbf{1.5}$$

Where:

$GDPG_{it}$ is economic growth,

FDI_{it} is foreign direct investment,

$NODA_{it}$ is official development assistance,

$GDPG_{it-1}$ is the first lag of the dependent variable for country *i* at a *t*-1 time period.

X_{it} is a vector of explanatory variables which include gross domestic savings (GDS), population growth (POP), life expectancy (LEXP), education (EDU), access to electricity (ELEC), and natural resource rents (NATR).

The time invariant country specific effects are captured by μ_i , and

ε_{it} is the error term.

The GMM models are usually simple to estimate if N>T (Roodman, 2009) and distorted when N<T. The homogeneity assumption of the slope coefficients of the lagged dependent variable (GDPG) is likely to produce unpredictable long-run estimates in heterogeneous slope coefficients (Pesaran & Smith, 1995; Pesaran & Shin, 1998).

As a result, the panel ARDL (Panel Autoregressive Distributed Lags) and ECM (Error Correction Model) bounds testing approach to cointegration as discussed in the next section was employed for a dynamic panel analysis to determine the relationship between economic growth, FDI and ODA.

4.9.2 Panel Autoregressive Distributed Lags

The study sought to test for the long-run cointegrating relationships (Research objective 2) between the variables of the study by applying the autoregressive distributed lags (ARDL) bounds testing approach developed by Pesaran, Shin and Smith (2001). In studies where N>1 and T>1 the panel ARDL is the preferred estimation technique as opposed to the traditional ARDL with a single time series (Pesaran *et al.*, 2001). The panel ARDL sought to determine the cointegrating relationship between the dependent and independent variables.

The panel ARDL model specifies and has the advantage that the variables can be of different levels of integration, as long as they are not of higher order I(2) (Pesaran *et al.*, 1999). In addition, panel ARDL is also appropriate for smaller sample sizes and it concurrently assesses the long-run relationships coupled with short-run parameters (Narayan, 2004), and includes the long and short-run effects of the variables in the model (Pesaran *et al.*, 2001).

The optimal lag lengths of the different variables were determined using the Akaike Information Criterion (AIC) and the Bayesian information criterion (BIC)/Schwarz Bayesian Criterion (SBC) analysis functions in Stata. The reason for the calculations was to accurately calculate the F-statistics when using the ARDL bounds testing approach. The optimal lag length is presented by the smallest values of the two criteria.

Given that the hypothesis of homogeneity between long-run parameters cannot be assumed, the Hausman (1978) test (to test the null hypothesis of homogeneity) was performed to determine the most appropriate estimator between either the pooled mean group (PMG) or the mean group (MG) estimators, or alternatively, the dynamic fixed effect estimator (DFE). If the probability value <0.05, the MG estimator, as opposed to the PMG, would be preferred.

However, Pesaran *et al.* (1999) argued that PMG is preferred when either N or T is small. The main difference between the MG and the PMG is that the PMG estimators pool the MG estimator’s features, such as averaging the individual equations for each cross section to produce consistent estimators (Pesaran *et al.*, 1999).

The PMG estimator allows for country heterogeneity in error variances, it also allows for the short-run coefficients, together with the intercepts, the speed of adjustment to the long-run equilibrium values with a proposal of homogenous long-run slope coefficients across countries (N) in the estimation (Loayza & Ranciere, 2006).

In this study, the FDI and official development assistance was a determinant of economic growth. For the purpose of this study, economic growth was hypothesised to be a function of FDI, ODA, gross domestic savings, population growth and human capital (presented by education and life expectancy), infrastructure (presented by access to electricity) and natural resource rents.

The following equation was estimated to examine the relationships between FDI, ODA and economic growth in the selected African countries. The unrestricted panel ARDL system of equations to be estimated were generalised as below:

$$\Delta GDPG_{it} = \varphi_0 + \sum_{k=1}^{p} \delta_{it} GDPG_{i,\,t-1} + \sum_{i=0}^{q} \delta_{2t} X_{i,t-1} + \mu_i + \varepsilon_{it} \qquad \textbf{1.6}$$

Where:

Y_{it} is the dependent variable,

$X_{i,\,t-1}$ is the (k×1) vector of the explanatory variables for group I,

μ_i is the fixed effect,

k is the studied country,

p and q are the lag length (Pesaran *et al.*, 1999).

Equations 1.7-1.9 (below) are the proposed model specifications of the ARDL system of equations that are specific for this study.

$$\Delta GDPG_{it} = \beta_0 + \beta_{1i} GDPG_{i,t-1} + \beta_{2i} FDI_{i,t-1} + \beta_{3i} NODA_{i,t-1} + \sum_{i=0}^{n} \delta_{1t} \Delta GDPG_{i,t-1} + \sum_{i=0}^{n} \delta_{2t} \Delta FDI_{i,t-1} + \sum_{i=0}^{n} \delta_{3t} \Delta NODA_{i,t-1} + \varepsilon_{it} \qquad \textbf{1.7}$$

$$\Delta FDI_{it} = \beta_0 + \beta_{1i} FDI_{i,t-1} + \beta_{2i} GDPG_{i,t-1} + \beta_{3i} NODA_{i,t-1} + \sum_{i=0}^{n} \lambda_{1t} \Delta FDI_{i,t-1} + \sum_{i=0}^{n} \delta_{2t} \Delta GDPG_{i,t-1} + \sum_{i=0}^{n} \delta_{3t} \Delta NODA_{i,t-1} + \varepsilon_{it} \qquad \textbf{1.8}$$

$\Delta NODA_{it} = \beta_0 + \beta_{1i}NODA_{i,t-1} + \beta_{2i}FDI_{i,t-1} + \beta_{3i}GDPG_{i,t-1} + \sum_{i=0}^{n} \lambda_{1t}\Delta NODA_{i,t-1} + \sum_{i=0}^{n} \lambda_{2t}\Delta FDI_{i,t-1} + \sum_{i=0}^{n} \lambda_{3t}\Delta GDPG_{i,t-1} + \varepsilon_{it}$ **1.9**

Where:

GDPG represents economic growth,

FDI represents foreign direct investment,

NODA represents official development assistance,

β are the long-run coefficients of the independent variables,

δ, φ, λ,Ө, γ are the short-run coefficients,

ε_{it} is error term with the i and t representing the country and time period, respectively.

The lag order (p, q) was selected using the Akaike Information Criterion. The lagged variables and the differences variables of the ARDL, respectively, test for the long-run and the short-run relationships of the variables, which would in theory assist with the achieving of Research objective 2.

4.9.3 Error correction model

After determining the long-run relationship between economic growth, FDI and ODA, the study determined the short-run (Research objective 3) effects using the panel based vector error correction model (ECM) (Pesaran *et al.*, 1999; Pedroni, 1999, 2004; Apergis & Payne, 2010).

The benefit of using the ECM is that it combines cointegration and captures the short-run effects of the variables under study (Engle & Granger 1987; Engle & Yoo, 1987; Hoffman & Rasche, 1996). Thus, it allows for causation of the lagged difference terms (short-run causality) as well as the error correction terms (long-run causality) (Apergis & Payne, 2010).

The choice of using the ECM was guided by the existence of cointegration between the variables. If cointegration existed, the ECM would be estimated. The generic ECM, based on the current variables that were proposed for the current study, are therefore, specified in equation 1.10:

$\Delta GDPG_{i,t} = \alpha_{0,t} + \sum_{j=1}^{p} \beta_j \Delta GDPG_{i,t-j} + \sum_{j=0}^{q} \phi_{i,j} \Delta X_{i,t-1} + \varphi_{1i} ECT_{i,\, t-1} + \omega_{it}$ **1.10**

Where:

Δ is the first-difference operator,

p, q the lag length selected using the AIC,

GDPG is the economic growth variable,

X is a vector of the independent variables,

ECT is the error correction term,

α is the constant,

β,ϕ, are short-run coefficients,

φ is the speed of adjustment to the long-run equilibrium,

ω is the error term which is assumed to be normally distributed with zero mean and constant variance.

The error correction term coefficient (φ) in the ECM equations explains the speed of adjustment of the system to the long-run equilibrium after a shock in the short run. The coefficient of the ECT (φ) is expected to be negative and statistically significant to show how the variables converge to the equilibrium level (Sadorsky, 2009; Bildirici & Kayıkçı, 2013).

In the event that the bounds test for cointegration indicated cointegration, generic ECM models would be specified in the following manner: The system of equations for the tri-variate ECM was as specified in equation 1.11-1.13.

$$\Delta GDPG_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta GDPG_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta FDI_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta NODA_{i,t-1} + \lambda_{1i}ECT_{i,\,t-1} + \varepsilon_{1it} \qquad \textbf{1.11}$$

$$\Delta FDI_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta FDI_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta GDPG_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta NODA_{i,t-1} + \lambda_{2i}ECT_{i,\,t-1} + \varepsilon_{2it} \qquad \textbf{1.12}$$

$$\Delta NODA_{it} = \alpha_0 + \sum_{k=1}^{q} \beta_{1i}\Delta NODA_{i,t-1} + \sum_{k=1}^{q} \beta_{2i}\Delta FDI_{i,t-1} + \sum_{k=1}^{q} \beta_{3i}\Delta GDPG_{i,t-1} + \lambda_{3i}ECT_{i,\,t-1} + \varepsilon_{3it} \qquad \textbf{1.13}$$

From equation 1.11-1.13 where:

α, is the constant,

β, short-run coefficients,

λ, φ, ϕ are the speed of adjustments to the long-run equilibrium

4.10 METHODOLOGY CONCLUSION

To conclude, the data and statistical analysis of this research study was done using Stata. The specific program was chosen as a result of its statistics functionality and capabilities and its relative ease of use. The descriptive and residual statistics among the data included, but was limited to the mean, minimum, maximum, standard deviation and the skewness and kurtosis of the data. Furthermore, a full clarification of the empirical and estimation models was given, and arguments around the use of the chosen method were provided. The General Method of Moments (GMM) estimation technique, followed by ADRL and ECM, was implemented on the regression analysis and was fundamental to the analysis of the variables, and formed the key to examining and estimating the relationship between the variables. The analysis indicated to what degree the one described the increase and or decrease in the other over different economic periods.

The data analysis will allow scholars and policy-makers to identify how robust the correlation between the various variables is. The interpretation of the results will permit experts to recognise what relationships exist between the variables, which might lead to improved aid policy formulation, and allow MNEs that have to make tough FDI decisions to take advantage of market imperfections. In addition, stationarity tests using the unit root tests and the robustness thereof were applied to permit for a more precise and explanatory interpretation of the outcomes.

CHAPTER 5:
DATA ANALYSIS AND DISCUSSION

5.1 INTRODUCTION

Chapter 5 forms an integral part of the study. It provides the empirical results needed for an in-depth and concrete analysis of the panel data set. This chapter presents a detailed discussion of the result outputs of the various methodologies and estimation techniques. The section follows a chronological sequence to make it more readable. Furthermore, the analysis of the data and the discussion thereof is ordered according to the different time periods and will be indicated as such.

The different and unique time periods chosen for the study (2000-2018; 2000-2006; 2007-2010; 2011-2018) were done in accordance with the defined research objectives and the research questions and to study the variables and their interactions preceding, and following specific economic events or shocks (for example, the global financial crisis), and the consequences of these variables and other monetary and fiscal interventions provided to, and by the sample of African countries for the economic development of each.

The empirical results are methodically arranged according to the stated research objectives. Thus, the structure is guided by the formulated research objectives, which are:

To examine the relationships between FDI, foreign aid and economic growth within the African context, under various economic conditions. With the specific objectives formulated for this being:

- Research objective 1: To evaluate the deterministic relationships between foreign direct investment, foreign aid and economic growth in African countries.
- Research objective 2: To examine the long-run cointegrating relationships between foreign direct investment, foreign aid and economic growth in Africa.
- Research objective 3: To determine causality between foreign direct investment, foreign aid and economic growth in Africa, and the robustness thereof.

The chapter outlines the data analysis and results section of the study, starting with a brief description of the data, followed by the descriptive and pre-test diagnostic statistical analysis.

After passing the required descriptive and diagnostic thresholds, the study employed a two-step dynamic system GMM to study the deterministic relationships between FDI, ODA and economic growth over the chosen time periods, followed by autoregressive distributed lags (ARDL) and error correction model (ECM) to examine the long-run cointegrating relationships and causality between the variables.

5.2 EMPIRICAL RESULTS

5.2.1 The data

The initial African country-specific data chosen for this study consisted of a selection of 29 countries over 28 years (1990-2018) selected from the World Bank's World Development Indicators (WDI). Following the selection and subsequent extraction of the data, missing variables were noted in many of the variables (series) pre-2000. The reasons for the missing values could vary from country to country, such as the ability of some governments to collect and process the data in a timely and accurate manner for the World Bank's data collection efforts.

After accounting for all the missing values and validating the possibility of an accurate dataset, data relating to 20 countries over 19 years (2000-2018) remained. The countries that had the data points for the selected series over the correct period were: Botswana, Burkina Faso, Chad, Democratic Republic of the Congo, Cote d'Ivoire, Egypt, Ghana, Kenya, Malawi, Mali, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, South Africa, Tanzania and Uganda. In limited cases where additional random missing values were noted in, for example, the education variable (EDU), the study used linear interpolation to interpolate the missing values using the three-year moving average calculated in Excel to fill the gaps, as recommended by Fung (2006).

5.3 DESCRIPTIVE STATISTICAL ANALYSIS AND DISCUSSION

This section of the study presents the descriptive statistical analysis of the variables chosen for this study as a preliminary necessary test before implementing the chosen methodology and estimation techniques. The descriptive statistical analysis was done on the raw data as extracted from the chosen database and imported into the statistical software (Stata) to get a preliminary feel for the data and to see what the sample conveyed. The analysis was done on the entire sample of African countries (29 countries), after accounting for missing values in the series and the unavailability of data for specific time periods.

After 'cleaning' or validating the raw data, the sample that was left constituted 20 African countries over 19 years (2000-2018). The 20 African countries that were left, and that were used in the analysis and whose data is available over the analysis period are: Botswana, Burkina Faso, Chad, Democratic Republic of the Congo, Cote d'Ivoire, Egypt, Ghana, Kenya, Malawi, Mali, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, South Africa, Tanzania and Uganda.

The use of descriptive statistics in the preliminary analysis is essential because it indicates whether the sample is normally distributed, whether there are any outliers in the data, and it provides information on the measure of central tendency (mean, median and mode), dispersion (for example, range, variance and standard deviation, showing how the data is spread out) and the measures of normality via kurtosis (that is, it measures the degree of sharpness) and skewness (thus, it measures the degree of asymmetry).

The data variables (series) selected for this study were GDPG, representing the annual GDP growth rate per country as a growth percentage; FDI, representing net FDI inflows as a percentage of GDP; NODA, representing nett ODA received as a percentage of gross national income (GNI); GDS, representing gross domestic saving as a percentage of GDP; POP, representing the annual population growth as a percentage; EDU, representing the nett secondary school enrolment rate as a percentage of the population of individuals who are of the official and equivalent school age; LEXP, representing the life expectancy of a newborn infant in years; ELEC, representing the percentage of the population with access to electricity, which is also a proxy for infrastructure availability; and NATR, representing the total contribution of natural resource rents as a percentage of GDP. Using a pooled estimation technique, the results output for the 20 African countries over the full 19 years (2000-2018) are presented in Table 5.1.

Table 5.1: Descriptive statistics output summary (2000-2018)

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	Probability	Observations
NODA	7.332358	6.067913	62.18660	0.014323	6.771152	2.201455	15.06697	2612.459	0.000000	380
POP	2.574553	2.673305	5.604957	1.107807	0.701151	-0.120347	3.240647	1.834203	0.399676	380
LEXP	57.79491	57.02650	76.45300	45.09000	7.070527	0.576242	2.642471	23.05409	0.000010	380
NATR	8.679403	6.996506	38.65062	0.192943	6.894415	1.685257	6.366600	359.3273	0.000000	380
GDS	14.57759	13.74876	57.16047	-40.81475	10.17929	0.315707	5.633746	116.1423	0.000000	380
GDPG	5.108262	5.257401	33.62937	-7.652310	3.539179	1.202218	14.70151	2259.523	0.000000	380
FDI	3.666213	2.436347	46.27524	-4.845830	5.159860	4.399927	28.16110	11249.88	0.000000	380
ELEC	37.76952	31.39433	100.0000	3.186104	28.82618	0.692708	2.305786	38.02073	0.000000	380
EDU	97.92410	101.1388	149.2714	32.35606	22.23287	-0.024459	3.186500	0.588609	0.745050	380

Source: Author's own computation from Stata outputs

The structure of the descriptive analysis reporting is to report on the information related to the measures of central tendency, measures of dispersion and the measures of normality for each variable for a total of 380 observation per series in the full data set.

Within the measures of normality, it should be noted that kurtosis measures the peakness or flatness of the distribution of the series (variable). It is assumed that when referring to a series as mesokurtic, it simply means it embodies a normal distribution with a kurtosis of 3; if it is leptokurtic, it means that it has positive kurtosis, it is peaked-curved and indicates more higher values for that particular series, above the sample average; and if it is platykurtic, it has negative kurtosis, a flatted curve indicating more lower values below the sample average.

If a series has normal skewness, it means that the series has a distribution that is symmetric around its mean and a skewness value of 0. For positive skewness, the series has a long right tail, indicating there are more of the higher values above the sample average. Finally, a negative skewness indicates a long left-tail distribution, with more of the lower values below the sample average.

Furthermore, the Jarque-Bera (Jarque & Bera, 1987) test, which jointly measures the skewness and kurtosis is performed and tested against the null hypothesis of an assumed normal distribution and then reported on.

The descriptive statistic summary in Table 5.1 indicates that, the mean for variable GDPG (GDP growth), for the sample of African countries is 5.11%. The mean is slightly lower than the 5.85% average GDP growth rate for other comparative emerging market economies (Li & Lin, 2019).

The minimum GDP growth rate over the entire analysis period (2000-2018) reflected a negative growth rate of 7.65% which might indicate the effects of the global financial crisis (2007-2010) and the effect it had on most African countries in the sample. The maximum GDP growth rate observed was 33.62%, which could be the result of a country in the sample bouncing back from a low or negative base level, or it could be the impact of an increase or decrease in any of the variables in the study's analysis.

The standard deviation from the sample mean is 3.54. The skewness value that measures the degree of asymmetry is 1.20. Thus, GDPG is positively skewed (has a long right tail because skewness value > 0) and is leptokurtic (kurtosis value 14.70 > 3). The deviation from normality is confirmed by the Jarque-Bera (J-B) statistical value

(2259.523) and the significance of the p-value (p-value < 0.05), signifying that the sample data does not have a skewness and kurtosis matching a normal distribution.

The mean for variable FDI was 3.67% of GDP. Over a comparative period, the African countries in our sample do not compare well in terms of FDI inflows with other emerging markets such as Asia, Southeast Asia and India (Cherif & Dreger, 2018; Singh, 2019; Zhang, Cheng & He, 2020).

The minimum value FDI contributed to GDP for the sampled African countries under review was -4.85%. The negative value illustrates a nett capital outflow, thus FDI outflows exceeded nett inflows for the specific African country within the pool. The maximum percentage FDI contributed to GDP is 46.28%. A possible reason for the large percentage could be because of the over-reliance on FDI for in-country investment or funding by one of the sampled countries (Pogátsa, 2018; Lam, 2019; Ha, 2019).

The standard deviation from the sample mean is 5.16. Variable FDI has a long-right tail and is thus positively skewed (skewness value 4.40 > 0) and leptokurtic (kurtosis value 28.16 > 3). The deviation from normality is confirmed by the Jarque-Bera statistical value (11249.88) and the significance of the p-value (p-value < 0.05), signifying that the sample data does not have a skewness and kurtosis matching a normal distribution.

NODA, as one of the main independent variables, has a mean 7.33%. Thus, of the sampled African countries, on average 7.33% of their gross national income over the analysis period consisted of ODA from donor countries. The official development assistance mean for the selected African countries is extremely high, when compared to a combined index of similar studies on emerging or developing markets that indicated a comparative mean of 2.11% (Kima & Lekheb, 2019). The minimum value NODA contributed to the gross national income of the sampled countries is 0.01% and the maximum 62.18%.

A possible explanation for the large deviations could be the economic and socio-economic circumstance some African countries in the sample faced over the course of the analysis period that necessitated ODA from DAC members, or merely the over-reliance on assistance by failed African states from those countries willing to provide and commit aid funding (Isaksson & Kotsadam, 2020; Dolan & McDade, 2020). The lasting impact of natural disasters, conflict and welfare programmes that necessitated assistance from DAC members to commit funding over extended time periods could also lead to higher than expected NODA values (Yahyaoui & Bouchoucha, 2021). The standard deviation for NODA is 6.77. The series represents positive skewness (skewness value 2.2 > 0) and is leptokurtic (kurtosis value 15.07 > 3). The deviation from normality is confirmed by the Jarque-Bera statistical value (2612.459) and the significance of the p-value (p-value < 0.05), signifying that the sample data does not have a skewness and kurtosis matching a normal distribution.

The GDS variable, as an indication of the savings rate for the sampled countries has a mean of 14.58%. The mean gross domestic savings rate is lower than those of other emerging markets in Latin America and Asia, implying possible differences between emerging market economies in, for example, financial access and interest rates between markets (Emara & Kasa, 2021).

The minimum GDS rate for the sample is -40.81% and the maximum value 57.16%. The significant deviation between the minimum and maximum values is indicative of the structural differences between the sampled countries. The value clearly illustrates that the citizens of some African countries still do not save in accordance with their levels of income or GDP indicators (Nagawa, Wasswa & Bbaale, 2020). Thus, some countries can be merely considered as consumers who are over-indebted and add very little value to their respective countries' GDP through increased production, apart from agricultural developments (Ssozi, Asongu & Amavilah, 2017).

The standard deviation for GDS is 10.18. In addition, the variable has a skewness of 0.32, indicative of a slightly longer right-tail distribution, which emulates a normal distribution (skewness value > 0) and is leptokurtic (kurtosis value 5.63 > 3). The deviation from normality is confirmed by the Jarque-Bera statistical value (116.1423) and the significance of the p-value (p-value < 0.05), signifying that the sample data does not have a skewness and kurtosis matching a normal distribution.

The annual population growth (POP) for the pooled sample has a mean of 2.57%, which is extremely high when compared to other developing and developed countries around the globe, where in some instances the population growth rate has been steadily declining (Lizunkov, Politsinskaya, Malushko, Kindaev & Minin, 2018). When compared to the mean of GDPG (5.1%) it implies that for the countries in the sample, over the given analysis period (2000-2018), the economies of the sampled countries grew at a faster rate than the population did. The comparison on a pooled basis, is positive for planning and job creation purposes for the selection of African countries but creates developmental challenges, due to the rapid urbanising workforce, especially in SSA (Saghir & Santoro, 2018).

However, the minimum population growth rate is 1.1% per year and maximum population growth rate is 5.6%, which is higher than the GDPG average and indicative of increased levels of unemployment (Bala, Ibrahim & Hadith, 2020). The standard deviation for POP is 0.70, and the data represents a skewness of -0.12, indicative of a long left tail and more lower values below the sample mean (skewness value -0.12 < 0) and is leptokurtic (kurtosis value 3.24 > 3). With a Jarque-Bera statistical value (1.834203), although high in relative terms, coupled with a p-value of 0.40 (p-value > 0.05), the study fails to reject the null hypothesis of normality at a 95% level of confidence.

The nett secondary school enrolment rate (EDU) series has a mean of 97.92%, a minimum of 32.35%, and a maximum of 149.27%. The high maximum value and high average for the sample of 20 African countries could be indicative of a large number of over-aged children registered for school, for example, due to factors ranging from grade repetition or last-minute registration into the schooling system, which are commonplace and should not necessarily be viewed as an indication of the success or failure of the sampled African countries' education system. In addition, it could indicate the additional educational spending by the African countries to improve access to education in their respective countries (Olasunkanmi, Oladele, Akinola & Bidemi, 2020).

The standard deviation is 22.23. The asymmetry of the series has a negative skewness, which indicates a long left tail (skewness value -0.02 < 0) and is leptokurtic (kurtosis value 3.19 > 3). From the series in the sample, EDU has a skewness and kurtosis closely matching a normal distribution, with a Jarque-Bera statistical value of 0.588609 and a p-value of 0.75 (p-value > 0.05). Therefore, the null hypothesis cannot be rejected at a 95% level of confidence.

The LEXP variable, representing the number of years an infant is expected to live, assuming all other mortality patterns remain constant, has a mean of 57.79 years. The minimum number of years an infant is expected to live, given the assumptions above, is 45.09 years and the maximum us 76.45 years. The range between the minimum and maximum value show that different countries experience vastly different levels of socio-economic development and access to healthcare which may impact the life expectancy of a particular age group in a particular country, and have long-term economic growth ramifications (Turan, 2020; Kiziltan, 2021).

The standard deviation is 7.07 for the series, mirroring a close to normal skewness with a slightly longer right tail (thus, a symmetrical distribution around the mean) of 0.58 (skewness value > 0) and is platykurtic (kurtosis value 2.64 < 3). The deviation from normality is confirmed by the Jarque-Bera statistical value (23.05409) and the significance of the p-value (p-value < 0.05).

The ELEC variable, used as a proxy to indicate a level of infrastructure availability, chosen for the study to measure the percentage of the population that has access to electricity has a mean of 37.76%. The mean is low compared to other developing markets but higher than on a purely regional basis such as SSA (Sarkodie & Adams, 2020).

The minimum and maximum values are 31.39% and 100% respectively. The high maximum value may indicate a country in the sample that is relatively well developed with good infrastructure that has been built up over the course of many years. The low average and minimum value show that some of the sampled African countries still have a long way to go to provide access to electricity for a large portion of their respective populations, which coupled with the low mean, if compared to other developing economies, indicates the enormous energy and infrastructure gaps prevalent in the study's sample (Ayaburi, Bazilian, Kincer & Moss, 2020).

The ELEC variable has a standard deviation of 28.82, which indicates a substantial fluctuation around the mean. The data shows a slightly positive (right-tail) distribution, but otherwise normal skewness value (0.69 > 0), and is platykurtic (kurtosis value 2.31 < 3). The deviation from normality is confirmed by the Jarque-Bera statistical value (38.02073) and the significance of the p-value (p-value < 0.05).

The natural resource rent variable (NATR), representing the total contribution of natural resource rents towards a county's GDP has a mean of 8.68%. Thus, on average for the sampled African countries in the analysis, natural resource rents are responsible for a GDP contribution of almost 10%, and explains the reliance on natural resources, which is coupled with the price fluctuations driven by market supply and demand forces that many natural resource-rich countries face, both in Africa and in oil-rich Middle Eastern countries (Aljarallah, 2021). The minimum value is 0.19% and the maximum value 38.65%. The significant difference in minimum and maximum values, shows that natural resource-rich countries continue to rely on the value of their country's natural resources and the country's ability to monetise and extract value from, and contribute to, the increase in their GDPs (Henri, 2019).

Fluctuation in the value of natural resource would therefore also add to the changes in the sample's GDP contribution for different countries over different periods. The standard deviation is 6.89. The series has a long right tail, thus positively skewed (skewness value 1.68 > 0) and is leptokurtic (kurtosis value 6.36 > 3). The deviation from normality is confirmed by the Jarque-Bera statistical value (359.3273) and the significance of the p-value (p-value < 0.05).

The joint skewness and kurtosis Jarque-Bera test, coupled with the p-values confirm the validity of the decisions made and the significances thereof in the preceding analysis. Finally, from the analysis in Table 5.1 it is noted that the p-values were statistically significant for most of the variables and indicated strong evidence against the null hypothesis of normality. However, POP had a p-value of 0.40 and EDU had a p-value of 0.75, thus the null hypothesis was not rejected at a 95% level of confidence that the data is a normally distributed series and occurred by random events.

Apart from the descriptive statistics and the unit root tests, a correlation matrix as an additional diagnostic test, is included as Appendix 1 to illustrate the correlation coefficients between the chosen variables in the analysis. The correlations in the correlation matrix are noted, although not formally reported on for the purpose of this study.

5.4 STATIONARITY (UNIT ROOT) TESTING

Most experimental econometric studies that rely on time series data accept that the fundamental series (data variable used or chosen for analysis) is stationary by its very nature. In practical terms, stationarity of a series suggests a flat-looking series without changes over time. Thus, the series has no trend, a constant variance, covariance and mean with no periodic shifts and a constant autocorrelation structure. Thus, the series does not fluctuate or differ methodically or systematically over time, and is therefore invariable over time. Thus, the statistical properties of the time series remain the same as they have in the past. If these assumptions are not met by the series, it is assumed that the series is nonstationary, and might imply the possibility of autocorrelation in the error term and create fundamental challenges within the analysis (Dickey & Fuller, 1981). In econometric estimation, the terms, 'unit root' and 'nonstationary' are used interchangeably and indicate that when a series is nonstationary, a unit root is present. The unit root test determines the order of integration of the variables (series) (Pesaran *et al.,* 2001).

Using nonstationary data and regressing multiple series in the presence of a unit root, would lead to a spurious regression analysis and doubtful results, and should be rejected. A nonstationary time series will have a time-varying variance and/or mean. In contrast, a stationary series will move back towards its mean or previous state, and the variance or movement around the mean will mostly be within a constant range.

The importance of testing for stationarity in time series and other data is significant, since the presence of a unit root means that the performance of a series can only be considered for the specific time under consideration or for a certain incident. The outcomes of an analysis using nonstationary data can therefore not be generalised over different time periods, and could not be used to predict the series' importance to other periods of time, making its use pointless. The data that is used in time series analysis should therefore preferably always be stationary under certain conditions (Huang *et al*., 1998). The statistical properties of the time series estimators within the analysis are effectively dependent on the stationarity of the data (Hsiao, 2014).

Knowing that the statistical properties of the time series estimators within the data are dependent on the stationarity of the data, and before cointegration techniques can be utilised, it is important to ascertain the level or order of integration between the variables. It is therefore important to execute stationary testing to confirm that the order of integration within the series data does not exceed the first order I(1). Knowing that the order or level of integration does not exceed I(1), indicates that the ARDL bounds test for cointegration can be performed and that the F-statistic can be correctly construed. This is based on the assumptions that the series are integrated of order I(0) or I(1) (Pesaran & Smith, 1995; Pesaran, 1997; Pesaran *et al.*, 1999, 2001).

A panel unit root-testing approach which originated from, but differs from the time series stationarity or unit root tests explained above, was followed in the study. The main transformation between the two approaches is that in a panel data unit root test, both the asymptotic behaviour of the cross section (N) and the time-series dimensions (T) are measured to establish stationarity of the variables (Im, Pesaran & Shin, 2003). The panel unit root framework is therefore a necessary diagnostic test to perform, in order to establish if a cointegration test is necessary, based on whether the series are stationary in levels.

Theoretical and empirical studies indicate that both the first and second generation of panel unit root test are sufficient approaches to test for stationarity or non-stationarity within panel data series. The key difference between the first- and second-generation tests is the assumption in the second-generation tests that cross-sectional units could be cross-sectionally dependent, as opposed to independent (Breitung, 2000; Pesaran, 2007; Moon & Perron, 2004). Utilising first generation unit root test under the wrong assumptions would lead to a low illustrative power of the chosen test, coupled with size misrepresentation in the outputs (Hurlin, 2010). Table 5.2 presents a summary of unit root empirical studies.

Table 5.2: Unit root empirical studies summary

First-generation studies (Homogeneity assumption)	Second-generation studies (Heterogeneity assumption)
Non-stationarity test: Tests null hypothesis of a unit root.	**Non-stationarity test: Tests null hypothesis of a unit root.**
Im *et al.* (2003)	Pesaran (2007)
Levin, Lin and Chu (2002)	Moon and Perron (2004)
Choi (2001)	Bai and Ng (2004)
Breitung (2000)	Chang (2002)
Maddala and Wu (1999)	
Stationarity tests	**Stationarity tests**
Hadri (2000)	Bai & Ng (2001)
	Harris, Leybourne and McCabe (2005)

Source: Author's own compilation

Within the first-generation literature cited in Table 5.2, only Hadri (2000) did not test the null hypothesis of a unit root. The tests of Maddala and Wu (1999), Im *et al.* (2002) and Choi (2001) were founded on heterogeneous cross-sectional construction, as opposed to homogeneous cross-sections (Breitung, 2000; Hadri, 2000; Levin *et al.* 2002) and all the tests except for the one developed by Hadri (2000) are sufficient to use on unbalanced panels.

Improving on the deficiencies experienced by the first-generation tests, all the second-generation tests assume that cross sections are heterogeneous and contain a unit root, apart from the tests of Bai and Ng (2001) and Harris *et al.* (2005) which do not accept the automatic presence of a unit root in the data.

Thorough consideration was given when the unit root tests were performed to evaluate the appropriateness of the different tests for this study. Both first- and second-generation unit roots tests were implemented and compared by looking at the outcomes of the tests, and by analysing the positive and negative elements of the tests on the dataset.

The structure of the diagnostic unit root tests, as they were selected in Stata is as follows: Firstly, the Levin, Lin and Chu test (2002) (also referred to as the LLC test) was performed, secondly, the Im, Pesaran and Shin (2003) (also referred to as the IPS test) was done. Thereafter, the Breitung t tests (BU), ADF-Fisher Chi-Square and the PP-Fisher Chi-Square (Maddala & Wu, 1999) panel unit root tests were done as cross-sectional dependent tests. The compatibility of these tests was verified by Maddala and Wu (1999) and Baltagi (2005, 2008), who argued that lag lengths of the Fisher test can differ, and that the lag selection is appropriate to other unit roots.

5.4.1 Levine, Lin and Chu (LLC) Test

The LLC test assumes homogeneity of the coefficient of the lagged dependent variable across all units of the panel. There is, however, inadequate strength in individual unit root tests against the alternative hypotheses, and they have a tendency to relentlessly move away from the equilibrium which is significant in small samples. (Levin *et al.*, 2002; Baltagi, 2005, 2008).

The LLC test (2002) theorised that every individual series has a unit root, against the alternative hypothesis that each time series is stationary, as follows:

H_0 = each time series contains a unit root.

H_1 = each time series is stationary.

Running the augmented Dickey-Fuller (ADF) unit root test (Dickey & Fuller, 1979; 1981) as a preliminary step in the unit root-testing process is recommended (Harris, 1992; Levine *et al.*, 2000). It is hypothesised by the following model:

$\Delta Y_{it} = \rho_i Y_{i,t-1} + \sum_{L=i}^{p_i} \theta_{i\,L}\, \Delta\gamma_{it-L} + \alpha_{mi} d_{mt} + \varepsilon_{it}$ where m = 1,2,3… **5.1**

with d_{mt} indicating the vector of deterministic variables, whilst α_{mi} is the corresponding vector of coefficients for model m = 1, 2, 3, …, p_i is the lag order (Levine *et al.*, 2000; 2002).

If ρ_i =0, it means the *y* process has a unit root for individual i, where I = 1,2,3,…,N and t is the time period 1, 2, 3…T.

If ρi<0, the y process is stationary around the deterministic part. L is the lag length.

According to Levin *et al.* (2002) and Baltagi (2005, 2008), the lag order is allowed to fluctuate across individual units. In order to obtain the standard error terms, supplementary regressions were run on equation 5.1. When utilising the LLC test, the null hypothesis was rejected when the LLC test was smaller than the critical value from the lower tail of a normal distribution.

The LLC test recommends a three-step order of operation. Thus, firstly, perform a separate augmented Dickey-Fuller regression for each cross section, secondly estimate the ratio of long-run to short-run standard deviations, and thirdly, compute the panel test statistics and run the pooled regression, which is the order this study followed.

Furthermore, to test the robustness of the model, the study additionally ran the Im, Pesaran and Shin (IPS) test to ensure that the robust statistic was resistant to errors in the results' output.

5.4.2 Im, Pesaran and Shin (IPS) Test

To allow for heterogeneity of the roots across the units, as opposed to homogeneity in the LLC, the IPS test could be seen as an extension of the LLC test (Im *et al.*, 2003). During the IPS test, H_o is that each series contains a unit root against H_1 that specifies that only some contain a unit root. From Monte Carlo simulations, it is shown that when large lag orders are selected for the underlying ADF regressions then the IPS test performs better than the LLC test due to the small sample performance of the *t*-bar test (Im *et al.*, 2003).

The ADF-Fisher Chi-Square and the PP-Fisher Chi-Square test were performed in addition to the LLC and IPS to ensure robustness. All these diagnostic tests were done before the GMM, panel ARDL and ECM methodologies were used and elaborated upon, with regards to the long and short-run cointegrating and causation relationship between the dependent and independent variables, as discussed in the following section.

5.5 TESTING FOR UNIT ROOTS

To test for, and to establish the order of integration of the variables (series) in the sample, with the aim of carrying out cointegration and regression analyses on the data set, the study performed preliminary stationarity tests, such as the LLC, IPS, ADF-Fisher Chi-Square and PP-Fisher Chi-Square tests. These stationarity tests act as a guide for the data analysis sequence and strengthen the argument for the use of the ARDL bounds approach and later the ECM methodology.

The suitability of the chosen methodologies was further amplified by the assumption that ARDL is only valid when the variables are integrated of order zero or one (thus, I(0) or I(1). It is noted that the ARDL bounds approach did not necessitate the variables to be of the same order of integration, but that the use of unit roots as a robustness enhancement strategy would ensure that only variables of lower order of integration were included when performing the cointegration and regression analysis test on the data sample.

This study relied in the guidance given by Gujarati and Porter (2009) when choosing which of the unit root test to apply, and this guidance was solely based on the strength and size of the unit root test. Therefore, the decisions depended on the probability of rejecting the null hypothesis, thus accepting the alternative hypothesis (power) and the level of significance based on the *p*-value (size).

After performing the LLC, IPC, the ADF-Fisher Chi-Square and PP-Fisher Chi-Square tests in this study, the result output yielded the following results for all the chosen variables in the study, as summarised and depicted in Table 5.3. The tests assumed that H_0 contains a unit root, against the alternative H_1 that it does not contain a unit root. The significance of the p-value drove the decision to accept or reject H_0 in favour of H_1. In addition, it was acknowledged that all test probabilities assumed asymptotic normality, apart from the Fisher type tests, that were computed in Stata using an asymptotic Chi-square distribution.

Table 5.3: Panel unit root test output summary (2000-2018)

Variable	Intercept	Intercept and trend	None	Decision
Levin, Lin & Chu				
GDPG	-3.24513***	-2.63942***	-19.4766***	I (1)
FDI	-3.26732***	-2.69142**	-3.24556***	I (0)
NODA	-11.2131***	-10.5598***	-17.5185***	I (1)
GDS	-7.26993***	-5.77429***	-15.3761***	I (1)
POP	-11.1723***	-21.7371***	-14.1170***	I (1)
EDU	-5.62437***	-4.60842***	-8.62625***	I (1)
LEXP	-32.1609***	-26.2853***	-15.2782***	I (1)
ELEC	-7.12861***	-5.74752***	-10.6333***	I (1)
NATR	-9.36751***	-7.86994***	-15.9209***	I (1)
Im, Pesaran and Shin				
GDPG	-4.59412***	-4.78774***	-	I (1)
FDI	-3.37848***	-2.34253**	-	I (0)
NODA	-11.2677***	-8.91797***	-	I (1)
GDS	-9.46422*	-7.18998***	-	I (1)
POP	-13.2996***	-23.9733***	-	I (1)
EDU	-6.18934***	-5.29822***	-	I (1)
LEXP	-34.4225***	-26.9040***	-	I (1)
ELEC	-11.0808***	-9.21169***	-	I (1)
NATR	-8.91093***	-6.43496***	-	I (1)
ADF - Fisher Chi-square				
GDPG	89.4249***	89.8989***	340.022***	I (1)
FDI	76.5488***	63.7009**	62.1084*	I (0)

Variable	Intercept	Intercept and trend	None	Decision
NODA	194.313***	142.508***	290.774***	I (1)
GDS	162.108**	122.259***	252.909***	I (1)
POP	244.821***	208.981***	249.690***	I (1)
EDU	113.533***	105.154***	159.533***	I (1)
LEXP	1429.26***	297.539***	254.329***	I (1)
ELEC	189.797***	151.267***	182.434***	I (1)
NATR	152.580***	110.553***	258.349***	I (1)
PP - Fisher Chi-square				
GDPG	203.569***	223.083***	454.845***	I (1)
FDI	99.1686***	92.1037***	63.0683*	I (0)
NODA	902.439***	298.856***	430.491***	I (1)
GDS	386.824***	264.222***	390.223***	I (1)
POP	94.7993***	68.4104**	148.593***	I (1)
EDU	214.235***	183.181***	230.685***	I (1)
LEXP	65.6993**	54.9361**	47.8956**	I (1)
ELEC	998.363***	345.289***	349.074***	I (1)
NATR	263.899***	244.349***	358.022***	I (1)

NOTE: Where **P*< 0.05; ***P*<0.01; ****P*<0.001 denotes the levels of significance.

Source: Author's own compilation from Stata outputs

The unit root test summary in Table 5.3 describes the four main unit root tests performed in Stata (LLC, IPS, ADF-Fisher Chi-square and PP-Fisher Chi-square) with three distinctive deterministic option terms: intercept, intercept and trend, and none. The summary shows that all the variables, except for FDI are of first order integration (thus stationary at first difference), and were mostly significant at ****P*<0.001, with the differences in *p*-values between the tests on some variables noted. FDI became stationary at level.

This section concludes the discussion of some of the diagnostic tests used within the panel data analysis which informed and strengthened the use of the appropriate methodologies and estimation techniques for the study. The following section provides a methodological breakdown of the models used, such as the dynamic two-step system GMM to analyse and evaluate the deterministic relationships between the variables (GDPG, FDI and NODA) over different and unique time periods. After establishing and determining the deterministic relationships between the variables using the GMM model estimation, an in-depth discussion and analysis surrounding the long-run and short-run cointegrating and causal relationships between the variables economic growth, FDI and official development assistance (using the ARDL and ECM model estimation techniques) is discussed and inferences drawn. Within the context of the models, the relevant and necessary diagnostic tests and their thresholds are also explained.

5.6 GENERALISED METHOD OF MOMENTS ESTIMATION

Historically, studies of endogenous models utilising dynamic panel data commonly occurred, and empirical research using this technique was also conducted. Two notable additions to dynamic panel data analyses are the work of the scholars, Arellano and Bond (1991) and the follow-up paper by Arellano and Bover (1995). There are a few more empirical papers elaborating on the complex estimation techniques by Blundell and Bond (1998) and Roodman (2006, 2009) which form the basis for many modern-day analysis.

However, despite having been in use for more than three decades, this method still has several unanswered issues. For the purpose of this study, the primary role of this section is to present a practical approach to how the system GMM was employed on the panel dataset in this study. It therefore builds on the chosen methodology and explains how the outputs in the system GMM analysis were acquired using Stata Software over the unique time periods within the African context.

In order to evaluate the deterministic relationships between FDI, ODA and economic growth within the African context, these variables were analysed as being vectors of one another, in other words, the main independent variables (FDI and ODA) could also be used as dependent variables in the models to evaluate the deterministic and dynamic interaction between them. The objective was thus to replace the main dependent variable in the study's model (economic growth) with the two main independent variables (FDI and ODA) to evaluate these interactive relationships.

To reliably account for the endogeneity problem associated with the dependent and independent variables and instrumental variable' lags in difference and in levels, the system GMM estimator, as expressed and expanded on by Roodman (2006, 2009), was employed in Stata in this study.

The combined use of this statistical methodology also enables the study to isolate endogeneity of the dependent or independent variables, through the use of additional instruments in the model. The specific system GMM equation was therefore defined as:

$$GDPG_{it} = \alpha GDPG_{it-1} + \beta_1 FDI_{it} + \beta_2 NODA_{it} + \sum_{n=1}^{i} \beta X_{i\,t} + \mu_i + \varepsilon_{it} \quad \textbf{5.2}$$

$$FDI_{it} = \alpha FDI_{it-1} + \beta_1 GDPG_{it} + \beta_2 NODA_{it} + \sum_{n=1}^{i} \beta X_{i\,t} + \mu_i + \varepsilon_{it} \quad \textbf{5.3}$$

$$NODA_{it} = \alpha NODA_{it-1} + \beta_1 FDI_{it} + \beta_2 GDPG_{it} + \sum_{n=1}^{i} \beta X_{i\,t} + \mu_i + \varepsilon_{it} \quad \textbf{5.4}$$

Where: *i* denotes country, *t* denotes time, α is the constant term and the time invariant country-specific effects are captured by μ_i, whilst ε_{it} is the error term.

$GDPG_{it}$ = economic growth (measured as the annual GDP growth percentage) for country *i* at time *t*.

$GDPG_{it-1}$ = first lag of GDPG, capturing the effects of the previous period's economic growth for country *i* at time *t-1*.

FDI_{it} = foreign direct investment (measured as a percentage of GDP) for country *i* at time *t*.

FDI_{it-1} = first lag of FDI, capturing the effects of the previous period's FDI inflows as a percentage of GDP for country *i* at time *t-1*.

$NODA_{it}$ = official development assistance or foreign aid received (measured as a percentage of GNI) for country *i* at time *t*.

$NODA_{it-1}$ = first lag of NODA, capturing the effects of the previous period's NODA inflows for country *i* at time *t-1*.

X_{it} = vector of the explanatory variables for country *i* at time *t* presented by gross domestic savings (GDS), population growth (POP), life expectancy (LEXP), education (EDU), access to electricity (ELEC) and natural resource rents (NATR).

In addition, the study used the two-step system GMM, as opposed to the one-step GMM because it used the heteroscedastic weight matrix in the estimation which would account for the over-identification in the models.

The issue with systems GMM is that autoregressive mistakes with autocorrelation occur at a high frequency when there are many instruments, and the more instruments used, the more the serial autocorrelation increases. To account for over-identification in the model, the study employed the Sargan-Hansen test (Sargan, 1958; Hansen, 1982), and to prevent serial autocorrelation, the study followed the Arellano and Bond (1991) recommendations.

To eliminate the issue of over-identification, Roodman (2009) performed a comprehensive study of the causes of surplus instruments and developed methods to rule out their presence via the Sargan and Hansen tests. When estimating the one-step option, Sargan test results are satisfactory when H_1 is accepted, thus where H_0 states that over-identification restrictions apply. However, the Hansen test is used to determine whether a dataset has significant over-identification in the context of a heteroscedastic matrix. Both tests identify the over-identification issue, and to account for the restriction, the number of groups must always be larger than the number of instruments. For the purpose of this study, the number of instruments in the model was reduced by restricting the number of lags to one period to account for the possibility of over-identification.

Some additional disadvantages that are associated with serial second-order autocorrelation in residues are present in endogenous models, particularly relating to instruments that may be inconsistent. The result of this restriction was that the researcher in the current study, continuously evaluated instrumental variables to identify the most appropriate regression, even when the number of independent variables was sufficient. This created additional complications in regression calculations due to serial autocorrelation.

Therefore, to check for autocorrelation, the study used the Arellano and Bond test, where the hypothesis states, H_0: there exists no autocorrelation. Stata provided the outcome for first and second order (AR(1) and AR(2)) autocorrelation and in the event where H_0 was rejected it indicated the presence of a unit root. Based on the descriptive statistics and diagnostic outcomes, the study's model already accounted for such an eventuality.

5.6.1 Test interpretations

This section discussed the interpretation of the following tests: (1) the Arellano and Bond test, (2) the Saragan test, and (3) the Hansen test.

Arellano and Bond test interpretation:

In interpreting the Arellano and Bond test, it was assumed that in panel data analysis, the is no correlation in the error term (Cameron & Trivedi, 2009). Additional assumptions were that the likelihood of AR(2) is not expected to be significant at $p < 0.05$. This would indicate that serial autocorrelation does not exist in the error terms. Generally, AR(1) is significant when $p < 0.05$.

The interpretation used in this study was:

H_o: Autocorrelation is not present.

Criteria for rejection or adoption:

To reject H_o the study used AR(2). This rejection applies when the probability pr > z is higher than 0.05, that is to say, the errors term is not serially correlated in the model.

Sargan test interpretation:

According to Roodman (2006, 2009), the Sargan test confirms the accuracy of the measuring instruments used in the study. One-step GMM estimates are measured using this test, and the results are appropriate in cases when the potential for overestimation is limited. However, when using two-step GMM estimates, it is encouraged to use the Hansen test to screen for over-identification.

The interpretation of the Sargan test is:

H_o: All the restrictions of over-identification are valid.

The null hypothesis is accepted or rejected when Prob > chi2 ≥ 0.05. In other words, the instruments employed in the estimate should be legitimate, and thus over-identification does not exist if the probability obtained is equal to or greater than 0.05.

Therefore, the null hypothesis cannot be rejected. Though the data indicates that the instruments are invalid, if the probability is below 0.05, the results suggest that over-identification is occurring in the model. This, therefore, demonstrates that the null hypothesis has been rejected. With a probability close to 1, it indicates the instruments may not be genuine, and therefore, the mathematical characteristics of the test have not been allowed to develop to their asymptotic limit. The study, therefore, should say no to H_o (Roodman, 2009) since the likelihood is less than 0.05.

It is known that the estimator will utilise the greater number of instruments accessible and the presence of over-identification will greatly increase the likelihood of rejection of the Sargan test, meaning it is recommended to always implement certain instrument limitations if the Sargan test is rejected based on the output in Stata.

Hansen test interpretation:

The use of the Hansen test with a heteroscedastic weight matrix is recommended and the interpretation of the test is as follows:

H_o: All the restrictions of over-identification are valid.

The null hypothesis is accepted or rejected when Prob > $x^2 \geq 0.05$, and according to Roodman (2009), if the probability is close to 1, the asymptotic properties of the model have not been applied.

The popularity of the panel data technique among researchers and academics is demonstrated by the fact that it is one of the most often utilised methods for empirical economic analysis. A huge benefit over cross-sectional or time-series data is the incorporation of individuals or groups and time in panel format.

Studies and new findings have allowed dynamic models to be run, bringing evolutionary theoretical hypotheses with new dynamics to light. The majority of studies on this topic have used databases composed of many individuals and a short time span. However, for panels with a relatively small number of individuals or groups and a longer time period, some restrictions emerge.

When using the two-step system GMM alternative containing equations in levels and differences, there are limitations because of the growth of instruments of endogenous regressors. It is essential to use as many deliberations as possible to correctly estimate models that use databases and methodologies of this kind.

The diagnostic statistics and the result summaries for all the models in this study indicates that the chosen models pass the required thresholds (see Appendices 2-26) and in addition, the result outputs for the Arellano and Bond tests (AR(1) and AR(2)) as well as the Sargan and Hansen tests are provided and indicated as such in Tables 5.4 to Table 5.6, specifically for the two-step system GMM estimation for each identified period of analysis.

5.7 GMM OUTPUT RESULTS FOR GDPG AS THE DEPENDENT VARIABLE

In compiling the two-step GMM output tables to find the deterministic relationships that exist between FDI, ODA and economic growth in African countries, this study followed the processes described above.

This section provides an in-depth analysis using the methods and controls presented above to estimate this relationship. The empirical outputs are discussed based on previous theoretical and empirical work, and provide the new links between the dependent and independent variables. The analysis is structured according to the two-step dynamic system GMM, with the output results containing and evaluating the deterministic relationship between each of the main variables, GDP growth, FDI and ODA against the regressors over different and unique time periods.

Table 5.4 presents a summary of the GMM results of the determinants of GDPG, which will be discussed below the table.

Table 5.4: Determinants of GDPG – GMM results

	Full period 2000-2018	**Pre-crisis 2000-2006**	**During crisis 2007-2010**	**Post-crisis 2011-2018**
Variables	**GDPG**	**GDPG**	**GDPG**	**GDPG**
L.GDPG	0.0820 (0.105)	0.0216 (0.127)	-0.451*** (0.107)	-0.0196 (0.151)
FDI	0.217** (0.0685)	0.665* (0.299)	-0.348* (0.161)	0.360** (0.103)
NODA	0.425 (0.278)	-0.542 (0.289)	-0.0333 (0.262)	-0.640 (0.358)

Variables	Full period 2000-2018 GDPG	Pre-crisis 2000-2006 GDPG	During crisis 2007-2010 GDPG	Post-crisis 2011-2018 GDPG
GDS	0.381** (0.122)	-0.0115 (0.120)	0.472** (0.128)	0.228** (0.0761)
POP	5.113** (1.755)	34.62* (16.41)	-6.475 (5.586)	-0.344 (2.634)
LEXP	-0.103 (0.224)	-3.329** (1.045)	-0.680 (0.472)	-0.435 (0.398)
ELEC	0.0115 (0.0465)	-0.103 (0.231)	0.199 (0.182)	0.112 (0.110)
NATR	-0.0514 (0.0786)	0.958*** (0.207)	-0.153 (0.0901)	0.388** (0.111)
EDU	0.0549 (0.124)	1.239*** (0.160)	0.0322 (0.119)	0.262** (0.0749)
_cons				
N	340	100	40	120
Groups	20	20	20	20
Instruments	15	18	20	16
AR(1)	-0.64	1.53	-1.01	-0.63
AR(2)	0.44	0.94	-0.56	-0.50
Sargan	43.05	4.98	17.01	25.80
Hansen	12.36	12.12	10.52	10.56

NOTE: Where *P< 0.05; **P<0.01; ***P<0.001 denotes the levels of significance.

Standard errors in parentheses

Source: Author’s own compilation from Stata outputs

5.7.1 First lag of GDP growth (L.GDPG) and GDP growth (GDPG)

Based on the findings in Table 5.4, the lagged dependent variable in the model (lag of GDPG) indicates that there is positive persistence or accumulation in GDP growth over the full analysis period (2000-2018) and the period before the global financial crisis (pre-crisis 2000-2006) but the relationship is not significant. However, there is a significant negative relationship between the lag of GDPG during the crisis (2007-2010), and a negative insignificant relationship after the global economic crisis (2011-2018). These findings were expected.

Theoretically speaking, the GDP growth from one period to another should persist and build on the previous year's success, all things being equal. The shockwaves that were sent throughout the world during the global financial crisis and the accompanying economic consequences that followed the crisis, especially the effect the crisis had on African countries, explain the outcomes. Thus, during an economic crisis, the positive GDP growth trajectory of the previous years (pre-crisis) would be eliminated, and the significant negative GDP growth effects would be felt, and have a profound impact on African countries, during and after a financial crisis.

5.7.2 Foreign direct investment and GDP growth (GDPG)

Table 5.4 indicates that FDI was found to have a significant positive relationship with GDPG over the entire period under review (2000-2018). FDI also expressed a positive significant effect on economic growth for the period before (2000-2006) and after (2011-2018) the global financial crisis. What is surprising is the significant negative relationship that occurred during the crisis period (2007-2010). Contrary to expectations, FDI did not have a positive effect on economic growth within African countries during the crisis period.

Developing countries may accelerate the development of their economies by attracting different kinds of FDI from industrialised countries, typically a transfer of sophisticated technology and inventions. Most economists agree that there is a favourable correlation between FDI and economic growth. However, FDI has varying effects in different countries, and it is affected by the overall economic climate and government policy (Nwaogu & Ryan, 2015). Income from FDI has the potential to become a significant source of capital for a developing country, resulting in economic growth. Investing in FDI initiatives may be beneficial for multinational companies, providing access to international markets, access to natural resources, and lowering manufacturing costs (Ramasamy & Yeung, 2020).

The majority of African countries are handicapped by anaemic financial sources or outdated technology, and savings or indigenous technology are inadequate and incapable of supporting sophisticated programmes, similar to other developing countries around the globe (Park, Lee & Lee, 2020; Benfratello & Maniello, 2020). Thus, in order to meet the shortfall in financial reserves, they must either source the lack of contemporary technology from outside, or increase their supply of money.

Other African countries suffer the same problems as those in the SSA region, including extremely high unemployment, significant debt, and stagnant economies. In order to finance their infrastructure ambitions, they want and need to generate enough money domestically to help themselves. Due to their limited internal financial reserves, they must compensate for their fiscal shortages by obtaining various external sources of capital. There are numerous types of FDI initiatives (for example, tax incentives on FDI investments) that are intended to benefit both the local economy and the people, as well as aid-responsive African countries in reducing poverty.

FDI has often been seen in neoclassical and endogenous growth models, and therefore, has been highlighted in the empirical literature as a significant growth-promoting factor. Neoclassical growth models serve as the underlying assumptions in a number of the research studies on the connection between FDI and economic growth. Chowdhury and Mavrotas (2005) discovered that FDI plays a role in three channels for economic development: influencing growth drivers, facilitating the flow of foreign investment, and affecting the flow of causation between the two variables.

Similar views were held by De Mello (1997), Shakar and Aslam (2015), and Adusah-Poku (2016) who agreed that FDI has a positive correlation with GDP growth. Their views are further supported by various authors, such as Ndambendia and Njoupouognigni (2010), and Lima, Pinheiro, Silva and Matos (2020). The aforementioned scholars believe that positive trade and investment relationships can only occur if several conditions, such as trade regimes, regulations of financial markets and banking systems, as well as the openness of the economies, and the levels of human capital in the country or countries hosting them, are present.

Other economists argue that FDI from rich nations may be problematic for the development of underdeveloped countries in the long term, if this investment is made from wealthy countries. Other specific examples of this idea are presented by Hein (1992) and Khan (2007) who believe that emerging economies cannot modernise their structures without moving forward inside the capitalist system. Therefore, it is recommended that developing countries boost their development, regardless of the FDI, or provide the economic environment for FDI to take root.

The literature is divided on the extent to which FDI does not help the host country economically (during the crisis period 2007-2010). Several academics have claimed that FDI should and does improve economic results in the host country, particularly economic growth (Budiharto *et al.*, 2017; Iamsiraroj, 2016; Pegkas, 2015; Siddique *et al.*, 2017). Additionally, new Keynesian viewpoints postulate that although FDI is not the final part of the development puzzle, development brought on by FDI into a country should undoubtedly help reduce joblessness by growing the economy (Gali, 2015).

Other research has discovered few plausible explanations. The connection between FDI and economic development in Africa was determined to be non-existent by Hervé (2016). In the African setting, Salifou and Haq (2017) showed that FDI may actually hinder economic development inside the receiving country. This is in addition to the argument over whether FDI has good or negative secondary impacts on domestic investments (Farla *et al.*, 2016).

Thus, the substantial negative connection between FDI and the economic growth variables shown in this analysis, specifically during the crisis period (2007-2010) is not entirely unexpected. Notably absent in the analysis was, however, the impact on employment. Yet, there seem to be reasons, which include FDI simply replacing similar domestic investment via specialised industrial equipment, leaving little room for large-scale employment-induced FDI.

Apart from the negative relationship between FDI and GDP growth during the crisis period (2007-2010), the analysis found that aggregated FDI inflows into African countries may provide sustainable and long-term economic development, as well as significant GDP growth before and after financial crises. One of the primary aims of boosting FDI flows to the African region is to reduce poverty, and to promote long-term development (Mohamed & Sidiropoulos, 2010). Inward FDI should therefore cover the investment vacuum left by outward investment. FDI may help the economy by boosting industry, financial services, construction, and the discovery of natural resources. By extension, it will also affect the ongoing debate regarding the openness of the economy and the deregulation of commerce (Hassine & Kandil, 2009).

Since these results can have a significant impact on the overall connection and effects of FDI inflows on GDPG as a proxy of economic development in the African region, this analysis represents a contribution to African countries who are eager to develop their economies. Therefore, it is necessary to provide suggestions for increasing inbound FDI to the African continent.

5.7.3 Official development assistance (NODA) and economic growth (GDPG).

The GMM output summary in Table 5.4 illustrates that over the entire analysis period (2000-2018), official development assistance has a positive effect on the economic growth of the African countries who formed part of the analysis. This result is in line with the expectation from aid promotors (Burnside & Dollar, 1997, 2000, 2004; Riddell, 2007; Wright & Winters, 2010) who argued that sufficient ODA would add to the aggregate developmental role that ODA is supposed to play upon disbursement from donor countries for developmental purposes.

The interesting part of the analysis is that none of the periods under review show any significant relationship between ODA and economic growth over any period (full, pre, during or post the financial crisis). On the contrary, the analysis shows that ODA has a negative effect in GDP growth for the periods pre-, during and post the global financial crisis (2000-2006; 2007-2010; 2011-2018). However, the lack of significance could be attributed to the amount of data points available to successfully run the GMM estimation over the selected and separate periods.

It is recommended that in future, additional crisis periods could be included or that longer time periods pre, during or post-crisis, be analysed to increase the data points available. The negative effect that ODA has on GDP growth was in line with the expectations of Easterly (2002, 2003, 2009) and Moyo (2009) who argued that ODA does not lead to a significant positive relationship with economic growth.

5.7.4 Gross domestic savings (GDS) and economic growth (GDPG)

The analysis in Table 5.4 shows that there is a significant positive relationship between gross domestic savings and GDP growth over the entire analysis period (2000-2018), the period during the crisis (2007-2010) and the period following the global financial crisis (2011-2018). The results indicate that a higher level of domestic saving improves a country's ability to weather economic difficulties, and it acts as an economic stimulation element which allows for a quick economic bounce back. What the analysis also points out is that gross domestic savings does not have significant deterministic effect on economic growth for periods (2000-2006) directly preceding an economic shock for African countries.

To achieve sustainable economic development goals, countries must simultaneously foster economic growth. A test of the government's success is thought of as being employed or having the prospects of becoming employed. This explains why there have been numerous research projects and public policy decisions made on the underlying drivers of economic development in Africa. Savings is an important contributing element to the development of the economy. Conventional thinking is that wealth creation results in increased economic growth via increases in the stock of physical capital (Kim & Nguyen, 2017).

In accordance with classical growth-savings models (Lewis, 1955), which explain that growth was made possible because there was a rise in savings and investment, it is expected that people migrate to cities to find jobs that provide better earnings than those found in rural sectors. As a result, more savings are generated, which means more money is available for investment, therefore helping the economy develop. While the lack of growth might be attributable to the absence of saving, the lack of a modern industrial sector contributed as well. Other authors, such as Harrod (1939) and Domar (1946) highlighted the significance of saving and investment as being critical for the development of an economy. Thus, the results indicate that a country may develop by either growing national savings or decreasing its capital production ratio. In many countries, growth relies on encouraging people to save more.

Note, however, that savings will not automatically translate into growth, since some of the savings are needed to cover for deteriorating assets, especially in Africa where maintenance of physical infrastructure is considered a luxury. On that basis, Solow

(1956) points out that the savings rate only leads to short-term development, while long-term growth relies on technical advancement. A constant rise in the saving rate will initially raise the capital inventory, producing a short-term gain in production per worker. However, owing to decreased growth returns, more savings will only cover the capital depreciation per worker in future periods, with similar findings affirmed in the African and developing country context (Nguyen & Nguyen, 2017; Akani & Ibibe, 2019; Wafula, 2021).

Endogenous growth postulates that an increasing rate of savings leads to capital accumulation and promotes economic development, thus more savings may boost national income and then investment in the near term, but do not influence long-term growth (Romer, 2006).

5.7.5 Population growth (POP) and economic growth (GDPG)

The analysis in Table 5.4 directly links the growth in a country's population (POP) to a positive and significant growth in the economy (GDPG) for the full analysis period (2000-2018) and is significantly positive for the period preceding the global financial crisis (2000-2006). This was expected, due to the assumption that predicts the increase in population would lead to an increased workforce and higher levels of production over the long term. In addition, the more people, the bigger the demand for goods and services, and the higher the economic output growth.

Contrary to the overall expectations, an increase in population growth led to a decrease in GDP growth during the crisis period (2007-2010) and the period after the crisis (2011-2018) for the African countries under review. Although not significant contributors, a possible inference could be drawn that the economic shocks experienced during the crisis and the lagged effect of joblessness and social spending in many of the countries, could lead to additional fiscal spending, and a diversion from priority growth-enhancing spending patterns on things such as infrastructure.

Empirical studies on the impact of population increases on economic development (GDP growth) have shown conflicting discoveries in certain countries. In the case of Sethy and Sahoo (2015) and Tumwebaze and Ijjo (2015), population increases in Southern Africa had a positive effect on economic growth (measured as GDP per capita). By contrast, Yao, Kinugasa and Hamori (2013) and Banerjee (2012) argued that China's per capita GDP growth, as a developing country, is negatively related to sustainable population growth indicators. Huang and Xie (2013) concluded that present population increases have a negative impact on economic growth, whereas delayed (lagged) population growth has a positive effect, but that these variables are not interrelated in the long run.

Such conflicting results have prompted many analysts to assess that there is the potential that population increases would not uniformly affect per capita production or GDP growth, but would rather vary under certain conditions and within certain countries. Becker, Laeser and Murphy (1999), for example, suggested that population growth among low-income agricultural societies slows growth in per capita income as the growth of labour in a country reduces returns, while the increasing population of high-income urban economies can lead to increased income due to rising profits.

Bucci (2015) refers to the beneficial impact on productivity of population increases, owing to increased expertise, but argues that bigger populations lead to more complicated manufacturing processes that balance these benefits. Mierau and Turnovsky (2014) suggest that decreasing mortality growth promotes economic development, whereas increasing fertility population growth rates tend to slow it down.

The rationale for these opposing impacts is that as mortality rates decrease, it encourages individuals to save more, which promotes growth, while when fertility rates increase it leads to negative effects on aggregate savings (Mierau & Turnovsky, 2014). Heady and Hodge (2009) showed that falling population growth rates in high-income countries are slowing down economic development, whereas high population growth rates in low-income countries are decreasing their economic growth.

5.7.6 Life expectancy (LEXP as a proxy for human capital) and economic growth (GDPG)

The dynamic two step GMM analysis summary in Table 5.4, exhibits a significant negative effect on GDP growth for the period analysed before the global financial crisis (2000-2006), and a negative but insignificant effect for all other periods under review: full (2000-2018), during (2007-2010) and post-crisis (2011-2018).

According to expectations, the economic growth of many African countries is negatively affected by their populations' life expectancy. The expectations were that an improved life expectancy, which could be provided via better in-country healthcare, would lead to a population that would live longer and contribute more in terms of production output over the span of their lives. A possible explanation for the contradiction in the results may be that the low life expectancy might be a burden on the economy because the governments of the respective countries need to provide additional monetary, healthcare and other benefit over longer than expected time periods, with lower levels of government income and taxation, due to reasons such as illnesses and diseases, such as Malaria, that some African countries still grapple with.

Life expectancy can have an impact on growth in a variety of ways. It could boost the domestic savings rate, resulting in a faster build-up of physical capital. It could be argued that when old-age spending becomes more essential (thus in countries with a low life expectancy), it reduces expenditures on children's education. It lowers the quantity of inheritances that parents make to their offspring, which in turn, delays the building up of physical wealth for growth purposes. Also, political changes in the income tax rate have an impact on the amount of fiscal spending on public education. The latter impact is growth-enhancing, since tax rates increase as a function of life expectancy, and the politically selected levels are always below the corresponding growth-maximising size (Kunze, 2014). The relationship between life expectancy and economic growth is determined by the balance of these influences.

5.7.7 Education (EDU as a proxy for human capital) and economic growth (GDPG)

Since at least the turn of the century, economists have been working to quantify the economic benefits that individuals and society will gain from higher levels of education. It is well known that employees who had more schooling may have other features that will cause them to earn better pay, regardless of their educational status. In this study, schooling or education may be an influencer for stable government revenue. Countries with greater education should have more stable government incomes, and thus subject to GDP growth, it is anticipated that more educated countries would develop quicker. Education may alter the pace of steady government development by helping employees create, deploy and accept new technologies, as suggested by Romer (1990).

The summary in Table 5.4 shows that the education levels of the selected African countries have a significant positive effect on GDP growth for the periods before (2000-2006) and after the economic crisis (2011-2018). The findings support the notion that skilled labour and a good level of education have a direct impact on a country's ability to compete and develop economically (Ngepah, Saba & Mabindisa, 2021). There seems to be a direct effect on competitiveness and a country's attractiveness for highly educated immigrants too (Oliinyk *et al.,* 2021).

Governments should encourage migrants and locals with higher education credentials and unique abilities to come to their countries when host country lack the needed expertise. Higher-skilled workers have a significant impact on economic growth, as their arrival not only replenishes the intellectual capital of the recipient country but also creates a competitive environment for indigenous people, motivating them to continue learning and improving their skills throughout their lives (Ogundari & Awokuse, 2018; Mbithi *et al*., 2021).

Strategies and policies should be developed to support highly skilled employees locally and from abroad, and utilised in country-specific macro-economic management policies, especially in Africa where skilled migrant workers are active in all sectors of the society (Oladipo, 2020).

Education has shown to have a positive effect on growth for the entire period (2000-2018), as well as during the crisis period, however, the effect is not significant. Thus, the findings illustrate that the higher the level of education in a country, the more likely it is to have a growing economy.

5.7.8 Infrastructure variable presented by access to electricity (ELEC) and economic growth (GDPG)

There have been considerable advances in recent decades to provide people across the globe with dependable energy, but certain areas remain notably under-served. It is worth noting that electricity infrastructure investment will have a significant impact on growth, poverty reduction, and other developmental indicators. Therefore, the involvement by development organisations and governments in enhancing energy availability and dependability is justified.

Access to electricity enables more efficient illumination during nights, it enhances the availability of information and communication technology, and leads to more productive industrial organisation than any other energy transporter, thus leading to GDP growth (Kander, Malanima & Warde, 2014). The use of better quality energy carriers, particularly grid-connected electricity, tends to grow with time and wealth (Csereklyei, Rubio-Veras & Stern, 2016).

However, electricity's causal impact on GDP growth and development has not been well documented empirically (Bruns, Gross & Stern, 2014), and most current research examined the economic impacts of energy consumption and household access. For example, quality of power supply may also be a significant determinant for GDP growth.

Many developing countries have recently modernised their energy sectors with less efficient pricing, and more power availability through indirect electricity subsidies via market liberalisation, and the economic consequences of these changes, although positive, varied (Jamasb, Nepal & Timilsina, 2017).

The summary in Table 5.4 provides data on an economic or macro-economic level, with the emphasis on the areas of the globe with the lowest levels of electricity, especially in the SSA region.

The GMM output indicates that there is, in line with expectations, a positive relationship between access to electricity (ELEC) and GDP growth during all periods under analysis, except for the negative relationship that is present before the financial crisis (2000-2006). Regardless of the negative relationship before the crisis, none of the relationships are significant.

5.7.9 Natural resources (NATR) and economic growth (GDPG)

Africa’s natural resource endowment as a continent is well known, and a contentious issue in terms of the continent’s stability, both in terms of economic growth and the ability of natural resources to attract FDI and ODA.

The analysis in Table 5.4 indicates that natural resource rents (NATR) do not have a positive or significant effect on economic growth for African countries over the entire analysis period (2000-2018) or the period during the financial crisis (2007-2010). This is in contrast to the expectations that natural resources tend to increase economic growth, due to the growth-enabling effect is has on industrial development and job creation.

The demand for natural resources is known to decline when economic activity slows, thus the results during the crisis (2007-2010) are not completely unexpected. There is, however, a significant positive relationship between natural resources (NATR) and GDP growth in the periods analysed before the crisis (2000-2006) and the period after the global financial crisis (2011-2018). The positive significant relationship between the variables could be attributed to the increase in economic and production activity in the ever-increasing global economy after an economic shock or recession.

In addition to the possible bounce-back from stagnant economic activity, FDI is influenced by the availability of natural resources and therefore GDP growth, particularly in emerging countries with limited local output and where key assets are underutilised. Resource abundance, since it serves both domestic and foreign markets, may be thought of as a metric of market size (Kinoshita & Campos, 2002), which in Africa varies.

The benefits of resource booms, particularly in emerging and impoverished nations, may boost economic development in such areas (Sachs & Warner, 1999). Natural resources have the potential to provide significant revenue via investment, and are able to support a rise in productivity, human capital, and health (Papyrakis & Gerlagh, 2004). It is beneficial to recognise that natural resources also assist international commerce and it is possible to diversify an economy by using these resources to help in other aspects of the economy (Douangngeune, Hayami & Godo, 2005).

5.8 GMM OUTPUT RESULTS FOR FDI AS DEPENDENT VARIABLE

Table 5.5 presents a summary of the GMM results for the determinants of FDI, which will be discussed below the table.

Table 5.5: Determinants of FDI – GMM results

	Full period 2000-2018	Pre-crisis 2000-2006	During crisis 2007-2010	Post-crisis 2011-2018
Variables	**FDI**	**FDI**	**FDI**	**FDI**
L.FDI	0.567^{***}	0.177^{**}	-0.219^{*}	-0.268
	(0.0910)	(0.0488)	(0.103)	(0.135)
NODA	-0.494^{*}	0.0791^{*}	1.833^{**}	0.0188
	(0.221)	(0.0282)	(0.599)	(0.167)
GDPG	0.0422	0.288^{***}	0.0419	0.677^{**}
	(0.0952)	(0.0699)	(0.241)	(0.178)

Variables	Full period 2000-2018 FDI	Pre-crisis 2000-2006 FDI	During crisis 2007-2010 FDI	Post-crisis 2011-2018 FDI
GDS	-0.211* (0.0896)	-0.341*** (0.0299)	-0.137 (0.215)	0.0326 (0.157)
POP	1.114 (1.957)	-1.824 (3.754)	-3.396 (8.765)	5.745 (4.998)
LEXP	-0.468* (0.183)	1.282** (0.361)	0.367 (0.496)	-2.353*** (0.371)
ELEC	0.0474 (0.0513)	-0.00364 (0.0838)	-0.233 (0.325)	0.302* (0.122)
NATR	-0.159 (0.0825)	-0.509*** (0.107)	0.0330 (0.118)	-0.319** (0.0983)
EDU	0.235* (0.100)	-0.260 (0.250)	-0.145 (0.138)	-0.346** (0.113)
_cons				
N	340	100	40	120
Groups	20	20	20	20
Instruments	19	19	15	19
AR(1)	-0.63	-1.07	-0.76	-0.95
AR(2)	-0.80	0.67	-0.81	-1.45
Sargan	18.62	30.73**	1.69	14.91
Hansen	10.38	12.54	8.86	11.66

NOTE: Where *P< 0.05; **P<0.01; ***P<0.001 denotes the levels of significance.

Standard errors in parentheses

Source: Author's own compilation from Stata outputs

5.8.1 First lag of FDI (L.FDI) and FDI

Similar to the outcomes based on the regression model for GDP growth in Table 5.4, Table 5.5 provides a summary of the regression model for FDI against the same regressors used in the initial model, with GDPG being included as an explanatory variable, and FDI as the dependent variable. This is necessary to evaluate the deterministic relationship between the main variable FDI growth and the explanatory variables, GDP growth and ODA.

To test the persistence or agglomeration effect, the first lag of FDI was proxied as an independent variable. The analysis in Table 5.5 summarises the results for the dynamic two-step GMM output, and as expected, there is a significant positive agglomeration effect between FDI and the first lag of FDI for the full period of analysis (2000-2018) and for the period before the global financial crisis (2000-2006). The assumption follows the theory that FDI inflows into a country from the previous periods would attract FDI inflows into a country in the years that follow.

However, during the global financial crisis (2007-2010) and the period after the crisis (2011-2018), the lagged or persistence effect of FDI had a negative effect on actual FDI for the mentioned periods, with a significant negative effect shown during the crisis (2007-2010).

A possible reason for the directional and significant changes could be the changes in macro-economic variables brought about in African countries in the run-up to, and during the crisis. In addition, there were changes to FDI determinants during and after the crisis, such as the interest rate variations brought about to counter inflation, as well as location-based choices from MNEs following the crisis (Popvici, 2014).

5.8.2 Official development assistance (NODA) and foreign direct investment (FDI)

Official development assistance (ODA) has little impact on private foreign investment (FDI inflows), according to Harms and Lutz (2006), unless the receiving country suffers from a heavy regulatory responsibility. ODA also lowers a recipient country's default risk, encouraging foreign private capital inflows (Asiedu & Villamil, 2002). Furthermore, ODA may have a beneficial impact on FDI in countries where project implementation is lacking from FDI initiatives. Ali and Isse (2006) stressed that FDI is negatively related to ODA and that it promotes unwanted institutions and incentives incompatible with the developmental agenda of aid donors.

Table 5.5 indicates that official development assistance (NODA) has a significant negative effect on FDI inflows over the full analysis period (2000-2018). Although these are not entirely unexpected results, a possible explanation for the negative effect between the variables is that FDI does not necessarily follow a developmental objective, and ODA in African countries could be an indication that the minimum development threshold needed for MNEs or investors to invest is purely not there yet. In contrast, all other periods under review (pre, during and post financial crisis) indicate that ODA has a positive influence on FDI into the selected African countries, with a significant relationship for all except the period after the crisis (2011-2018).

Theoretically, ODA distribution of assistance is said to be driven by local disadvantages (such as being a land-locked country) or the needs of donors and the interests of the recipient. The comparative locational advantages of the host country that match the interests of MNEs or investors are considered when FDI choices are decided upon. The impact of ODA on FDI, in general, may be beneficial for growth and poverty alleviation when developmental programmes are implemented correctly.

Burnside and Dollar (2000) along with Collier and Dollar (2002, 2004) produced supportive literature, and concluded that the distribution of ODA implies donor country support for sound policy implementation, which might lead to the alleviation of poverty over the long term. For FDI location decisions, good macro-economic policies and efficient governance, coupled with an increase in wealth, are important factors that might influence such investment decisions into Africa. Similarly, the FDI decisions from investors based in the country which is the aid provider, may have a positive incentive or a profit-seeking interest motive, but as Blaise (2005) noted, such claims cannot be made for FDI under all circumstances. Aid that is based on political or historical interest does not intend to provide any developmental advantages, but rather encourages negative conduct that is harmful to FDIs (Alesina & Weder 2002; Tavares 2003).

Contradictory findings from Kimura and Todo (2007) showed the distinct impact of ODA on FDI inflows and described the impacts as a positive infrastructure effect, a negative rent-seeking, and positive vanguard impact. Bilateral official development assistance, according to Yasin (2005), attracts FDI to African countries, thereby strengthening the theoretical arguments emanating from Dunning's OLI framework that bilateral ODA influences location-based FDI selection verdicts.

5.8.3 Economic growth (GDPG) and foreign direct investment (FDI)

One of the main aims of a government should be to raise the standard of living and provide better quality of life for its citizens. Changes in FDI and similar foreign financing mechanisms, such as remittances, FDI, and exports, have a profound effect on a state's economic development. However, FDI is the most significant external financial resource contributing to a developing country's economic growth. Countries with high population growth, such as African countries, focus on promotion strategies that aim to attract foreign investments, since these investments have a beneficial effect on the country's economic development (Te Velde, 2001; Loewendahl, 2001; Habanabakize & Meyer, 2018; Olagbaju & Akinlo, 2018; Ibrahim & Acquah, 2020).

The results output in Table 5.5 show that GDP growth (GDPG) has a significant positive effect on FDI for the periods before (2000-2007) and after the global financial crisis (2011-2018). In addition, positive relationships between GDP growth and FDI are present for the full analysis period (2000-2018) and during the financial crisis (2007-2010), however, the relationship and effects between GDP growth and FDI are not significant over the mentioned periods.

From the theoretical and empirical evidence in the literature, the results were expected. The results indicate an implied two-way bi-directional relationship between GDP growth and FDI inflows, but it does not equate to causality between the variables, which will be tested in the causality section of this analysis. The results compare favourably and in-line with the regression results in Table 5.4, apart from the effect FDI has on GDP growth during the crisis period (2007-2010).

Articles written by Glass (2002) and Saggi (2002) show that FDI increases the productivity of firms and transfers technical knowledge from international businesses to local ones. Growth-enhancing technological transfers through FDI increases may occur either via the introduction of new goods into the marketplace of the country directly benefiting, or through an emigrant workforce that was previously engaged in foreign businesses. FDI has the effect of increasing the degree of technological application and modernisation, and by extension, the overall development of the economy and vice versa.

Though views differ, one concept is that the economic development of recipient countries is dependent on specific variables such as the amount of FDI. The results of a number of academic studies show that FDI's effect on economic development relies on the degree of educational and vocational training workers have (Borensztein & De Gregorio, 1998). The higher the level of the workforce's qualifications, the greater FDI's contribution to overall economic development.

Conversely, Blomstrom, Lipsey and Zejan (1992) assert that economic development has a significant effect on FDI in a rich country but, in a less developed country, it has a lesses impact and its workforce's qualifications are irrelevant. Balasubramanyam, Salisu and Sapsford (1996) and Nair-Reichert and Weinhold (2001) concluded that the effect of FDI on a state's overall economic development is proportionate to the state's commercial openness.

The anticipated effect of economic development on FDI in economies with low GDP growth, a low level of education, limited infrastructure, and limited commercial openness was predicted to be minimal for the African countries in the sample. Economic growth has a beneficial effect on FDI countries with established financial markets, and a financial sector that is in the developing stage (Makoni, 2016).

However, investment in a region does not affect that county's overall economic growth, regardless of its degree of development, according to research published by Carkovic and Levine (2002). Beugelsdjijk, Smeets and Zwinkels (2008) concurred and stated that FDI-led growth in developing countries is debatable. Therefore, it could be argued that with greater GDP per capita (as a proxy for economic growth) comes less FDI. Wage rates, for example, is one of the most significant elements of production, particularly for export-oriented and market-oriented FDI in Africa. A lower wage rate implies reduced manufacturing costs and therefore more market competition (Rivera & Castro, 2013). Furthermore, efficiency-seeking FDI seeks to operate in countries with lower wage rates. As a result, it seems that resources-exporting countries are not a good destination for efficiency-seeking FDI. A study by Walsh and Yu (2010) show that the per capita GDP (as a growth proxy) is negatively correlated in an investigation of 27 established and developing countries over 23 years. Furthermore, Grubaugh (2013) found that during the 1980–2008 period, the increases in wage rates did not have a linear correlation with FDI and GDP.

The Rentier State Theory (Mahdavy, 1970) suggests that when oil-exporting countries use a portion of their income to pay their people more, overall economic growth occurs. Rentier oil-exporting countries in Africa would thus have increased production costs because of the high per capita GDP, which leads to higher prices for goods and services and as a result, international investors will find it difficult to invest in countries like this, since they are most likely pursuing export-oriented FDI.

5.8.4 Gross domestic savings (GDS) and foreign direct investment (FDI)

Evidence in Table 5.5 indicates that gross domestic savings (GDS) has a significant negative impact on FDI inflows over the full analysis period (2000-2018) and before the crisis period (2000-2006). A negative insignificant relationship is observed during the global financial crisis (2007-2010), and an insignificant positive effect over the period after the crisis (2011-2018).

The negative relationships infer that an increase in gross domestic savings over time would lead to a decrease in FDI inflows into the selected African countries, except for the possible periods following an economic crisis. The results are contrary to expectations. It is to be expected that an increase in both savings and investment (via FDI) would lead to an increase in employment for locals, and thus, increases to overall income levels and growth indicators.

The study's findings are in contrast with the results perpetuated by Azam and Shakeel (2012) who found the impact of GDS on FDI to be positive and significant. In the context of the crowding-out effect, FDI has a significant positive influence on domestic saving over the short term, but not over the long term for SSA countries (Fonchamnyo, Dinga & Ngum, 2021). Furthermore, the contrast between the economic dynamics in African countries and their Eastern European developing country counterparts is emphasised by contradictory findings in the domestic saving–FDI nexus over the short and long term (Avci & Akin, 2020).

Furthermore, domestic savings do not restrict investment, and hence, growth in an open economy with unimpeded access to foreign capital, which is not always the case in many African countries. Without hindering development, domestic savings and investment may deviate from the different intended outcomes. Local funds will flow to investment projects with greater anticipated returns, without impediments to international capital movement restrictions. Aghion, Comin and Howitt (2006) stated that comparatively poorer countries that increase their domestic savings have a higher impact on the GDP growth and respective economic development than the relatively wealthy ones.

Foreign investment (FDI) is necessary in impoverished countries to transmit technical knowledge from frontier markets to the local innovative industries. In African countries, the local banks may co-finance international investment projects, but domestic companies can borrow locally and do not necessarily have to seek foreign funding for their initiatives from the wealthier investment destinations.

5.8.5 Population growth (POP) and foreign direct investment (FDI)

The expanding population and accompanying rising unemployment rates in Africa have become an important concern for developing countries on the continent. In the coming decade, significant growth in the population is anticipated. This would increase social unrest, lead to the immigration of competent and educated workforce, and cause illegal migration between countries. If effective and efficient job-creating investment policies are not in place, the socio-economic issues related to rising unemployment and decreasing per capita GDP could be waiting for many African countries.

The population growth rate for the full analysis period (2000-2018) and the period after the global financial crisis (2011-2018) has a positive, yet insignificant effect on FDI inflows into the selected African countries in the study's sample (see Table 5.5). For the periods before (2000-2006) and during (2007-2010) the global financial crisis, a negative, insignificant relationship prevailed between population growth rates and FDI inflows.

Contrary to the findings presented in Table 5.5, Sweezy (1940) alluded to the idea that population growth may influence FDI inflows via its increased impact on consumer tendencies; through its influence on consumer demand and finally through the constant competition between competitors who need to compete for the consumer supply side. It is likely that a population that has a large percentage of dependents would have a relatively high consumer inclination. Although a fast-expanding population includes a high percentage of youngsters, it also includes a large number of adults beyond working age in the permanent population, if the life expectancy of the same country increases. However, the two circumstances vary significantly from a social and political point of view. Undoubtedly, in the elder age group, a large percentage of dependents pose much greater societal problems than a large proportion of children who are growing up to become active participants in the economy.

5.8.6 Life expectancy (LEXP as a proxy human capital) and foreign direct investment (FDI)

Table 5.5 indicates that over the full analysis period (2000-2018) and the period after the economic crisis (2011-2018), life expectancy has a significant negative effect on FDI inflows into the selected African countries. The result infers that the longer people in the selected African countries live, the less FDI inflows the countries receive. Moreover, a positive and significant relationship between an increase in life expectancy and FDI inflows prevails for the period right before the global financial crisis (2000-2006) and during the crisis period (2007-2010), although the relationship between variables LEXP and FDI is insignificant for the latter period.

Even though there is a substantial body of theoretical literature that supports the beneficial effect of FDI on the life expectancy of countries (used as a proxy for poverty reduction), empirical data on the subject is still divided, as is the case in Table 5.5. FDI has been shown to have a beneficial effect on poverty reduction in certain empirical works, for example, Fowowe and Shuaibu (2014) reported that LEXP had an impact on FDI and vice versa. It should be noted that a small number of empirical works have shown that FDI has a detrimental effect on poverty alleviation (Ali & Nishat, 2010). Other studies, in addition to those that have shown a positive or negative effect of FDI on poverty reduction, have concluded that FDI has no substantial influence on poverty reduction. The zero net effect of the relationship between life expectancy and FDI is described in Soumare’s (2012) study.

FDI-related studies on life expectancy have shown varying results, depending on the location of the study, the proxy variable used as a regressor, the methodology used, and the time period under consideration, thereby confirming the notion that the FDI-life expectancy inverse relationship cannot be generalised across all African countries or areas of research. It is impossible to overstate the significance of life expectancy in an economy in general, and in Africa, specifically.

5.8.7 Education (EDU as a proxy for human capital) and foreign direct investment (FDI)

The GMM summary in Table 5.5 indicates that education (EDU) as a human capital proxy, has a significant positive effect on FDI over the full analysis period (2000-2018). However, a significant negative relationship exists between education and FDI inflows into the selected African countries for all other periods (pre-, during and post-financial crisis: 2000-2006; 2007-2010; 2011-2018), with the period after the crisis (2011-2018) indicating no significant effect.

In line with expectations, the results infer that developing countries may specialise in low-tech products or natural resources, with minimal spillovers and learning-by-doing possibilities, according to Grossman and Helpman (1991). As a result, the quantity and impact on FDI may be ineffective. FDI has been focused on mineral resource industries, especially mining, in the least developed nations in African countries, leading to resource dependence. The multiplier effects of FDI in mining and on production and employment figures seem to be modest. Investment in information infrastructure and skills allows countries to diversify their economy away from their natural resource endowments, which helps to mitigate some of the drawbacks of constrained and geographically isolated countries (Addison & Heshmati, 2003).

According to Romer (1993), there are significant concept gaps between wealthy and poor nations. FDI, he says, may help poorer countries transmit technical and economic know-how. These transfers may have far-reaching consequences for the whole economy, and as a result, foreign investment has the potential to improve the productivity of all businesses, not just those that receive funding sources from beyond their borders.

Blomstrom, Lipsey and Zeyan (1994) observed no beneficial educational effect on FDI inflows. Schneider and Frey (1985) indicated that a lower proportion of the age group with secondary education is not necessarily a good descriptive regressor to evaluate the effect to education on FDI inflows. Hanson (1996) found that FDI was not a major predictor of adult literacy and vice versa. Cross-country studies thus indicate that investment in educations is not always a major contribution to internal FDI decisions (Narula & Dunning, 2010). Therefore, market and resource-seeking FDI motives drive investment decisions, and thus, the need for a higher-educated workforce seems less critical in African countries.

In contrast, Noorbakhsh, Paloni and Youssef (2001) conclude that there are statistically significant and positive effects between human capital (EDU) on FDI inflows, and the impact becomes substantial over the long term. Many MNEs operating in developing countries tend to favour an efficient and highly trained workforce which has become essential in modern times, especially considering the rapid changes in technological advancements (Miyamoto, 2003; Okafor, Piesse & Webster, 2017; Olayemi & Temitope, 2018; Wang & Zhuang, 2021).

5.8.8 Infrastructure variable presented by access to electricity (ELEC) and foreign direct investment (FDI)

Infrastructure, which represents the capacity of host countries to attract foreign investment, is an important consideration for international companies. Infrastructure is one of the major factors affecting the return on investment, and that is particularly significant for developing countries. The quality and availability of infrastructure are critical prerequisites for the successful functioning of MNEs, and developed infrastructure reflects the host country’s capacity to attract more FDI. Electrical infrastructure is seen as a critical factor in determining the success of investments, since it improves productivity and reduces costs, particularly in developing countries (Asiedu, 2002; Tintin, 2013; Abbas & El Mosallamy, 2016).

Table 5.5 illustrates that over the full analysis period (2000-2018), access to electricity (ELEC) leads to an increase in FDI into the selected African countries, however, the positive effect that access to electricity (ELEC) has on FDI inflows is only significantly positive in the period after the global financial crisis (2011-2018).

It could be inferred that an economic shock, and the accompanying fiscal and monetary policy changes necessitated by the different African countries, could afterwards lead to investments being attracted into the energy sector. Alternatively, after economic downturns, some African countries focus on large-scale infrastructure investments and fund these projects with money from abroad.

For the periods analysed before (2000-2006) and during the crisis (2007-2010), the relationship between access to electricity as an infrastructure proxy and FDI remained negative, yet insignificant. The analysis is in line with the expectation that improvements in electrical infrastructure would lead to an increase in FDI for African countries.

Public infrastructure is broadly defined to include telecommunications, energy, transportation, and other conventional forms of infrastructure (Roller & Waverman, 2008). In Africa, it is widely proposed that infrastructure helps offset the effects of being landlocked and being absent from the global market centres, which applies to many SSA countries (Calderon & Serven, 2008). Economic diversification, productivity improvements, and better quality of human capital are the ways via which public infrastructure may affect FDI inflows and economic growth (Kessides, 1993).

In comparison with other emerging countries, Sub-Saharan Africa has a history of being among the worst performers in terms of infrastructure, and this has been one of the reasons for poor economic growth and lack of large-scale FDI inflows (Calderon & Serven, 2008). It is argued that just 25% of the population has access to or has electric services. In terms of access to telephone and mobile subscriptions (as proxies for infrastructure) the data does not significantly improve the outlook of infrastructure (Aker & Mbiti, 2010). Infrastructure limitations are reported to be significant impediments to corporate competitiveness.

Most notable among SSA's power sector shortcomings is the severe power deficit in the region. Due to inadequate public power delivery, limited access (particularly in rural regions), and insufficient investment, the industry is defined as being a deterrent for FDI inflows (UN-HABITAT, 2011). The lack of access to much-needed electricity has caused significant problems for the continent, and has led to the inability to grow the continent’s industrial base that is reliant on the sufficient and timely delivery of affordable electricity. Ndulu (2006) claims that if SSA increases the per capita output of the electricity sector to the level of East Asia, then GDP growth would rise by 0.5%. Despite the fact that the SSA countries have a population of 1.3 billion, together they generate just enough electricity to meet the needs of a country with a population less than Spain's, which has just 5% of the total population (UN-HABITAT, 2011).

There is a direct correlation between a lack of adequate power supply in the SSA region and businesses' lack of productivity and competitiveness and FDI inflows. Most SSA countries have less than 500 megawatts of electricity capacity, thus these countries must use expensive, alternative sources of power that cost an average of

$0.35 per kilowatt-hour of power. It is estimated that South Africa lost from $245 to $282 million as a result of the lengthy power outages that the country suffered in 2008, with almost half of the losses in mining (UN-HABITAT, 2011), and unfortunately, with no end in sight. Also, the impact of electricity supply constraints on the overall economic outlook over the short and long term, could easily erase the economic growth gains built up over many years, when sudden price increases are forced upon electricity and other infrastructure users in developing countries (Inglesi-Lotz & Ajmi, 2021).

5.8.9 Natural resources (NATR) and foreign direct investment (FDI)

The analysis presented in Table 5.5 indicates that natural resources (NATR) have a negative effect on FDI inflows into African countries. Over the full analysis period (2000-2018) studied, the negative relationship between the variables persisted, and was significant for the periods before the crisis (2000-2006) and after the crisis (2011-2018). The only time when natural resources were positively associated with FDI inflows was during the crisis period (2007-2010), however, the effect remains insignificant. Contrary to expectations, the analysis shows that natural resources do not have a significant positive effect on the FDI decisions for inward investments into Africa.

Against the backdrop of a commodities' boom before the global financial crisis (2000-2006) and a steady increase in macro-economic stability, the African continent has been experiencing a historic return to commodity demands. The era after the global financial crisis also saw an increase in private inflows of capital in the form of FDI into some African countries (Cheung, De Haan & Qian, 2012). However, like in other developing countries, the overall benefits in terms of employment and welfare from foreign capital inflows have been modest, owing mostly to the minimal spillovers in the local economy, which is primarily targeted at the use of capital-intensive natural resources (Morrissey, 2012).

In addition, African countries' reliance on commodities exposes them to economic volatility and other risks that are associated with export instability and exchange rate increases. Indeed, owing to the limited production base and their susceptibility to the vagaries of the international commodities market, development in resource-rich countries remains unpredictable. Furthermore, most countries wealthy in natural resources have high poverty levels, and have delayed developmental objectives, including access to social services such as healthcare, education, water and sanitation. This raises grave concerns about the sustainability of resource-led development.

The findings of Asiedu (2013) showed that the FDI is adversely affected by natural resources. This was consistent with the findings of Poelhekke and Van der Ploeg (2010, 2013), but Asiedu (2013) concluded that the high quality of the government institutions was capable of mitigating the adverse effects of natural resources and criticised the findings of Poelhekke and Van der Ploeg (2010, 2013) through various institutional quality measures. Asiedu (2013) characterised this unfavourable connection as an overwhelming result. The drivers of FDI to 25 transitional or changing economies were studied by Kinoshita and Campos (2003), using single panel data from the period 1990 to 1998. They discovered that countries holding an excess of natural resources drew greater FDIs over the long term.

Mineral wealth is an advantage for certain countries in terms of attracting FDI, while they are a burden for the others. Contemporary evidence supports the claim that commodity endowed countries attract less FDI due to the resource market fluctuations and demand or supply constraints. Elheddad (2016) concluded that mineral resources, as measured by oil rents on oil rich countries, have a negative relationship with FDI inflows, which persists even when other FDI determinants are taken into account. Inferences could be drawn to include other natural resource-abundant African countries too. When resource rents rose, FDI inflows fell. Furthermore, the empirical findings indicate that trade openness and labour force are the key variables that promote FDI inflows into Gulf Cooperation Council member states, whereas political turmoil and corruption discourage FDI inflows.

5.9 GMM OUTPUT RESULTS FOR ODA AS THE DEPENDENT VARIABLE

Table 5.6 (on the next page) presents a summary of the GMM results of the determinants of NODA, which will be discussed below the table.

Table 5.6: Determinants of NODA – GMM Results

Variables	Full period 2000-2018	Pre-crisis 2000-2006	During crisis 2007-2010	Post-crisis 2011-2018
	NODA	NODA	NODA	NODA
L.NODA	0.328*** (0.0772)	-0.140* (0.0627)	0.116 (0.135)	0.296** (0.0880)
FDI	-0.00949 (0.102)	1.353* (0.527)	0.241* (0.102)	-0.0500 (0.0718)
GDPG	0.0864* (0.0341)	-0.634 (0.517)	0.0642 (0.0446)	-0.145* (0.0658)
GDS	-0.190** (0.0530)	-0.147 (0.494)	0.0537 (0.0683)	-0.0736* (0.0340)
POP	-7.773* (3.553)	-1.696 (5.601)	8.078** (2.650)	0.879 (1.210)
LEXP	-0.197* (0.0878)	0.299 (1.432)	-0.110 (0.156)	-0.335 (0.168)
ELEC	-0.0105 (0.0298)	-0.161 (0.184)	-0.00414 (0.0355)	0.0142 (0.0258)
NATR	-0.0540 (0.0694)	1.463* (0.671)	0.0476 (0.143)	0.0822* (0.0362)
EDU	0.0552 (0.0452)	0.381 (0.454)	-0.0498 (0.131)	0.109*** (0.0272)
_cons				
N	340	100	40	120

Variables	Full period 2000-2018	Pre-crisis 2000-2006	During crisis 2007-2010	Post-crisis 2011-2018
	NODA	NODA	NODA	NODA
Groups	20	20	20	20
Instruments	17	19	18	19
AR(1)	-1.66	-1.18	-1.85	-2.36
AR(2)	-0.39	-1.72	-0.23	-0.60
Sargan	10.28	15.85	33.42***	9.13
Hansen	11.05	8.72	14.15	8.88

NOTE: Where **P*< 0.05; ***P*<0.01; ****P*<0.001 denotes the levels of significance.

Standard errors in parentheses

Source: Author's own compilation from Stata outputs

5.9.1 First lag of NODA (L.NODA) and NODA

Similar to the outcomes based on the regression model for GDP growth (GDPG) in Table 5.4 and FDI inflows in Table 5.5, Table 5.6 provides a summary of the regression model for official development assistance (NODA) against the same regressors used in the initial model, with FDI and GDPG being included as an explanatory variable and official development assistance (NODA) as the dependent variable. This is necessary in order to evaluate the deterministic relationship, as per the initial research questions between the main variable GDP growth and explanatory variables FDI and ODA.

Based on the analysis in Table 5.6, the lagged coefficient for NODA (official development assistance) was persistent and significantly positive with NODA from previous years, over the entire analysis period (2000-2018) for the selected African countries. The same trend was observed for the periods during (no significance), and post the global financial crisis (2007-2010; 2011-2018). However, a negative and significant relationship was noted between the lagged dependent and the dependent variable (NODA) for the pre-crisis period.

This deviation between the various periods under review could suggest the inflow of ODA over longer periods of time are done in accordance with the long-term project planning and funding for African countries, or alternatively, it could reflect the willingness of donor countries to disburse development aid, according to their own local economic climates. The negative and significant relationship noted pre-crisis and the lagged effect during the crisis, could be explained by the notable official development assistance clawbacks from aid donors, as traditional aid providers focused on reigning in fiscal and non-essential spending in their home countries to manage the effects and the anticipated effects of the global financial crisis during those periods (Morozkina, 2018).

5.9.2 Foreign direct investment (FDI) and official development assistance (NODA)

The results in Table 5.6 indicate that FDI does not significantly influence ODA over the full analysis period (2000-2018) or for the post-crisis period (2011-2018), where a negative relationship was noted in both cases. However, a significant positive relationship is noted for the periods preceding the crisis (2000-2006) and during the crisis (2007-2010), implying that an increase in FDI would necessarily lead to increase in official development assistance.

According to the expectations derived from the available literature, it should not necessarily be expected that an increase in FDI would lead to an increase in ODA, because ODA and FDI decisions, and the criteria for such differ considerably (Wang & Le, 2019; Aberu, Oladapo & Adegboyega, 2021; Francisco, Moreira & Caiado, 2021).

According to Helleiner (1997), foreign investment inflows from MNEs and investors, which in turn encourage local businesses to compete with or among foreign investors, promotes the transfer of technology and managerial skills to improve domestic productivity. The FDI may assist privatisation via infrastructure enhancement investment channels, portfolio investment flows, and also improve financial markets' depth and efficiency, which can successively contribute to the allocation of resources, guaranteeing significant impact on growth and investment (Jones, Megginson, Nash & Netter, 1999) without the need for ODA. Bosworth and Collins (1999) stress that FDI loans to foreign countries and investment in portfolios may cut interest rates or boost the loans available to finance new domestic investment, in essence, crowding out ODA initiatives in developing countries.

A similar argument by Harrison and McMillan (2003) indicated that FDI, in particular, alleviated the financing restrictions imposed by businesses on developing countries, such as Africa, and this impact is greater for low-income areas than for high-income territories. Creating and expanding the financial markets of developing countries also contribute to loans and portfolio movements which can replace the need for aid funding.

Like every other capital inflow (including ODA), FDI has a liquidity component which enables it to increase its total savings in the market in order to finance investment and to help strengthen the country's exchange rate, although this has side-effects on the overall economy. However, Mileva (2008) found that increases in produced goods via the investment of private capital can be made more affordable and could act as a source of foreign currency by export-promoting policies.

The impact of ODA, on the contrary, is substantial when it interacts with other factors in the regression, such as education and infrastructure, indicating that strong institutions that lead infrastructure and human capital development are a requirement for aid efficiency. This is similar to the findings of Burnside and Dollar (2004), who found that assistance alone has little impact on development, but that it becomes important when interacting with institutional determinants, and should therefore be conditional (Chauvet & Guillaumont (2004).

This reinforces the significance of institutions in building trust and in boosting cross-border FDI activity. The premise of having strong institutions to support development, could not be more relevant and true than during the global COVID-19 pandemic, especially for Africa, within the FDI–ODA nexus (Ndiili, 2021; Marcos-Garcia, Carmona-Mereno, Lopez-Puga & Garcia, 2021; Richter *et al.,* 2021).

5.9.3 Economic growth (GDPG) and official development assistance (NODA)

The results in Table 5.6 reflect the same inconclusive results found in the available literature. Over the full analysis period (2000-2018), GDP growth had a significant positive influence on the increase in official development assistance (NODA). The positive influence that GDPG had on official development increases remained constant during the crisis period (2007-2010) although the effect was insignificant. In contrast, a negative insignificant relationship between GDP growth and official development assistance was noted for the periods before (2000-2006) and after the global financial crisis (2011-2018).

It is possible that the limited amount of data between variables GDPG and NODA (pre- and post-global financial crisis) could lead to the given results, and it is advised that for future research, similar global economic events over longer periods of time should be grouped together and run on the same model to test for different result outcomes.

A substantial body of research has been devoted to the study of the impact of foreign assistance on economic development and vice versa. Previous studies have shown that foreign assistance has a beneficial effect on economic development (Papanek, 1973; Karras, 2006; Ndambendia & Njoupouognigni, 2010). Papanek (1973) examined the effect of foreign assistance on economic development using cross-country regression, and discovered a positive connection between foreign aid and economic growth. Singh (1985) examined the effect of foreign assistance on economic development using an ordinary least squares (OLS) model. He discovered that foreign assistance aided economic development in less developed countries between 1970 and 1980.

Levy's (1988) study of the effect of assistance on economic development in SSA found that economic growth and ODA are positively related. According to Burnside and Dollar (2000), sound fiscal, monetary, and trade policies benefited assistance and economic development in developing countries. Cungu and Swinnen (2003) used nine years of data to evaluate the influence of assistance on economic development using POLS and fixed effects. They discovered a link between assistance and economic development. Dalgaard, Hansen and Tarp (2004) found that although foreign assistance had a beneficial effect on economic development, the size of the effect varied according on climatic circumstances.

Gomanee, Girma and Morrissey (2005) reached the same conclusion as Levy when they analysed SSA countries (1988). Karras (2006) also discovered a favourable effect of foreign assistance on economic development in 71 developing countries using data from 1960 to 1997. Ndambendia and Njoupouognigni (2010) discovered a favourable effect of foreign assistance on economic development in SSA using a pooled mean group estimator (PMG).

According to some academics, there was a negative correlation between foreign assistance and economic development (Gong & Zou, 2001; Mallik, 2008; Mitra & Hossain, 2013; Mitra, Hossain & Hossain, 2015). Gong and Zou (2001) discovered that ODA had a detrimental effect on capital accumulation and labour supply. They argued that foreign assistance would boost citizens' spending, while also increasing citizens' free time, thus decreasing the labour supply. Nonetheless, Mallik (2008) found that foreign assistance has a long-run detrimental effect on economic development. Mitra and Hossain (2013) showed that increasing foreign assistance by 1% resulted in a 0.51% decline in economic growth in the Philippines. Additionally, Mitra *et al.* (2015) discovered a negative connection between ODA and economic growth for 13 Asian countries in the short and long term. They found that increasing foreign assistance by 1% resulted in a 0.18% decline in economic growth in Asian countries.

Other studies found no correlation between ODA and economic development. For example, Mosley *et al.* (1987) found that economic growth was unaffected by assistance. Boone's (1996) findings corroborated those of Mosley *et al.* (1987). Lensink and Morrissey (2000) discovered that there was a negligible correlation between ODA and economic development.

Liew, Mohamed and Mzee (2012) examined the influence of foreign assistance on economic development in East African countries between 1985 and 2010. They used pooled ordinary least squares, random effect, and fixed effect models. They discovered that foreign assistance has a detrimental effect on economic development. Dreher and Langlotz (2015) investigated the relationship between assistance and growth in 96 countries from 1974 to 2009 using an excludable instrument. They found that assistance had little effect on growth.

Galiani *et al.* (2016), on the other hand, used a quasi-experiment to examine the impact of assistance on growth in 35 countries from 1987 to 2010. They discovered a link between assistance and economic development. As shown by the literature review above, the effect of foreign assistance on economic development is equivocal, with disparate empirical findings in terms of data, econometric methodology, and geographical country applicability.

Aid was shown to have a greater effect on growth than FDI. African countries are more vulnerable to export instability and its accompanying economic volatility because of their reliance on exports (Ndikumana & Sarr, 2016). An influx of capital may lead to an appreciation in the exchange rate and an increase in the trade imbalance, according to the findings of Calvo, Leiderman and Reinhart (1996).

There is debate among researchers about whether the liberalisation of capital flows leads to better macro-economic policy and better governance. Chigbu, Akujuobi and Ebimobowei (2012) examined the effect of capital inflows on economic development in various emerging countries, and they found that FDI proxies' remittances, portfolio investment, and foreign borrowing all had a beneficial effect on the economy of the studied countries.

Calderón and Nguyen (2015) examine 38 SSA countries and found that inflows of ODA and FDI lead to economic development, but debt inflows do not. According to Mallik (2008), ODA has a long-term detrimental effect on the development of many African countries. Similarly, in a study published in 2014, Adams and Atsu found that ODA had a long-term adverse impact on the development of the economy in Ghana. In another similar investigation, Kodama (2012) postulates that unstable ODA flows negatively affect lower-income economies, despite Odusanya, Logile, and Akanni (2011) saying that foreign assistance had a positive effect on economic growth in Nigeria and vice versa. Using the ARDL methodology, Choong, Zheng and Tiong (2010) showed that ODA led to economic development in Tanzania, whereas Wamboye, Adekola, and Sergi (2014) argued that ODA's beneficial impact is dependent on the amount or quality of the aid provided.

5.9.4 Gross domestic savings (GDS) and official development assistance (NODA)

Empirical research focused on the efficiency of ODA in fostering economic growth and development through domestic accumulation and investment in the recipient developing countries (Murphy, 2006). The analysis in Table 5.6 indicates that there is a significant negative relationship between gross domestic savings (GDS) and official development assist (NODA) over the full analysis period (2000-2018) and the period after the global financial crisis (2011-2018). Pre-crisis (2000-2006) results showed a negative but insignificant relationship between the variables. Thus, an increase in domestic savings, lead to a decrease in official development assistance. Opposing results were noted for the period during the financial crisis (2007-2010), where an insignificant, but positive relationship between GDS and NODA was noted. The mixed results are in line with the distinguished literature.

The notion that dependent ODA receivers are more reliant on foreign funds for their domestic investments advocated for a reverse connection between foreign support and domestic savings. Supporters of this perspective argued that, instead of boosting the savings rates of beneficiaries, the ODA was a replacement for domestic financial resources. ODA was shown to boost government spending, raise domestic investment and decrease tax collections without generating economic growth or promoting savings. Radelet (2006) argued that foreign assistance may impair savings and tax recovery incentives and output in the private sector, which is in line with the negative relationship between GDS and NODA observed in Table 5.6.

Nushiwat (2007) has identified three different positions or phases in the discussion of relationships between domestic savings and ODA of recipients when reviewing the effectiveness of ODA in support of domestic spending and domestic investment in the recipient countries. It could be hypothesised that ODA and domestic savings connections are positive. Thus, such a hypothesis states that domestic savings are favourably impacted via ODA inflows towards the development of the least developed countries. Proponents of this perspective believe that developing countries with little domestic capital may cover their funding shortfalls through ODA inflows to support investment opportunities in countries with limited access to global capital markets (Nushiwat, 2007; Shields, 2007).

Both of these gaps relate to the national savings gap and the external trade deficit. The savings gap model originally anticipated that both limitations on saving and foreign currency restrictions in developing countries would be eased by the positive impact of foreign assistance (Nushiwat, 2007). Due to most of the residents in poor developing country being regarded as impoverished and unable to save money, these developing countries lack the ability to accumulate reserves. Thus, a shortage of financial resources to support a projected level of investment in most emerging countries created a gap between the anticipated investment and the accumulated savings. This capital deficit would therefore be complemented or replaced by ODA. Capital inflows cover the gap with increased domestic savings (Chenery & Strout, 1966).

The effects of foreign capital, domestic capital accumulation and foreign borrowing were investigated by Cui and Gong (2008). The results from this investigation have shown that a steady rise in ODA has caused long-term capital accumulation and greater investment rates leading to better economic growth. Moreover, in their empirical studies investigating the effect of ODA inflows into Pakistan, Eregha and Irughe (2009) found a positive relationship between domestic savings and foreign development financial support.

5.9.5 Population growth (POP) and official development assistance (NODA)

The results in Table 5.6 indicate that population growth (POP) has a significant negative effect on official development assistance (NODA), over the entire analysis period (2000-2018) and a negative but insignificant relationship is present for the period before the crisis (2000-2006). In contrast, population growth for the selected African countries has a highly significant effect on official development assistance during the crisis period (2007-2010), and a positive, but insignificant effect between the variables after the crisis period (2011-2018).

A possible explanation for the significant differences over the periods is that ODA decisions during crisis periods could be increased in counties where the development need is coupled with a human or social element. Therefore, the more people in need, the more aid is provided by donor agencies. The results do, however, echo the theory argued within the Solow (1956) that growth models predict that countries with greater population growth rates would achieve poorer economic growth and weaker stability. The anticipated sign of the population growth coefficient is negative. It forecasts that countries with higher savings rates and lower population growth will generate greater per capita incomes than other countries making them less reliant on official development assistance over the short and long term.

Some African countries, such as Ghana, overcame poverty and provided employment for their increasing population through the receipt of donor support to grow their respective economies (Adom, 2015).

Apart from making ODA funds accessible to the needy via multilateral microfinance banks, micro-insurance services have been offered to safeguard their customers' incomes. Micro-insurance allows recipients to become more engaged in their financial destiny and to avoid the everyday economic uncertainties that may lead to a reemerging incidence of poverty in the case of tragedy (Abor, 2013). Sachs (2005) argues that ODA is critical for health efforts in developing countries, and is even more important because of the continuous population increase throughout developing countries.

5.9.6 Life expectancy (LEXP as a proxy human capital) and official development assistance (NODA)

High life expectancy is linked to high per capita income globally, but improved life expectancy increases may have conflicting consequences. On one side, reduced mortality may raise per capita income by improving resource productivity (most notably human capital) and reduce ODA dependency. Lower mortality may boost population growth, greater population reduces income per capita when fixed factors of production exist.

According to Jayachandran and Lleras-Muney's (2009) suggestion, life expectancy increases with other human capital elements such as increased healthcare as well as education. Recent macro-empirical research on the causal effect of life expectancy on economic performance has led to conflicting findings. Empirical research shows that longer life expectancy leads to quicker economic development, according to Lorentzen, McMillan and Wacziarg (2008). The increase in life expectancy, however, causes quicker population growth, which has a negative causal impact on per capita income over the long term (Acemoglu & Johnson, 2007).

The results in Table 5.6 indicate a significant negative relationship between life expectancy (LEXP) and official development assistance (NODA) across the full analysis period (2000-2018). Thus, the higher a country’s life expectancy, the less likely it is to increase or attract ODA from official donor countries. The analysis period before (2000-2006) the crisis indicated a positive relationship between the variable, albeit the relationship showed no significance, as opposed to the periods during (2007-2010) and after (2011-2018) the global financial crisis, which indicated a negative, insignificant relationship between LEXP and NODA.

When both recipient and periodic specific variables (life expectancy and ODA) are accounted for, Trumbull and Wall (1994) found that a higher infant mortality rate correlates to higher overall bilateral and multilateral assistance inflows. When just periodic effects are taken into account, however, the findings are the reverse. In the

1980s, France, Japan, Sweden, and the United States of America found that, despite evidence of aid donors giving more aid to poorer countries, indicators reflected more humanitarian needs' fulfilment, such as the improvements in calorie intake and life expectancy for 36 African country recipients (Schraeder, Hook & Taylor, 1998).

This study's results on the ODA–life expectancy nexus signify that an increase in a country's life expectancy might also act as an indication of overall improvement in the selected African countries' human development indicators, which might ultimately lead to changes in donor behaviour towards aid recipients (Bonuedi, Kamasa & Boateng, 2019). Furthermore, an increase life expectancy within the selection of African countries in the sample could imply an improvement in overall economic development, and therefore, the need for increased ODA is reduced (Abraham & Tao, 2021).

Sarpong and Bein (2021) obtained similar results, and suggested that the direct link between the improvements in the quality of life, and therefore, the life expectancy of the people in SSA, through sustainable development, should be strengthened to discourage SSA from relying of ODA from foreign donors. African government officials should thus evaluate their sustainable development goals and align their growth policies to finance life enhancement initiatives.

5.9.7 Natural resources (NATR) and official development assistance (NODA)

Ideological, political, cultural and commercial interests have defined Africa's role in the global natural resource market for many years. Ideological affiliations between African countries and their attitude towards eastern and western countries are well known, and support from the one or the other is called upon when developmental challenges need to be solved, whether social, political or economic. It is in this realm where African countries use their abundance of resources as a tool to attract the interests of these foreign countries.

The results presented in Table 5.6 indicate a negative relationship between natural resource rents (NATR) and official development assistance (NODA) over the entire analysis period (2000-2018), and a positive relationship between the variable during the crisis period (2007-2010), however, none of the relationships are significant.

In contrast, natural resource rents are positively and significantly related to the inflow of ODA from donor countries for the periods before the global financial crisis (2000-

2006), as well as after the global financial crisis (2011-2018). It could be that, during times of economic growth and times of economic recovery, presented by the different time periods, can be seen as deciding factors for ODA programme implementations and fund disbursements.

The empirical research provided in the literature review section does not give a clear picture of the present state of the ODA distribution in relation to natural resource rents, or whether it is directly related to the natural resource foreign policy agendas of donors. In certain findings, the political and strategic concerns of donors triumph over the needs or policy quality of recipients. Some studies argue that the strategic interests of contributors are not important (Burnside & Dollar, 2000).

More help goes to smaller and poorer countries (Easterly, 2007) and more assistance goes to countries with lower levels of corruption (Winters & Martinez, 2015). Concerns that ODA may significantly decrease as a result of financial and economic difficulties impacting contributors are deemed to be overestimated (Fuchs, Dreher & Nunnenkamp, 2014; Jones 2015). However, new insights provided by Eman and Ahmed (2021) showed that there is an interdependent link, between natural resource and official development assistance provided for African countries. Also, Eman and Ahmen (2021) argue that the natural resource abundance prevalent in some African countries is being used as leverage for ODA choices by donors. However, natural resources exploitation by ODA DAC and other members are becoming unpopular and an easy target for politicians, since people consider it a charity and exaggerate its actual monetary amount (Heinrich, Kobayashi & Bryant, 2016), and thus, downplay the exploitation of resources within Africa as a form of bilateral trade.

The primary way of evaluating the ODA allocations includes taking into account data in which ODA is averaged across successive periods (typically four to six years). This is explained by the values of certain independent variables observed at, or at the same time lag periods. This study and the findings in Table 5.6 have done just that and indicated that natural resource abundance in African countries do indeed attract significant ODA inflows, but only under certain conditions and under the watchful eyes and within the strategic interest of donors.

5.9.8 Education (EDU as a proxy for human capital) and official development assistance (NODA)

Within the context of this study, the link between education as a human capital proxy in the regression analysis and official development assistance is mostly centred on the funding initiatives and the level of education with the recipient African countries. The results in Table 5.6 indicate that no significant relationship exists between the level of education (EDU) and ODA inflows for the selected African countries over the full analysis period (2000-2018) studied, or for the periods before (2000-2006) or during the financial crisis (2007-2010). Although the relationships were not significant, they were positive for 2000-2018 and 2000-2006, and negative during the crisis (2007-2010). Contrary to the mentioned periods, a significant positive relationship exists between education (EDU) and ODA inflows for the period after the global financial crisis (2011-2018). Thus, when the level of education increases, the foreign direct inflows from ODA sources also increase.

Where educational needs are highest, ODA-led initiatives in the education sector were structured under ideas of manpower planning, which were supported by the leading national economic teams (Heyneman, 2003). As a result, projects concentrated on technical vocational education and a more ‘practical’ secondary school curriculum as a means to train skilled employees and assist governments in addressing skills shortages (Heyneman, 2003). Infrastructure for education systems was also a focus of education initiatives, including the construction of schools, labs, workshops and libraries, coupled with the infrastructure associated with its support (Jones, 1992; Eberhard, Gratwick, Morella & Antmann, 2017).

While the international community's focused on the Millennium Development Goals, the implementation of performance-based allocation systems, and the international community's aid modalities are appropriate in many situations, they do not appear to be well tailored to assist the world's most vulnerable countries. Indeed, Psacharopoulos (2006) argues that although the education MDGs are admirable in their goals, they are impractical, since they do not address how such a large increase in primary education might be funded.

Meeting the education objectives in fragile countries (for example, in many African countries) has clearly been hindered by a lack of resources, since these countries are considered high-risk settings for assistance delivery (Colenso, 2005; Collier, 2007). Weak institutions, such as fragile government treasury functions and poor fiscal spending in the education sector may sabotage the ODA effectiveness, and the possibility of conflict in sensitive regions raises the danger of gains in educational development being reversed. In addition, the widespread corruption within fiscal choices made by governments with access to ODA funds could have severe consequences for the overall educational endeavours (human capital improvements) of developing countries (Jetter & Parmeter, 2018). Furthermore, unstable governments may expose donor agencies to fiduciary risks, which must be carefully managed.

Strong educational institutions and the life-long learning ambitions are known to be economic growth enablers (Ogundari & Awokuse, 2018). Heavy-hitter donors, such as the UK's Department for International Development (UKAID), are becoming more committed to working successfully in fragile countries. However, before these donors begin to build up ODA operations in these countries, they will need to find better methods to disburse money that address donor concerns about institutional capabilities and corruption.

The effectiveness of many development aid projects are reliant on good quality education, as the difficulty associated with many developmental projects require a certain degree of expertise for the projects to be successful (Yogo, 2017). The difficulty that bilateral and multilateral agencies are confronted with is determining how money should be distributed when the underlying partnership foundation and expertise is mostly missing in many of the countries in which they operate. This implies that strong governance might no longer be an essential requirement for development assistance. Too much dogmatism about good governance has resulted in a strong aversion to assisting weak countries. According to an earlier study by Grindle (2004), the problem is not so much about excellent governance as it is about good enough governance. The international development community must evaluate whether countries are on the path to ‘democracy’ and the rule of law, and on what basis they can assist them.

5.9.9 Infrastructure variable presented by access to electricity (ELEC) and official development assistance (NODA)

Poverty is a significant barrier not just to developing countries, but to the whole world's sustainable development agenda. Poverty eradication is the primary goal, along with economic development, of bilateral and multilateral funders. Poverty is now characterised as poor social conditions, in addition to economic deprivation, such as education, health and nutrition. One approach to deal with the many elements of poverty is to increase opportunity, and one of those possibilities is access to modern energy sources, such as electricity.

The results in Table 5.6 indicate that a negative and insignificant relationship exists between access to electricity (ELEC) and official development assistance (NODA) within the selected African countries. The results were confirmed for the entire analysis period (2000-2018), the period before (2000-2006) and during the global financial crisis (2007-2010). A positive and insignificant relationship was noted for the period after the crisis (2011-2018).

According to the study’s expectations and based on the available and cited literature, it was expected that ODA inflows would increase significantly due to the developmental nature of ODA programmes, especially on energy infrastructure development in Africa.

The expectations were grounded on the SDGs and their emphasis on intercontinental problems, reviving the interest in the connection between the many development strands in African countries and the wider social sector. The increased interest in electricity's role in enabling favourable results in health, education, agriculture, poverty reduction and other development sectors is one of many key dialogues that have emerged. For example, vaccine storage, electronic teaching aids, and irrigation and agricultural water pumping all rely on different levels of energy.

There is a scarcity of energy for essential developmental services in SSA. A healthcare study focusing on four healthcare facilities in one of most populated countries in the sub-region showed that power is not available at all four of those institutions, and almost three-quarters of all electrical services fail to provide dependable supply (Adair-Rohani *et al.*, 2013). Meanwhile, the objectives and goals for energy access continue to lag in SSA. Despite the recent improvements in worldwide electricity entry rates, approximately 620 million people will still not have access to electricity by 2030, with 85% of them Sub-Saharan Africans (IEA *et al.* 2020). If the present gap is not addressed urgently, African countries will not deliver on the electricity-dependent developmental results.

5.9.10 Section conclusion

To conclude this section and in line with the first research objective and research question of this study, it was found that the deterministic relationships between economic growth (GDPG), foreign direct investment (FDI) and official development assistance (NODA) are dynamic in nature and period dependent. Using a two-step dynamic system GMM model, the study found both significant positive and significant negative relationships between the variables, employed interchangeably.

Furthermore, the direction of the relationships also changed, given the different periods. For example, in so far as the deterministic relationship between economic growth (GDPG) and official development assistance (NODA) was concerned, NODA had no significant relationship with GDPG, but economic growth determined significant positive official development assistance (NODA) inflows over the full period (2000-2018), but significant negative official development assistance inflows, or rather outflows, in the period after the global financial crisis (2011-2018) for the selection of African countries.

Similarly, FDI had a significant positive deterministic relationship with economic growth (GDPG) for all the periods under analysis, except for the period during the global financial crisis (2007-2010). In contrast, only economic growth (GDPG) had a significant positive deterministic relationship with FDI for the periods pre- and post the global financial crisis (2000-2006; 2011-2018).

The analysis and discussion showed that the same dynamic and deterministic relationships between the variables and over the different time periods were present between economic growth, FDI and official development assistance in the company of the other control and proxy variables for the selected African countries.

5.10 PANEL COINTEGRATION TEST

This section presents the panel cointegration test using the autoregressive distributed lag (ARDL) bounds test and the error correction model.

Following the analysis of the results and discussions above, the next part of the analysis focuses on answering Research questions 2 and 3 of this study. This section provides an in-depth analysis and discussion around the long-run and short-run cointegrating relationship between FDI, ODA and economic growth in African countries. In addition, the analysis and discussion will accentuate and determine the causality between the dependent variable, GDP growth, and the main independent variables, FDI and ODA, and the robustness of these relationships.

This section follows the chosen methodologies and estimation techniques needed to answer the research questions, as set out in Chapter 4, which are the autoregressive distributed lag bounds test approach (panel ARDL) towards cointegration and the error correction models (ECM). From these models and estimation techniques, causality will be inferred and conclusions drawn.

The benefit of utilising these techniques is that it identifies long-term balance and short-term outcomes. Furthermore, these techniques offer statistical benefits such as less co-linearity, greater flexibility and better effectiveness of estimates. It should be noted that the ARDL and ECM estimation techniques were employed on the panel data in this study by following all the prescribed diagnostics tests as mentioned in the previous section of this chapter. Therefore, no additional discussions on the descriptive statistics, the correlation matrix, panel unit root (stationarity), cross-sectional dependency tests or other similar tests are necessary, apart from the Hausman test to ascertain whether to use the MG, PMG or DFE estimator.

All diagnostic tests as to the appropriateness of the chosen models and estimators (ARDL and ECM) have already been done and were discussed in the previous sections, therefore, only the appropriate analysis table or appendices will be referred to when and where necessary. The study has also already established that series are integrates of different orders, having a combination of I(0) and I(1) series (see Table 5.3). Any additional pre-test diagnostics will, however, be summarised and discussed as per the required tests and model assumptions.

The analysis in the following section could only be done on the variables for the full analysis period (2000-2018), due to a lack of enough data points to effectively run the models for the separate periods, pre-, during and post the global financial period (2000-2006; 2007-2010; 2011-2018).

5.10.1 Cointegration analysis: long and short-run cointegration and the error correction model

To successfully determine the long and short-run cointegrating relationship between FDI, NODA and economic growth (GDPG), the study applied the ARDL bounds test approach to the panel data and extracted the error correction terms (ECT) from the ECM model estimation to ascertain the short-run characteristic present between the variables within the model. The pre-test diagnostics indicated that the optimal lag length for all variables in the models were 1 lag (see Appendix 26).

In accordance with Pesaran *et al.* (1999, 2001), the researcher needed to decide between using the mean group (MG), the pooled mean group (PMG), or the dynamic fixed affect (DFE) model in the analysis. As per Pesaran *et al.*'s (1999, 2001) suggestion, the PMG likelihood estimators were used to estimate both long-run coefficients, which capture the pooling behaviour of homogeneity constraints, and short-run coefficients, which are calculated by averaging the estimated error-correction coefficients and other short-run parameters across groups, providing accurate cointegration results between the variables.

Because homogeneity cannot be assumed, the study tested the null hypothesis of homogeneity by using the Hausman test to decide between using the mean group (MG), pooled mean group (PMG) or the dynamic fixed affect (DFE) estimators. The Hausman test indicates the preferred method of estimation and is based on the following hypotheses:

Deciding between MG and PMG:

H_0: MG and PMG estimates are not significantly different. PMG is more efficient.

H_1: Null is not true.

Decision: Use PMG if p-value > 0.05 (H_0 cannot be rejected).

Decision: Use MG if p-value < 0.05 (reject H_0).

Deciding between DFE and PMG:

H_0: DFE and PMG estimates are not significantly different. PMG is more efficient.

H_1: Null is not true.

Decision: Use PMG if p-value > 0.05 (H_0 cannot be rejected).

Decision: Use DFE if p-value < 0.05 (reject H_0).

Table 5.7 provides an output summary for the Hausman test which guided the decision regarding whether to accept or reject the null hypothesis, and to use the correct model estimators in Stata.

Table 5.7: Hausman test summary for MG, PMG or DFE estimation decision (2000-2018)

Deciding between MG & PMG			
DEPENDENT VARIABLE	**∆.GDPG**	**∆.FDI**	**∆.NODA**
Chi-Square **p-value**	0.73 0.6958	0.08 0.9628	0.58 0.7468
Decision	**Use PMG (p-value > 0.05)**	**Use PMG (p-value > 0.05)**	**Use PMG (p-value > 0.05)**
Deciding between DFE & PMG			
Chi-Square **p-value**	2.45 0.2944	2.56 0.2784	1.65 0.4374
Decision	**Use PMG (p-value > 0.05)**	**Use PMG (p-value > 0.05)**	**Use PMG (p-value > 0.05)**

Note: ∆ is the difference operator

Source: Author's own compilation from Stata outputs

The summary in Table 5.7 shows that the pooled mean group (PMG) was the preferred estimation technique to run the ARDL and ECM models on the panel data for the African countries and the study's interpretation would therefore focus on the PMG output. Cointegration was determined from the statistical significance of the long-run coefficients and the error correction term in these models.

Table 5.8 (on the next page) provides the ARDL and ECM model outputs, from which the long and short-run cointegration and causation analysis between dependent variable GDP growth (GDPG), FDI and NODA were done.

Table 5.8: ARDL and ECM results with dependent variable GDPG

VARIABLES	PMG ∆.GDPG	MG ∆.GDPG	DFE ∆.GDPG
LONG RUN			
L.FDI	-0.00457	-0.106	0.189***
	(-0.15)	(-0.25)	(3.45)
L.NODA	0.106**	-1.554	0.127
	(2.76)	(-1.00)	(1.91)
ECT	**-0.846*** **	**-0.987*** **	**-0.765*** **
	(-10.26)	**(-13.10)**	**(-15.09)**
SHORT RUN			
∆.FDI	0.265	0.236	0.0357
	(1.80)	(1.75)	(0.65)
∆.NODA	-0.157	-0.546	0.0525
	(-0.95)	(-1.28)	(1.17)
_cons	3.943***	5.308***	2.823***
	(8.75)	(5.07)	(5.65)
N	360	360	360

NOTE: Where **P*< 0.05; ***P*<0.01; ****P*<0.001 denotes the levels of significance.

∆ is the difference operator

t statistics in parentheses

Source: Author's own compilation from Stata outputs

5.10.1.1 Long-run cointegration and the ECT: Dependent variable GDP growth (GDPG)

The error correction term (ECT) in Table 5.8 indicates that there is an overall long-run association between all the variables within the model where economic growth (GDPG) is the dependent variable, and FDI and NODA are the independent variables. Therefore, in the case of disequilibrium this model will correct at a speed of 84.6% within a year.

The ARDL model results in Table 5.8 further confirm that there is indeed a significant and positive long-run cointegrating relationship between official development assistance (NODA) and economic growth (GDPG).

The results in this study are similar to those found in other development studies that promote the effectiveness of ODA, and the long-term benefits thereof as a growth enabling tool to support in-country macroeconomic growth efforts, coupled with the correct mix of policy interventions (Economides *et al.*, 2004; Refaei & Sameti, 2015; Adebayo & Kalmaz, 2020). Yet, there is no significant long-run cointegrating relationship between FDI and economic growth (GDPG).

5.10.1.2 Causality: Dependent variable economic growth (GDPG)

Long-run causality:

The results in Table 5.8 indicate that official development assistance significantly causes an increase in economic growth (GDPG) in the long run. However, FDI, although negatively, does seem to be causing economic growth (GDPG), although it is not significant. Therefore, it cannot be concluded that FDI causes economic growth (GDPG) in the long run.

The results and causal relationship between official development assistance and economic growth in this study are in contrast to the findings of Uddin, Mustakim and Hossain (2020), who concluded an opposing unidirectional causal relationship between the variables in the developing country context in South Asia. However, the results in Table 5.8 are similar and were confirmed by Akbar (2021), in the context where development aid provides much-needed relief in war-torn countries, similar to those found in Africa.

Short-run causality:

The results in Table 5.8 indicate that neither FDI, nor NODA causes economic growth (GDPG) in the short run, which implies indeed that the relationship between economic growth (GDPG) and official development assistance (NODA) seem to be a long-run relationship. Thus, it is a long-term, rather than short-run occurrence.

Table 5.9 provides the ARDL and ECM model outputs, from which the long and short-run cointegration and causation analysis between dependent variable FDI, and independent variables economic growth (GDPG) and official development assistance (NODA) were done.

Table 5.9: ARDL and ECM results with dependent variable FDI

VARIABLES	PMG ∆.FDI	MG ∆.FDI	DFE ∆.FDI
LONG RUN			
L.NODA	0.0354	-0.0487	-0.0210
	(0.68)	(-0.16)	(-0.12)
L.GDPG	0.363***	0.310	-0.297
	(4.83)	(1.12)	(-1.25)
ECT	-0.493***	-0.664***	-0.291***
	(-5.92)	(-9.40)	(-7.39)
SHORT RUN			
∆.NODA	0.306	0.395	-0.00885
	(1.23)	(1.43)	(-0.20)
∆.GDPG	0.157**	0.130	0.0355
	(2.70)	(1.38)	(0.65)
_cons	0.711**	1.646	1.625**
	(3.21)	(1.59)	(3.16)
N	360	360	360

NOTE: Where *P< 0.05; **P<0.01; ***P<0.001 denotes the levels of significance.

∆ is the difference operator

t statistics in parentheses

Source: Author's own compilation from Stata outputs

5.10.1.3 Long-run cointegration and the ECT: Dependent variable FDI

The error correction term (ECT) in Table 5.9 indicates that there is an overall long-run association between all the variables within the model where FDI is the dependent variable, and economic growth (GDPG) and NODA are the independent variables.

Therefore, it was determined that with any deviation from the long-run equilibrium, the model will correct at a speed of adjustment of 49.3% within a year.

The ARDL results in Table 5.9 further confirm that there is a significant and positive long-run cointegrating relationship between economic growth (GDPG) and FDI, implying that over the long run, increases or decreases in economic growth could indicate similar movements in FDIs in Africa. However, no significant long-run cointegrating relationship between NODA and FDI was found. The significant long-run cointegrating relationships between GDPG and FDI in other developing and emerging markets were similar, and indications are that economic growth plays an important role as an FDI indicator in long-term decision-making (Saleem, Shabbir & Khan, 2020).

5.10.1.4 Causality: Dependent variable foreign direct investment (FDI)

Long-run causality:

The results in Table 5.9 indicate that economic growth (GDPG) significantly causes an increase in FDI in the long run, but that NODA, although positive, appears to be causing an increase in FDI, although the effect is not significant. This implies that NODA in the long run, does not cause FDI.

The results in Table 5.9 further provide governments and policy-makers in the region a better understanding of how to reorganise economic growth and trade policies so that their positive spillovers reach rural regions and local businesses, resulting in long-term sustainable economic growth and development for African countries, as advanced by Akadiri, Gungor, Akadiri and Bamidele-Sadiq (2020) who drew similar conclusions.

Short-run causality:

Furthermore, Table 5.9 stipulates that economic growth (GDPG) in the short run, also significantly causes an increase in FDI, which indicates a definite long and short-run causal relationship between FDI and economic growth (GDPG). The findings on the short-run causal relationship are similar to the recent findings of other Africa-specific development studies and confirm the assumptions that growth leads to investment (Abu Bakar & Afolabi, 2017; Muazu & Acquah, 2020; Seyni & Edith, 2021). NODA, while positively influencing FDI, does not significantly cause FDI.

The study therefore concludes that there is no significant causation between official development assistance and foreign direct investment in the short or in the long run.

Table 5.10 provides the ARDL and ECM model outputs, from which the long and short-run cointegration and causation analysis between dependent variable NODA, and independent variables economic growth (GDPG) and FDI were done.

Table 5.10: ARDL and ECM Results with dependent variable NODA

	PMG	**MG**	**DFE**
VARIABLES	**∆.NODA**	**∆.NODA**	**∆.NODA**
LONG RUN			
L.FDI	-0.237**	0.414	-0.105
	(-3.29)	(0.53)	(-1.34)
L.GDPG	-0.131	0.892	0.0543
	(-1.77)	(0.72)	(0.45)
ECT	**-0.441*** **	**-0.587*** **	**-0.660*** **
	(-6.07)	**(-7.48)**	**(-12.98)**
SHORT RUN			
∆.FDI	-0.199	-0.286	-0.0131
	(-1.01)	(-1.29)	(-0.20)
∆.GDPG	0.00792	0.0442	0.0773
	(0.13)	(0.36)	(1.17)
_cons	4.495***	5.125***	4.850***
	(3.52)	(4.42)	(8.41)
N	360	360	360

NOTE: Where *P< 0.05; **P<0.01; ***P<0.001 denotes the levels of significance.

∆ is the difference operator

t statistics in parentheses

Source: Author’s own compilation from Stata outputs

5.10.1.5 Long-run cointegration and the ECT: Dependent variable NODA

The error correction term (ECT) in Table 5.10 indicates that there is an overall long-run association between all the variables within the model, where NODA is the dependent variable and economic growth (GDPG) and FDI are the independent variables. Therefore, it is determined that any deviation from the long-run equilibrium in this model will correct at a speed of adjustment of 44.1% within a year.

The results in Table 5.10 also confirm that there is a long-run cointegrating relationship between FDI and NODA, and that relationship is significant and negative, in contrast with the findings of Kapingura (2018), who found no significant relationship between the variables within a sample of SADC countries. The results further show that there is no significant long-run cointegrating relationship between economic growth (GDPG) and official development assistance (NODA).

5.10.1.6 Causality: Dependent variable official development assistance (NODA)

Long-run causality:

From the results in Table 5.10, it can confidently be said that FDI negatively caused NODA in the long run, but that economic growth (GDPG) although seeming responsible for causing a decrease in official development assistance (NODA), is not significant; therefore, economic growth (GDPG) does not cause official development assistance (NODA) in the long run.

Yiheyis and Cleeve (2018) argued that the causal relationships between FDI and official development assistance, read in conjunction with the crowding in or crowding out effect, depends on the sectoral fund allocations and the productivity in the successes of either FDI or aid projects within Africa. The results in Table 5.10 show that FDI increases in the long run lead to a decline in official development assistance inflows.

Short-run causality:

Neither FDI nor economic growth (GDPG) causes official development assistance inflows (NODA) into Africa in the short run, which implies indeed that the relationship between official development assistance and FDI seem to be a long-run kind of relationship. Thus, the casual relationship is a long term, rather than short-run phenomenon.

Table 5.11 (on the next page) presents a summary of the cointegration and causation results of the study.

Table 5.11: Cointegration and causation summary

	Long-run coefficients			Short-run coefficients			
Dependent variables	**GDPG**	**FDI**	**NODA**	**ΔGDPG**	**ΔFDI**	**ΔNODA**	**ECT**
ΔGDPG		-0.00457	0.106**		0.265	-0.157	-0.846***
		(-0.15)	(2.76)		(1.80)	(-0.95)	(-10.26)
Causality		NO	YES		NO	NO	YES
Cointegration		NO	YES		N/A	N/A	YES
ΔFDI	0.363***		0.0354	0.157**		0.306	-0.493***
	(4.83)		(0.68)	(2.70)		(1.23)	(-5.92)
Causality	YES		NO	YES		NO	YES
Cointegration	YES		NO	N/A		N/A	YES
ΔNODA	-0.131	-0.237**		0.00792	-0.199		-0.441***
	(-1.77)	(-3.29)		(0.13)	(-1.01)		(-6.07)
Causality	NO	YES		NO	NO		YES
Cointegration	NO	YES		N/A	NO		YES

NOTE: Where *P< 0.05; **P<0.01; ***P<0.001 denotes the levels of significance.

Δ is the difference operator

t statistics in parentheses

Source: Author's own compilation from Stata outputs

The cointegration and causation summary in Table 5.11 articulates the long-run cointegrating relationships between economic growth (GDPG), FDI and NODA in the selected African countries under study. The error correction term (ECT) indicates the speed of model adjustment for all models and shows joint causality in all cases (thus, when the dependent variables are replaced by the regressors) and is always between 0 and -1 in all the models.

Table 5.11 provides an overall illustration of the outcomes discussed in conjunction with Tables 5.7 to 5.10 and illustrates that in all cases, there is only unidirectional causation between the variables, both in the short and long run. However causation would only be directed towards one of the two independent variables within any given model, regardless of the dependent variables used in the regression, in contrast with the evidence in the available literature.

From a planning and/or policy perspective in Africa, knowing what the direction of causation is for African countries, would make it easier for governments, MNEs and investors to focus on the cause-and-effect relationship between economic growth, FDI and official development assistance and allow them to align their decisions accordingly.

5.11 CHAPTER CONCLUSION

Chapter 5 formed the crux of the study as it set out to answer the research questions and to meet the objectives of the study. Several econometric methods were used to meet the study's goals and the study first fulfilled Research objective 1, by following the chosen methodology and estimation techniques chosen in Chapter 4. Preliminary tests were conducted to evaluate the nature of the data, such as descriptive statistics and correlation analysis on the entire dataset extracted from the World Bank’s World Development Indicators databank. Prior to the econometric model estimations, amongst others, the Hausman and unit root tests were done and elaborated upon.

The dynamic two-step system GMM model was used to evaluate the deterministic relationship between economic growth, foreign direct investment and official development assistance for the selection of African countries, over different time periods and under different economic conditions. The findings showed that there is no general consensus on the deterministic relationship between the variables, economic growth, foreign direct investment and official development assistance within the selected African countries. Rather, the results and accompanying discussion showed that the relationships between the variables are dynamic in nature, and may differ under unique circumstances, as shown in the analysis and discussions. The deterministic relationships are also dynamic and change when the dependent and independent variables are in the presence of other control or proxy variables. The dynamic and deterministic relationships were supported and underpinned by both theoretical and empirical studies, as outlined in the discussions and literature review.

After establishing the deterministic relationships between the variables, the ARDL bounds test approach toward panel data was used to examine the long-run cointegrating relationship between economic growth (GDPG), foreign direct investment (FDI) and official development assistance (NODA) to answer Research question 2 and to achieve Research objective 2. Diagnostic tests confirmed the validity of the estimation techniques before the panel data analysis was done. The pooled mean group (PMG) was selected as the best estimator to examine and to ascertain what cointegrating relationship exists between foreign direct investment, official development assistance and economic growth in Africa. The error correction model (ECM) evaluated joint causality between the dependent and independent variables. The analysis and discussion concluded that for all the variables, the error correction term was negative and significant, indicating convergences to equilibrium over the long term.

In addition, the data analysis and discussion answered Research question 3 and met Research objective 3 by determining the direction of causality between foreign direct investment, official development assistance and economic growth and the robustness thereof. The direction and robustness of the causal relationship between the variables were summarised in Table 5.11, indicating long and short-run, unidirectional causation between the variables.

CHAPTER 6:
CONCLUSION AND RECOMMENDATIONS

6.1 INTRODUCTION

This chapter presents the conclusions to the study. It provides an overview of what the research aimed to accomplish, briefly examines the key results and highlights the contributions to the existing body of knowledge. The chapter also analyses the theoretical, social and policy implications of the empirical results, and makes some recommendations and concludes with ideas for potential future studies.

6.2 MOTIVATION AND OBJECTIVES OF THE STUDY

For many years, African countries have been grappling with high unemployment rates, low levels of development, and with the common perception that Africa cannot grow on its own, and therefore, needs intervention from abroad (Matandare, 2018; Masipa, 2018; Diko & Sempijja, 2020). These so called ‘interventions’ have come in many forms and from many organisations, foreign governments, or even individual citizens, who believe that by providing African countries and her peoples with the lessons learned in their own home countries, it would stimulate the same outcomes in the targeted African country (Brown & Fisher, 2020). However, as noted in the literature and empirical data in the previous chapters, the African continent is dynamic in every sense of the word. Differences in religion, political ideologies, levels and understanding of democracy, education, economic structures, social structures, conflict resolution approaches, and to not even mention, the vast geological variances between the countries on the content, make it extremely difficult to find solutions to some of the difficult challenges each individual country faces (Barlow, 2020).

Foreign direct investment and official development assistance have long been promoted as growth-enabling mechanisms to assist and grow the African continent’s capital base, provide employment, and gradually improve the overall well-being of the citizens that live here (Mowlaei, 2018; Twerefou *et al.*, 2020). African governments are always on the lookout to attract foreign direct investments and often attract investors by promising above-average returns on infrastructure projects, and provide investment incentives not available to local investors, crowding out the savings incentives within their own countries (Agyeman, Arthur & Addai, 2021; Faku, 2021).

Additional challenges faced by many African countries, is the fact that the continent is characterised by half-won wars and simmering conflicts, coupled by massive environmental challenges, such as droughts and floods, extreme poverty and general lack of basic infrastructure (Barlow, 2016).

To account for the lack of funds and lack of infrastructure, African governments often approach donor countries to support these poverty alleviation and other challenges. Official development assistance is then provided to the government and country in question, with very little oversight as to where the money is going, or if the assistance is leading to the intended developmental outcomes, or if it even helps with economic growth (Easterly, 2007; Meaza, 2021). There is also a perception that official development assistance into Africa would lead to foreign direct investments, which in turn, should lead to growth, with ambiguous evidence to support such claims (Sachs, 2014; Yiew & Lau, 2018; Younsi, Bechtini & Khemili, 2021).

Within this context, of not knowing what the relationships between economic growth, foreign direct investment and official development assistance is for African countries and their growth endeavours, the study started taking shape. The comprehensive intention of the thesis was to investigate the position played by foreign direct investment (FDI) and official development assistance (ODA) on the economic growth of African countries, over different and unique time periods for planning, investment and developmental purposes.

Having knowledge of the dynamics and interaction between the variables will assist governments with improved policy directives, help MNEs with their FDI decision-making into the continent, and more broadly, assistant local investors with their savings decisions. Furthermore, knowing how the relationships interact over different economic conditions or periods, might lead to an improved understanding of the African continent's development framework.

6.3 SUMMARY OF OBJECTIVES AND RESULTS

This section presents the findings of the study related to the determinants of economic growth, foreign direct investment and official development assistance in Africa; the cointegrating relationships between economic growth, foreign direct investment and official development assistance in Africa; and the causal relationships between economic growth, foreign direct investment and official development assistance in Africa.

6.3.1 Determinants of economic growth, foreign direct investment and official development assistance in Africa

Research objective 1 of this study was to evaluate the deterministic relationships between foreign direct investment, official development assistance and economic growth in African countries. The reasoning behind the objective was to allow countries, policy-makers, MNEs and individual investors to make evidence-based decisions when analysing an African country’s FDI or ODA-led growth strategies and needs, to align these strategies with the intended and decided-upon outcomes of the investor or donor.

The study used the dynamic two-step system GMM model to regress the dependent and independent variables from a selection of African countries. After accounting for missing data in the dataset, this study examined 20 African countries over a period of nineteen years (2000-2018). The results and discussion concluded that the relationships between the chosen variables are dynamic in nature, as both significant positive as well as negative deterministic relationships were discovered between economic growth (GDPG), foreign direct investment (FDI) and official development assistance (NODA) in the presence of unique control variables that are often associated with being growth-enabling variables.

The uniqueness of the results and discussions is seen in that the deterministic relationship between the main variables in the study (GDPG, FDI and NODA) seems to change under different economic circumstances, which were presented by the full analysis period, the periods pre-, during and post the global financial crisis (2000-2018; 2000-2006; 2007-2010; 2011-2018). Furthermore, the direction of the relationships also changes, given the different periods. For example, in so far as the deterministic relationship between economic growth (GDPG) and official development assistance (NODA), NODA has no significant relationship with GDPG, but economic growth determines significant positive official development assistance (NODA) inflows over the full period (2000-2018), but significant negative development assistance inflows, or rather outflows, in the period after the global financial crisis (2011-2018) for our selection of African countries.

Therefore, from a theoretical perspective, deterministic ODA-led growth strategies followed by African countries, their bilateral donors, or multilateral organisations have shown to be time-dependent and circumstantial, possibly based on the economic conditions of the donors themselves (Frot, 2009; Gasparatos *et al*., 2020). Similarly, official development assistance is inherently exogenous, and therefore, lends support as a determinant to the exogenous growth model (seen in conjunction with the population growth rates in our sample of African countries) propelled by Solow and Swan (1956), yet economic growth is a significant determinant for aid inflows, not only for the selected sample of African countries but also other developing countries (Martinez, 2021). The selection of African countries in the sample can thus plan for possible ODA-led growth strategies during future economic circumstances they may be faced with that closely mimic the scenarios presented in this study (periods pre-, during and after a global financial crisis).

Similarly, foreign direct investment (FDI) has a significant positive deterministic relationship with economic growth (GDPG) for all the periods under analysis, except for the period during the global financial crisis (2007-2010). In contrast, economic growth (GDPG) only has a significant positive deterministic relationship with foreign direct investment (FDI) for the periods pre- and post the global financial crisis (2000-2006; 2011-2018). The FDI-led growth nexus and the findings in this study are, therefore, similar to the findings in the theoretical and empirical literature for both developed and developing countries (Owusu-Nantwi & Erickson, 2019; Adedoyin, Bekun, Driha & Balsalobre-Lorente, 2020). Determinants for FDI investment decisions by MNEs, therefore, seem to be guided by universal factors, and are not country or continent-specific.

The analysis and discussion showed that the same dynamic and deterministic relationships between the variables, and over the different time periods, were present between economic growth, foreign direct investment, and official development assistance, in the company of the other control and proxy variables for the selected African countries.

This study, on African-specific data, found support for both the push and pull factor-driven FDI theories, such as the OLI framework when MNEs make investment decisions into the African region. The push and pull factors that attract or discourage investment into the sample of African countries, such as natural resource abundance, levels of education or infrastructure availability all form part of the risk and reward deciding factors that apply to MNEs globally, and regarding which, Africa is no exception (Carbonell & Werner, 2018; Feng, Ge, Li & Lin, 2021; Shahbaz, Mateev & Abosedra, 2021). From the analysis and discussion in Chapter 5, the unique time dimensions used, and the changes in deterministic behaviour between the variables explain the capital availability and growth dynamics of MNEs, especially the circumstances surrounding the global financial crisis (Doytch, 2021; Izadi, Rashid & Izadi, 2021).

The study can thus conclude what the deterministic relationship between foreign direct investment, official development assistance and economic growth for the African countries in our sample is, and more so, what the deterministic relationship is over different economic circumstances (pre-, during and post a financial crisis). This study has further showed that these deterministic relationships are period dependent. The results and comprehensive discussions in Chapter 5 were supported by both theoretical and empirical studies in terms of how the studies related to the selected variables in this study.

6.3.2 Cointegrating relationships between economic growth, foreign direct investment and official development assistance in Africa

After this study identified and concluded the deterministic relationship between foreign direct investment, official development assistance and economic growth for the selection of African countries, as per Research objective 1 and Research question 1, the study progressed to ascertain what the long-run cointegrating relationship is between the same variables. Recognising the cointegration between the chosen variables assists with a better understanding of the correlations between the variables and the conditional sensitivity thereof in the long run. Research objective 2 was to examine the long-run cointegrating relationship between FDI, ODA and economic growth in Africa, and in doing so, it answered Research question 2. Merely knowing what relationships exist does not necessarily provide sufficient evidence for the long-term correlation among variables (Engle & Granger, 1987).

Through the use of the (ARDL) bounds test approach towards cointegration, the study evaluated and examined the presence of cointegration between the variables, economic growth (GDPG), foreign direct investment (FDI) and official development assistance (NODA) independently. The results and discussion asserted that significant positive long-run relationships were found between official development assistance (NODA) and economic growth (GDPG); between economic growth and foreign direct investment (FDI); and a significant negative long-run cointegrating relationship between foreign direct investment (FDI) and official development assistance (NODA). This implies that the cointegrating relationships between these variables are long-term phenomena, rather than short-term experiences. The results were reaffirmed by the significance of the error correction term (ECT), derived from the error correction model (ECM) in all the regression models.

Therefore, the results obtained in this study support the long-term theoretical and empirical approach to development funding through official development assistance as a means of increasing economic growth and development over the long term, as advocated by proponents of aid towards developing countries (Dollar & Levin, 2006; Sachs *et al.*, 2004, 2006; Sachs, 2014; Riddell & Nino-Zarazua, 2016; McArthur & Sachs, 2019). The results obtained in this study reject the notion that official development assistance does not foster economic growth and is ineffective in Africa or other developing countries over the long run (Adedokun, 2017; Adams & Elassal, 2020; Admassu, 2020; Rao *et al.*, 2020). Furthermore, the results reaffirm the crowding out and negative effect that official development assistance has on FDI into developing countries and Africa in particular (Addison & Baliamoune-Lutz, 2020). The economic growth–FDI nexus in the selection of African countries in our study, displayed similar cointegrating characteristics towards other developed and developing countries (Iamsiraroj, 2016).

6.3.3 Causal relationships between economic growth, foreign direct investment and official development assistance in Africa

For the study to answer Research question 3 and to meet Research objective 3, causality between economic growth, foreign direct investment and official development assistance had to be established. Merely knowing which variable determines the movement and direction of the other, or what the cointegrating relationships are between the variables, regardless of the valuable insight it provides, is not enough information to provide for a cause-and-effect relationship.

The study inferred causality and the direction and robustness thereof for the three main variables, making use of the results output of the ADRL (PMG) and ECM models in the analysis. Drawing conclusions from cause-and-effect relationships will aid in the decision-making process, by narrowing down the complexities of the FDI–ODA–economic growth nexus.

The results presented in Table 5.11 provided evidence that there is unidirectional long-run causality between economic growth (GDPG) and foreign direct investment (FDI), between FDI and NODA, and between NODA and GDPG, respectively. Also, the only unidirectional short-run causality was established between economic growth (GDPG) and foreign direct investment (FDI), implying that economic growth causes an increase in foreign direct investment, both in the long and in the short run, similar to the relationships found in other BRICS countries (Banday, Murugan & Maryam, 2020). It was interesting to note that the causal relationship between the variables was only directed towards one of the two independent variables, regardless of the dependent variable used in the regression.

The causality findings confirmed the initial doubt that foreign direct investment and official development assistance are not necessarily complementary forms of economic growth funding, rather official development assistance in the long run causes economic growth, and economic growth in turn, causes an increase in foreign direct investment in both the long and short run into our selection of African countries.

In light of the results and the discussions presents in this thesis, and the constant quest to increase official development assistance (Desai, 2020), notable long and short-run economic growth-enabling interventions would assist African countries in attracting both aid and investment, depending on the needs and economic circumstance of each specific African country.

The analysis and discussions provided throughout the study answered all the research questions and met all the research objectives, as set out at the beginning of this thesis. This study established the deterministic relationships between foreign direct investment, official development assistance, and economic growth for the selection of African countries by using a unique approach to the two-step system GMM employed over unique and dynamic time periods. The study used the ARDL (PMG) bounds test approach on the same dataset to ascertain the long-run cointegrating relationship between economic growth, FDI and official development assistance, and inferred causality and the robustness thereof, based on the outcomes of the same estimation model.

6.4 CONTRIBUTION TO NEW KNOWLEDGE

Drawing insight from the available literature and the data analysis and discussions presented through this study, the influence and effects of the outcomes on the economic growth–foreign direct investment–official development assistance nexus for African countries became evident. Earlier empirical studies (Sethi, Bhujabal, Das & Sucharita, 2019; Yahyaoui & Bouchoucha, 2020; Tefera & Odhiambo, 2020) on the aid–growth nexus or on the FDI–growth nexus were not focused and were not examined in combination, as either growth-enhancing or growth-hindering aspects within the African development context. Yet many economic growth policies for African countries were formulated based on a hypothesis fallacy that in combination, these two foreign funding methods are complementary and work in tandem, given the same theoretical push and pull factors within a developing country context (Kapingura, Ikhide & Tsegaye, 2018; Peštek, Lazović-Pita & Abdić, 2020; Bhatnagar, 2021).

This study emphasised that in terms of the selection of African countries that constituted the sample, given unique and different economic circumstances, the economic growth trajectory and relationship between the variables, economic growth, foreign direct investment and official development assistance also change. This phenomenon can be attributed to the structural and fundamental differences that were observed in the literature between the many African countries on the continent and their developing counterparts (Tchamyou, 2020; Tikhonova, 2020). Furthermore, by merely being determinants of one another during a specific time period, does not mean that the deterministic relationship between economic growth, FDI or official development assistance will remain the same, given that these relationships change under alternative economic conditions (Ahn & Park, 2018; Walters, 2018).

The inclusion of different and unique time periods during which to study the relationships, contributes to the theoretical and empirical literature, in that, during periods before an economic crisis, during an economic crisis, and post an economic crisis, the deterministic relationship between economic growth, foreign direct investment and official development assistance changes significantly, and indicates in what directions these changes are, thus, contributing the understanding of the push and pull factor dynamics between the variables as a result of global economic events (Combes, Kinda, Ouedraogo & Plane, 2019; Emara & Mohamed, 2021).

The study also contributes in the sense that relationships are different over the short and long term, allowing African countries to plan for long, as well as short-term developmental growth projects and negative global financial impacts (Fromentin, 2017).

The study differs from other empirical works because the variables remained dynamic, regardless of which variable (GDPG, FDI or NODA) was regressed. This was due to both funding inflows being included in a combined manner, as it studied the dynamism between them within the African context, as opposed to other developing countries (Anh & Mai, 2012; Ahn & Park, 2018). Importantly, this study proved that FDI and ODA are not complementary funding sources, leading to direct increases in economic growth and development in Africa, but rather are censorious of each other.

Additionally, the study used a variety of unique regressors (GDS, POP, LEXP, ELEC, EDU and NATR) as controls and proxies in the analysis, contributing to the unknown deterministic relationships between the variables and the three main variables of economic growth, foreign direct investment and official development assistance. These findings contribute to the importance of the proxies and the nexus of development funding and FDI, and how it relates to the overall African continent's sustainable development goals and allows for a country-level trend analysis (Marandu, Mburu & Amanze, 2019).

A concluding contribution is the use of the two-step system GMM methodology, as opposed to the well-known and studied pooled OLS framework to establish and dissect the previously unknown causality and deterministic relationships between economic growth, foreign direct investment and official development assistance.

6.5 FDI, ODA AND ECONOMIC GROWTH POLICY IMPLICATIONS FOR THE AFRICAN COUNTRIES UNDER STUDY

6.5.1 Foreign direct investment-led growth policy implications and recommendations for Africa

A government's policy position in effect guides an MNE's investment policy decision-making into a foreign country, and provides the needed stability for local investors to invest their savings in a responsible and sustainable manner.

FDI-inspired growth was recommended as an initial theoretical approach in the literature review, as both push and pull factors influence FDI inflows into Africa (Opperman & Adjasi, 2017; Senga, Cassimon & Essers, 2018; Nyame-Asiamah, Amoako, Amankwah-Amoah & Debrah, 2020). After concluding the results, it can be stated that the continent's goal should be to enhance the attractiveness of foreign direct investment by dramatically increasing the level of economic growth, as a significant cause-and-effect relationship has been established.

Considering the possible advantages that it will have in the short and the long term, African countries should focus on FDI-led interventions. Investment in physical capital increases the stock of physical capital available for production, and via the knowledge spillovers, the overall technological level of all MNEs and governments in an economy should improve (Romer, 1994; Bohle & Regan, 2021).

It is recommended that the African region's attractiveness for foreign direct investment (FDI) has to be improved, in accordance with an endogenous growth hypothesis. Technical developments usually fuel long-term economic growth due to technology transfers and knowledge spillovers in an endogenous growth model (Grossman & Helpman, 1991). According to Masoud (2014), technological development should be endogenous, and aggregate capital stock rises in response to it. In the endogenous growth theory, growth was thought to be reliant on governmental policies that enlivened competition, increased international commerce, and fostered innovation (Belloumi, 2014; Buckley, 2021).

The findings in this study supports the validity of similar policy recommendation for African countries. The chosen pool of regressors indicated that factors from inside the sampled African countries significantly influence the FDI inflows and outflows and the accompanying economic growth trajectory. Factors, such as improvements in domestic saving and education levels, assist MNEs seeking to establish a presence on the continent.

In the endogenous growth model, FDI that originates in the host country influences growth in the host country in many ways, for example, through the transfer of skills, knowledge and technology, economic and interest growth rates, the creation and strengthening of human capital, the integration of global economies, and in addition, host-country business rivalry increases through the increases in local business start-ups (Forte & Moura, 2013; Carstens & Freybote, 2019).

A growth-driven FDI strategy could potentially work well in the African region, and governments should concentrate on making internal reforms that foster future economic development, as a prerequisite for attracting foreign investment. Such internal reforms could be providing clarity on and the protection of property rights, which is a prerequisite for many MNEs that sometimes invest on behalf of other investors or shareholders. Stability and clarity on issues, such as mineral and exploration rights, would pave the way for a stable mining sector in terms of African governments who rely on the natural resource extractive industry to bolster the fiscal income that is needed for developmental priorities in other sectors.

In the near term, a national internal restructuring and reform plan could be implemented in African countries, since this tactic will work to improve the situation immediately. Restructuring in terms of a competence-based employment strategy, instead of a ‘cadre based’ system, which is known within the government sector as ‘cadre deployment’, has led to the economic devastation of many countries on the continent (Jankielsohn & Mollentze, 2021).

There has been considerable deterioration in the African region's political, social, and economic circumstances as of late, and these conditions are unlikely to improve any time soon, especially considering the economic and social consequences of COVID-

19 (Kanu, 2020). The political, financial, governance structures and institutional strengths, beliefs, and ideologies of the continent have prevented the region from becoming an attractive foreign investment destination within the global economy (Nyoti, 2018; Pasara, 2019; Davis, 2020; Istiak, 2021). The countries in the African region thus need to decrease rent-seeking behaviour, develop and enhance manufacturing, diversify their economies, and foster financial and institutional independence from oil exports and carbon resources, in an effort to move away from resource nationalism (Hickey, Abdulai, Izama & Mohan, 2020).

For many years, the people of the African continent had eagerly anticipated the democratic transition from authoritarian to representative governments. The preservation of human, intellectual and property rights has always been a cornerstone of most democratic administrations' policies, helping to advance institutional and political change and economic development (Onslow, 2017; Perrin, Clement, Melot & Nougaredes, 2020).

Historically, MNEs have tended to put the most investment capital in countries with stable political environments that support and encourage investment-friendly conditions. Coupled with institutional changes, MNEs required confidence that their investments are safeguarded in the area they invest in. Legislation that protects investments must be made obvious by relevant financial regulations, a robust financial system, clear judicial systems, and democratic governmental bodies, as argued by Gossel (2018), to improve FDI confidence levels. These promises are an invitation for new FDI inflow and greater economic development. That is why policy interventions to immediately adopt a number of changes, such as better investment legislation, reduced political risk, and deregulating commerce, across the African continent are desperately needed, with the African Continental Free Trade Area (AfCFTA) agreement being a step in the right direction.

A final policy implication for the FDI–economic growth nexus in terms of African countries is to align investment incentives, such as preferential taxes or trade agreements, to their national strategies; a practical intervention that works well in other parts of the world (Chien & Fok, 2021). The results of this study have shown the dynamic nature of the FDI–economic growth relationship, given specific and unique economic circumstance. African countries could therefore align FDI incentives according to the prevailing economic circumstances they are faced with. In other words, increase or decrease incentives so that the intended strategic growth outcomes match the FDI incentives for that period. These policies should be nimble and quickly adjustable.

6.5.2 Official development assistance-led growth policy implications and recommendations for Africa

Official development assistance or any other development assistance that is provided through bilateral or multilateral channels for the selection of African countries in this study should be accepted or rejected based on a proper, in-country needs analysis, and projects should be implemented with proper and sufficient oversight from donors (Cohen, Godfrey, Jeune & Kindornay, 2021). The literature was clear that proper governance structures within aid-receiving countries and a multifaceted approach are a prerequisite for the aid to have the intended developmental outcomes (Sachs, 2018; Dreher, Fuchs & Langlotz, 2019. What this study has also shown is that additional factors, such as the level of natural resources (NATR) abundance might lead to aid inflows after donor countries experience dramatic economic shocks.

Furthermore, it is recommended that the African countries that formed part of the sample should align their national strategic priorities to the official development aid provided, and not in the opposite direction, where donors dictate a foreign country's development agenda in favour of aid disbursements (Eissa, 2020; Liu, 2020). Aligning foreign policy objectives from donors to the domestic policies and developmental priorities within a country could be dangerous (Kalu & Aniche, 2020).

It is recommended that the African countries in the sample align their national strategy with their foreign and domestic policies in favour of themselves and in favour of the citizens that voted them into power. Whilst maintaining sovereignty, by accepting unconditional or conditional aid from donors, a foreign policy that promotes global good governance, peace, stability and prosperity for all countries must be crafted to guide decision-makers to achieve the African continent's sustainable development goals, because official development assistance provided by the tax-paying citizens from wealthier countries has been shown to cause economic growth in the studied African countries, over the long term.

Official development assistance should not be seen as a continuous 'handout' or an uninterrupted and endless fiscal support programme by African and other developing countries, but as a ‘goodwill developmental gesture’, by the goodhearted country that provides it and that requires accountability over its use (Tijerina, 2017).

6.6 SUGGESTIONS FOR FUTURE RESEARCH

It is challenging to examine the economic growth dynamics on the African continent due to the nature and the structural composition of the continent and the countries that together form the continent. Even though this thesis studied and determined the economic growth–FDI–official development aid nexus, there are so many other factors outside the scope of this study that influence the continent’s growth-aid dynamics, as well as the FDI–growth relationship that did not form part of this thesis.

A possible area for future research is the investment success rate for MNE investments into Africa. There is a great amount of literature that refers to the continent as the ‘last frontier’ that provides exceptional business opportunities as an emerging market (Trouille, 2020; Shenkar, Liang & Shenkar, 2021; Zi & Linke, 2021). Knowing what the business success rate or rate of return for MNEs is, and how it can be improved would assist economic and investment growth decision-makers and countries to formulate strategic alignments to improve investment success rates.

Official development assistance plays a crucially important role on the African continent, therefore, future research with regard to an African country-specific, official development assistance threshold for aid disbursement or retraction should be developed. This will elevate the uncertainty around aid inflows and provide developmental stability.

Further, research around aid succession planning, in other words, to determine what African countries committed to do with the official development assistance they received, and what they are planning to do, from a policy perspective, to replace aid inflows. This might answer important questions around aid efficiencies and recipient accountability.

6.7 LIMITATIONS OF THE STUDY

The variables chosen for this study were influenced by many factors outside of the study, thus it was challenging to compare the outcomes to other similar results outside the scope of this study, and within different markets with different economic fundamentals. The availability and accuracy of the data might be limited to the feedback the data provider received from the various African countries, and might be incomplete under certain conditions.

Generalising the results will be limited to the African countries in the study and to OECD DAC member recipient states, and not all donor countries, which limits the finding to these countries and their influence on Africa's economic growth.

The selected timeframe (1990-2018) used to test the relationship between economic growth, FDI and ODA throughout the different economic phases might not be representative of the relationship between the variables over other economic periods.

The study is limited in the sense that the analysis and findings do not include all countries within Africa. Limiting the scope of the study to only a selection of countries was due to time constraints and data availability of the entire population, which should be noted.

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APPENDICES

APPENDIX 1:
CORRELATION MATRIX

Correlation									
Probability	NODA	POP	LEXP	NATR	GDS	GDPG	FDI	ELEC	EDU
NODA	1.000000								

POP	0.459898	1.000000							
	0.0000	-----							
LEXP	-0.309406	-0.401159	1.000000						
	0.0000	0.0000	-----						
NATR	0.252087	0.480812	-0.298969	1.000000					
	0.0000	0.0000	0.0000	-----					
GDS	-0.469903	-0.269405	0.022715	0.054077	1.000000				
	0.0000	0.0000	0.6589	0.2931	-----				
GDPG	0.195537	0.225153	-0.075117	0.224675	0.038746	1.000000			

	0.0001	0.0000	0.1439	0.0000	0.4514	-----			
FDI	0.149250	0.147211	-0.068024	0.149050	-0.202697	0.209699	1.000000		
	0.0035	0.0040	0.1858	0.0036	0.0001	0.0000	-----		
ELEC	-0.644575	-0.722166	0.634598	-0.329700	0.256450	-0.190811	-0.125754	1.000000	
	0.0000	0.0000	0.0000	0.0000	0.0000	0.0002	0.0142	-----	
EDU	0.105325	-0.350265	0.224052	-0.103568	-0.022316	0.055585	0.055044	0.061134	1.000000
	0.0402	0.0000	0.0000	0.0436	0.6646	0.2798	0.2845	0.2345	-----

A number of preliminary diagnostic test were done to ascertain whether the two step, dynamic system GMM was the preferred and correct model to regress our dependent and independent variables. We applied the Hausman (1978) test to determine whether to use the fixed or random effect models. In addition, we tested for the joint validity of the cross-sectional individual effects, we tested for cross-sectional dependency (Frees, 1995; Pesaran, 2004) and for homoscedasticity we used the Breusch Pagan (1980) Lagrange Multiplier (LM) to further test for random effects.

We tested the joint validity of cross-sectional effects by performing the applied Chow test or F-test to test for the poolability or individual effects and the validity of the cross-sectional effects. The outcomes of the Breusch Pagan (1980) Lagrange Multiplier (LM) test tested for homoscedasticity or serial correlation. To account for heteroscedasticity issues based on the Hausman (1978) test outcome, the fixed effects model with Driscoll and Kraay Standard Errors estimator was used as the solution to heteroscedasticity problems.

APPENDIX 2:

DIAGNOSTIC TESTS WITH GDPG AS DEPENDENT VARIABLE (FULL DATASET 2000-2018)

Test	Test Statistic	P – Value	Inference
Hausman (1978) specification test H_0: $E(\mu_{it}\|X_{it}) = 0$ H_A: $E(\mu_{it}\|X_{it}) \neq 0$	Chi2 = 41.36	0.0000	Regressors are not exogenous. Hence the fixed effects requirement is valid and favoured; therefore, ***H0*** is rejected.
Joint validity of cross-sectional individual effects $H_0 : \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=1.61	0.0517	Cross-sectional individual effects are valid.
Cross-sectional dependence tests $H0: \rho_{ij} = \rho_{ji} = cor(\mu_{it}, \mu_{jt}) = 0$ $HA: \rho_{ij} \neq \rho_{ji} = 0$ **Pesaran (2004) CD test** **Frees (1995) CD test**	CD=1.084 F= 0.276	0.2784 α= 0.10: 0.1438 α= 0.05: 0.1888 α= 0.01: 0.2763	Cross sections are independent.
Breusch Pagan (1980) LM test for random effects H_0: $\delta_\mu^2 = 0$ H_A: $\delta_\mu^2 \neq 0$	LM = 0.00	0.9999	Random effects are not present in the results output. Thus, the random effects model is not preferred.
Heteroscedasticity H_0: $\delta_i^2 = \delta$ *for all i* H_0: $\delta_i^2 \neq \delta$ *for all i*	Chi2=43.28	0.0000	Reject H_0. The variance of the error term is not constant. Heteroscedasticity is present.

APPENDIX 3:

DIAGNOSTIC TESTS WITH GDPG AS DEPENDENT VARIABLE (PRE-CRISIS DATASET 2000-2006)

Test	Test Statistic	P – Value	Inference
Hausman (1978) specification test ***H₀***: $\mathbf{E(\mu_{it}\|X_{it}) = 0}$ ***H_A***: $\mathbf{E(\mu_{it}\|X_{it}) \neq 0}$	Chi2 = 41.24	0.0000	Regressors are not exogenous. Hence the fixed effects requirement is valid and favoured; therefore, $\boldsymbol{H_0}$ is rejected.
Joint validity of cross-sectional individual effects $\boldsymbol{H_0 : \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0}$ $\boldsymbol{H_A : : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0}$	F=2.1	0.0104	Cross-sectional individual effects are valid.
Cross-sectional dependence tests $\boldsymbol{H0: \rho_{ij} = \rho_{ji} = cor(\mu_{it}, \mu_{jt}) = 0}$ $\boldsymbol{HA: \rho_{ij} \neq \rho_{ji} = 0}$ **Pesaran (2004) CD test** **Frees (1995) CD test**	CD=0.869 F= 0.017	0.6153 α= 0.10: 0.4127 α= 0.05: 0.5676 α= 0.01: 0.9027	Cross sections are interdependent.
Breusch Pagan (1980) LM test for random effects $\boldsymbol{H_0: \delta_\mu^2 = 0}$ $\boldsymbol{H_A: \delta_\mu^2 \neq 0}$	LM = 0.00	0.9999	Random effects are not present in the results output. Thus, the random effects model is not preferred.
Heteroscedasticity $\boldsymbol{H_0: \delta_i^2 = \delta}$ ***for all i*** $\boldsymbol{H_0: \delta_i^2 \neq \delta}$ ***for all i***	Chi2=49.55	0.0000	Reject $\boldsymbol{H_0}$. The variance of the error term is not constant. Heteroscedasticity is present.

APPENDIX 4:

DIAGNOSTIC TESTS WITH GDPG AS DEPENDENT VARIABLE (DURING CRISIS DATASET 2007-2010)

Test	Test Statistic	P – Value	Inference
Hausman (1978) specification test ***H₀***: $\mathbf{E(\mu_{it}\|X_{it}) = 0}$ ***H_A***: $\mathbf{E(\mu_{it}\|X_{it}) \neq 0}$	Chi2 = 37.71	**0.0001**	Regressors are not exogenous. Hence the fixed effects requirement is valid and favoured; therefore, ***H₀*** is rejected.
Joint validity of cross-sectional individual effects $\boldsymbol{H_0 : \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0}$ $\boldsymbol{H_A : : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0}$	**F=1.25**	0.2810	Cross-sectional individual effects are not valid.
Cross-sectional dependence tests $\boldsymbol{H0: \rho_{ij} = \rho_{ji} = cor(\mu_{it}, \mu_{jt}) = 0}$ $\boldsymbol{HA: \rho_{ij} \neq \rho_{ji} = 0}$ **Pesaran (2004) CD test** **Frees (1995) CD test**	CD=2.994	0.0025	Cross sections are independent.
Breusch Pagan (1980) LM test for random effects $\boldsymbol{H_0: \delta_\mu^2 = 0}$ $\boldsymbol{H_A: \delta_\mu^2 \neq 0}$	LM = 0.00	0.9999	Random effects are not present in the results output. Thus, the random effects model is not preferred.
Heteroscedasticity $\boldsymbol{H_0: \delta_i^2 = \delta}$ ***for all i*** $\boldsymbol{H_0: \delta_i^2 \neq \delta}$ ***for all i***	Chi2=2.60	0.1069	Reject ***H₀.*** The variance of the error term is not constant. Heteroscedasticity is present.

APPENDIX 5:
DIAGNOSTIC TESTS WITH GDPG AS DEPENDENT VARIABLE (POST CRISIS DATASET 2011-2018)

Test	Test Statistic	P – Value	Inference
Hausman (1978) specification test ***H₀***: $\mathbf{E(\mu_{it}\|X_{it}) = 0}$ ***H_A***: $\mathbf{E(\mu_{it}\|X_{it}) \neq 0}$	Chi2 = -113.55	**0.0000**	Regressors are not exogenous. Hence the fixed effects requirement is valid and favoured; therefore, ***H₀*** is rejected.
Joint validity of cross-sectional individual effects $\boldsymbol{H_0 : \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0}$ $\boldsymbol{H_A : : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0}$	**F=2.79**	0.0004	Cross-sectional individual effects are valid.
Cross-sectional dependence tests $\boldsymbol{H0: \rho_{ij} = \rho_{ji} = cor(\mu_{it}, \mu_{jt}) = 0}$ $\boldsymbol{HA: \rho_{ij} \neq \rho_{ji} = 0}$ **Pesaran (2004) CD test** **Frees (1995) CD test**	CD=1.642 F= 0.182	0.1007 α= 0.10: 0.3583 α= 0.05: 0.4923 α= 0.01: 0.7678	Cross sections are interdependent.
Breusch Pagan (1980) LM test for random effects $\boldsymbol{H_0: \delta_\mu^2 = 0}$ $\boldsymbol{H_A: \delta_\mu^2 \neq 0}$	LM = 0.00	0.9999	Random effects are not present in the results output. Thus, the random effects model is not preferred.
Heteroscedasticity $\boldsymbol{H_0: \delta_i^2 = \delta}$ ***for all i*** $\boldsymbol{H_0: \delta_i^2 \neq \delta}$ ***for all i***	Chi2=11.24	0.0008	Reject ***H₀.*** The variance of the error term is not constant. Heteroscedasticity is present.

APPENDIX 6:

DIAGNOSTIC TESTS WITH FDI AS DEPENDENT VARIABLE (FULL DATASET 2000-2018)

Test	Test Statistic	P – Value	Inference
Hausman (1978) specification test ***H₀***: $\mathbf{E(\mu_{it} \mid X_{it}) = 0}$ ***H_A***: $\mathbf{E(\mu_{it} \mid X_{it}) \neq 0}$	Chi2 = 75.02	0.0000	Regressors are not exogenous. Hence the fixed effects requirement is valid and favoured; therefore, $\boldsymbol{H_0}$ is rejected.
Joint validity of cross-sectional individual effects $\boldsymbol{H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0}$ $\boldsymbol{H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0}$	**F=3.2**	0.0000	Cross-sectional individual effects are valid.
Cross-sectional dependence tests $\boldsymbol{H0: \rho_{ij} = \rho_{ji} = cor(\mu_{it}, \mu_{jt}) = 0}$ $\boldsymbol{HA: \rho_{ij} \neq \rho_{ji} = 0}$ **Pesaran (2004) CD test** **Frees (1995) CD test**	CD=0.372 F= 0.406	0.0.7097 α= 0.10: 0.1438 α= 0.05: 0.1888 α= 0.01: 0.2763	Cross sections are independent.
Breusch Pagan (1980) LM test for random effects $\boldsymbol{H_0: \delta_\mu^2 = 0}$ $\boldsymbol{H_A: \delta_\mu^2 \neq 0}$	LM = 0.00	0.9999	Random effects are not present in the results output. Thus, the random effects model is not preferred.
Heteroscedasticity $\boldsymbol{H_0: \delta_i^2 = \delta}$ ***for all i*** $\boldsymbol{H_0: \delta_i^2 \neq \delta}$ ***for all i***	Chi2=542.14	0.0000	Reject $\boldsymbol{H_0}$. The variance of the error term is not constant. Heteroscedasticity is present.

APPENDIX 7:
DIAGNOSTIC TESTS WITH FDI AS DEPENDENT VARIABLE (PRE-CRISIS DATASET 2000-2006)

Test	Test Statistic	P – Value	Inference
Hausman (1978) specification test ***H₀***: $\mathbf{E(\mu_{it} \mid X_{it}) = 0}$ ***H_A***: $\mathbf{E(\mu_{it} \mid X_{it}) \neq 0}$	Chi2 = 1070.52	**0.0000**	Regressors are not exogenous. Hence the fixed effects requirement is valid and favoured; therefore, ***H₀*** is rejected.
Joint validity of cross-sectional individual effects $\boldsymbol{H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0}$ $\boldsymbol{H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0}$	F=10.01	0.0000	Cross-sectional individual effects are valid.
Cross-sectional dependence tests $\boldsymbol{H0: \rho_{ij} = \rho_{ji} = cor(\mu_{it}, \mu_{jt}) = 0}$ $\boldsymbol{HA: \rho_{ij} \neq \rho_{ji} = 0}$ **Pesaran (2004) CD test** **Frees (1995) CD test**	CD=0.873 F= -0.279	0.3824 α= 0.10: 0.4127 α= 0.05: 0.5676 α= 0.01: 0.9027	Cross sections are interdependent.
Breusch Pagan (1980) LM test for random effects $\boldsymbol{H_0: \delta_\mu^2 = 0}$ $\boldsymbol{H_A: \delta_\mu^2 \neq 0}$	LM = 0.00	0.9999	Random effects are not present in the results output. Thus, the random effects model is not preferred.
Heteroscedasticity $\boldsymbol{H_0: \delta_i^2 = \delta}$ ***for all i*** $\boldsymbol{H_0: \delta_i^2 \neq \delta}$ ***for all i***	Chi2=259.67	0.0000	Reject ***H₀.*** The variance of the error term is not constant. Heteroscedasticity is present.

APPENDIX 8:

DIAGNOSTIC TESTS WITH FDI AS DEPENDENT VARIABLE (DURING CRISIS DATASET 2007-2010)

Test	Test Statistic	P – Value	Inference
Hausman (1978) specification test H_0: $E(\mu_{it} \mid X_{it}) = 0$ H_A: $E(\mu_{it} \mid X_{it}) \neq 0$	Chi2 = 33.15	0.0001	Regressors are not exogenous. Hence the fixed effects requirement is valid and favoured; therefore, H_0 is rejected.
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=1.8	**0.0718**	Cross-sectional individual effects are not valid.
Cross-sectional dependence tests $H0: \rho_{ij} = \rho_{ji} = cor(\mu_{it}, \mu_{jt}) = 0$ $HA: \rho_{ij} \neq \rho_{ji} = 0$ **Pesaran (2004) CD test** **Frees (1995) CD test**	CD=0.105	0.9163	Cross sections are interdependent.
Breusch Pagan (1980) LM test for random effects H_0: $\delta_\mu^2 = 0$ H_A: $\delta_\mu^2 \neq 0$	LM = 0.00	0.9999	Random effects are not present in the results output. Thus, the random effects model is not preferred.
Heteroscedasticity H_0: $\delta_i^2 = \delta$ *for all i* H_0: $\delta_i^2 \neq \delta$ *for all i*	Chi2=12.64	0.0004	Reject H_0. The variance of the error term is not constant. Heteroscedasticity is present.

APPENDIX 9:

DIAGNOSTIC TESTS WITH FDI AS DEPENDENT VARIABLE (POST CRISIS DATASET 2011-2018)

Test	Test Statistic	P – Value	Inference
Hausman (1978) specification test ***H₀***: $\mathbf{E}(\mu_{it}\|\mathbf{X}_{it}) = 0$ ***H_A***: $\mathbf{E}(\mu_{it}\|\mathbf{X}_{it}) \neq 0$	Chi2 = 76.60	0.0000	Regressors are not exogenous. Hence the fixed effects requirement is valid and favoured; therefore, H_0 is rejected.
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=3.97	**0.0000**	Cross-sectional individual effects are valid.
Cross-sectional dependence tests $H0: \rho_{ij} = \rho_{ji} = cor(\mu_{it}, \mu_{jt}) = 0$ $HA: \rho_{ij} \neq \rho_{ji} = 0$ **Pesaran (2004) CD test** **Frees (1995) CD test**	CD=1.202 F= -0.013	0.2294 α= 0.10: 0.3583 α= 0.05: 0.4923 α= 0.01: 0.7678	Cross sections are interdependent.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	LM = 0.00	0.9999	Random effects are not present in the results output. Thus, the random effects model is not preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ ***for all i*** $H_0: \delta_i^2 \neq \delta$ ***for all i***	Chi2=165.51	0.0000	Reject H_0. The variance of the error term is not constant. Heteroscedasticity is present.

APPENDIX 10:
DIAGNOSTIC TESTS WITH NODA AS DEPENDENT VARIABLE (FULL DATASET 2000-2018)

Test	Test Statistic	P – Value	Inference
Hausman (1978) specification test ***H₀***: $\mathbf{E(\mu_{it}\|X_{it}) = 0}$ ***H_A***: $\mathbf{E(\mu_{it}\|X_{it}) \neq 0}$	Chi2 = 198.51	0.0000	Regressors are not exogenous. Hence the fixed effects requirement is valid and favoured; therefore, H_0 is rejected.
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F= 4.40	0.0000	Cross-sectional individual effects are valid.
Cross-sectional dependence tests $H0: \rho_{ij} = \rho_{ji} = cor(\mu_{it}, \mu_{jt}) = 0$ $HA: \rho_{ij} \neq \rho_{ji} = 0$ **Pesaran (2004) CD test** **Frees (1995) CD test**	**CD= 0.357** F= 0.567	0.2790 α= 0.10: 0.1438 α= 0.05: 0.1888 α= 0.01: 0.2763	Cross sections are independent.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	LM = 0.00	0.9999	Random effects are not present in the results output. Thus, the random effects model is not preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ ***for all i*** $H_0: \delta_i^2 \neq \delta$ ***for all i***	Chi2=362.06	0.0000	Reject H_0. The variance of the error term is not constant. Heteroscedasticity is present.

APPENDIX 11:

DIAGNOSTIC TESTS WITH NODA AS DEPENDENT VARIABLE (PRE-CRISIS DATASET 2000-2006)

Test	Test Statistic	P – Value	Inference
Hausman (1978) specification test ***H₀***: $\mathbf{E(\mu_{it}\|X_{it}) = 0}$ ***H_A***: $\mathbf{E(\mu_{it}\|X_{it}) \neq 0}$	Chi2 = 87.81	0.0000	Regressors are not exogenous. Hence the fixed effects requirement is valid and favoured; therefore, ***H_0*** is rejected.
Joint validity of cross-sectional individual effects ***H_0*** : $\boldsymbol{\alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0}$ ***H_A***: : $\boldsymbol{\alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0}$	F=2.22	0.0065	Cross-sectional individual effects are valid.
Cross-sectional dependence tests $\boldsymbol{H0: \rho_{ij} = \rho_{ji} = cor(\mu_{it}, \mu_{jt}) = 0}$ $\boldsymbol{HA: \rho_{ij} \neq \rho_{ji} = 0}$ **Pesaran (2004) CD test** **Frees (1995) CD test**	**CD=0.115** F= -0.211	0.0918 α= 0.10: 0.4127 α= 0.05: 0.5676 α= 0.01: 0.9027	Cross sections are interdependent.
Breusch Pagan (1980) LM test for random effects ***H_0***: $\boldsymbol{\delta_\mu^2 = 0}$ ***H_A***: $\boldsymbol{\delta_\mu^2 \neq 0}$	LM = 0.00	0.9999	Random effects are not present in the results output. Thus, the random effects model is not preferred.
Heteroscedasticity ***H_0***: $\boldsymbol{\delta_i^2 = \delta}$ ***for all i*** ***H_0***: $\boldsymbol{\delta_i^2 \neq \delta}$ ***for all i***	Chi2=88.32	0.0000	Reject ***H_0***. The variance of the error term is not constant. Heteroscedasticity is present.

APPENDIX 12:

DIAGNOSTIC TESTS WITH NODA AS DEPENDENT VARIABLE (DURING CRISIS DATASET 2007-2010)

Test	Test Statistic	P – Value	Inference
Hausman (1978) specification test ***H₀***: $\mathbf{E(\mu_{it}\|X_{it}) = 0}$ ***H_A***: $\mathbf{E(\mu_{it}\|X_{it}) \neq 0}$	Chi2 = 49.02	0.0000	Regressors are not exogenous. Hence the fixed effects requirement is valid and favoured; therefore, ***H₀*** is rejected.
Joint validity of cross-sectional individual effects $\boldsymbol{H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0}$ $\boldsymbol{H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0}$	F=2.61	0.0085	Cross-sectional individual effects are valid.
Cross-sectional dependence tests $\boldsymbol{H0: \rho_{ij} = \rho_{ji} = cor(\mu_{it}, \mu_{jt}) = 0}$ $\boldsymbol{HA: \rho_{ij} \neq \rho_{ji} = 0}$ **Pesaran (2004) CD test** **Frees (1995) CD test**	CD=0.362	0.07170	Cross sections are interdependent.
Breusch Pagan (1980) LM test for random effects $\boldsymbol{H_0: \delta_\mu^2 = 0}$ $\boldsymbol{H_A: \delta_\mu^2 \neq 0}$	LM = 0.00	0.9999	Random effects are not present in the results output. Thus, the random effects model is not preferred.
Heteroscedasticity $\boldsymbol{H_0: \delta_i^2 = \delta}$ ***for all i*** $\boldsymbol{H_0: \delta_i^2 \neq \delta}$ ***for all i***	Chi2=0.61	0.4338	The variance of the error term is not constant. Heteroscedasticity is present.

APPENDIX 13:

DIAGNOSTIC TESTS WITH NODA AS DEPENDENT VARIABLE (POST CRISIS DATASET 2011-2018)

Test	Test Statistic	P – Value	Inference
Hausman (1978) specification test ***H₀***: $\mathbf{E}(\mu_{it}\|X_{it}) = 0$ ***H_A***: $\mathbf{E}(\mu_{it}\|X_{it}) \neq 0$	Chi2 = -504.45		Regressors are not exogenous. Hence the fixed effects requirement is valid and favoured; therefore, H_0 is rejected.
Joint validity of cross-sectional individual effects $H_0: \alpha_1 = \alpha_2 = \cdots \alpha_{N-1} = 0$ $H_A: : \alpha_1 \neq \alpha_2 \neq \cdots \alpha_{N-1} \neq 0$	F=11.38	**0.0000**	Cross-sectional individual effects are valid.
Cross-sectional dependence tests $H0: \rho_{ij} = \rho_{ji} = cor(\mu_{it}, \mu_{jt}) = 0$ $HA: \rho_{ij} \neq \rho_{ji} = 0$ **Pesaran (2004) CD test** **Frees (1995) CD test**	CD=0.085 F= 0.335	0.0675 α= 0.10: 0.3583 α= 0.05: 0.4923 α= 0.01: 0.7678	Cross sections are interdependent.
Breusch Pagan (1980) LM test for random effects $H_0: \delta_\mu^2 = 0$ $H_A: \delta_\mu^2 \neq 0$	LM = 9.32	0.0011	Random effects are not present in the results output. Thus, the random effects model is not preferred.
Heteroscedasticity $H_0: \delta_i^2 = \delta$ *for all i* $H_0: \delta_i^2 \neq \delta$ *for all i*	Chi2=96.8	0.0000	Reject H_0. The variance of the error term is not constant. Heteroscedasticity is present.

APPENDIX 14:
MODEL RESULT SUMMARIES FOR GDPG AS DEPENDENT VARIABLE (FULL PERIOD 2000-2018)

Variables	Pooled Effects Model GDPG	Fixed Effects Model GDPG	Random Effects Model GDPG	2 Step System GMM GDPG	FGLS Model GDPG
L.GDPG	0.279***	0.212***	0.279***	0.0820	0.279***
	(0.0485)	(0.0508)	(0.0485)	(0.105)	(0.0478)
FDI	0.106**	0.165***	0.106**	0.217**	0.106**
	(0.0327)	(0.0412)	(0.0327)	(0.0685)	(0.0323)
NODA	0.0706	0.0794	0.0706	0.425	0.0706*
	(0.0363)	(0.0453)	(0.0363)	(0.278)	(0.0358)
GDS	0.0547**	0.128***	0.0547**	0.381**	0.0547**
	(0.0201)	(0.0333)	(0.0201)	(0.122)	(0.0198)
POP	0.649	1.845*	0.649	5.113**	0.649
	(0.483)	(0.927)	(0.483)	(1.755)	(0.476)
LEXP	-0.00294	-0.118	-0.00294	-0.103	-0.00294
	(0.0341)	(0.0682)	(0.0341)	(0.224)	(0.0336)
ELEC	-0.00138	0.0152	-0.00138	0.0115	-0.00138
	(0.0130)	(0.0344)	(0.0130)	(0.0465)	(0.0128)
NATR	0.00863	0.0218	0.00863	-0.0514	0.00863
	(0.0298)	(0.0573)	(0.0298)	(0.0786)	(0.0293)
EDU	0.00437	-0.0136	0.00437	0.0549	0.00437
	(0.00967)	(0.0204)	(0.00967)	(0.124)	(0.00953)
_cons	0.183	3.771	0.183		0.183
	(2.294)	(3.522)	(2.294)		(2.262)

N	360	360	360	340	360
R^2	0.2112	0.1474	0.2112		
Groups	20	20	20	20	20
Instruments				15	
AR(1)				-0.64	
AR(2)				0.44	
Sargan				43.05	
Hansen				12.36	

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX 15:
MODEL RESULT SUMMARIES FOR GDPG AS DEPENDENT VARIABLE (PRE CRISIS 2000-2006)

	Pooled Effects Model	Fixed Effects Model	Random Effects Model	2 Step System GMM	FGLS Model
Variables	**GDPG**	**GDPG**	**GDPG**	**GDPG**	**GDPG**
L.GDPG	0.214*	-0.0824	0.214*	0.0216	0.214**
	(0.0839)	(0.110)	(0.0839)	(0.127)	(0.0803)
FDI	0.247***	0.423**	0.247***	0.665*	0.247***
	(0.0643)	(0.135)	(0.0643)	(0.299)	(0.0616)
NODA	0.0150	-0.00759	0.0150	-0.542	0.0150
	(0.0563)	(0.0656)	(0.0563)	(0.289)	(0.0539)
GDS	0.0932**	0.278**	0.0932**	-0.0115	0.0932**
	(0.0360)	(0.0850)	(0.0360)	(0.120)	(0.0345)
POP	0.573	1.942	0.573	34.62*	0.573
	(0.997)	(1.737)	(0.997)	(16.41)	(0.955)
LEXP	0.138	0.0254	0.138	-3.329**	0.138
	(0.0825)	(0.340)	(0.0825)	(1.045)	(0.0790)
ELEC	-0.0462	0.0529	-0.0462	-0.103	-0.0462
	(0.0278)	(0.105)	(0.0278)	(0.231)	(0.0266)
NATR	0.0963	0.295*	0.0963	0.958***	0.0963
	(0.0620)	(0.141)	(0.0620)	(0.207)	(0.0593)
EDU	0.00870	-0.0441	0.00870	1.239***	0.00870
	(0.0175)	(0.0665)	(0.0175)	(0.160)	(0.0168)
_cons	-6.499	-5.191	-6.499		-6.499
	(5.822)	(15.94)	(5.822)		(5.575)

N	120	120	120	100	120
R^2	0.3372	0.1110	0.3372		
Groups	20	20	20	20	20
Instruments				18	
AR(1)				1.53	
AR(2)				0.94	
Sargan				4.98	
Hansen				12.12	

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX 16:
MODEL RESULT SUMMARIES FOR GDPG AS DEPENDENT VARIABLE (DURING CRISIS 2007-2010)

Variables	Pooled Effects Model GDPG	Fixed Effects Model GDPG	Random Effects Model GDPG	2 Step System GMM GDPG	FGLS Model GDPG
L.GDPG	-0.217	-0.578*	-0.217	-0.451***	-0.217
	(0.161)	(0.223)	(0.161)	(0.107)	(0.147)
FDI	0.0487	-0.00856	0.0487	-0.348*	0.0487
	(0.134)	(0.211)	(0.134)	(0.161)	(0.122)
NODA	0.118	0.135	0.118	-0.0333	0.118
	(0.126)	(0.288)	(0.126)	(0.262)	(0.115)
GDS	0.0599	0.292	0.0599	0.472**	0.0599
	(0.0563)	(0.156)	(0.0563)	(0.128)	(0.0514)
POP	3.792*	-3.109	3.792*	-6.475	3.792*
	(1.794)	(8.646)	(1.794)	(5.586)	(1.638)
LEXP	0.0528	-0.474	0.0528	-0.680	0.0528
	(0.0910)	(0.631)	(0.0910)	(0.472)	(0.0831)
ELEC	0.0515	-0.115	0.0515	0.199	0.0515
	(0.0429)	(0.182)	(0.0429)	(0.182)	(0.0392)
NATR	0.0631	-0.0413	0.0631	-0.153	0.0631
	(0.0651)	(0.203)	(0.0651)	(0.0901)	(0.0594)
EDU	0.0689*	0.00674	0.0689*	0.0322	0.0689*
	(0.0331)	(0.147)	(0.0331)	(0.119)	(0.0302)
_cons	-17.86*	42.43	-17.86*		-17.86*
	(8.769)	(45.38)	(8.769)		(8.005)

Variables	Pooled Effects Model GDPG	Fixed Effects Model GDPG	Random Effects Model GDPG	2 Step System GMM GDPG	FGLS Model GDPG
N	60	60	60	40	60
R^2	0.2469	0.0035	0.2469		
Groups				20	20
Instruments				20	
AR(1)				-1.01	
AR(2)				-0.56	
Sargan				17.01	
Hansen				10.52	

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX 17:
MODEL RESULT SUMMARIES FOR GDPG AS DEPENDENT VARIABLE (POST CRISIS 2011-2018)

Variables	Pooled Effects Model GDPG	Fixed Effects Model GDPG	Random Effects Model GDPG	2 Step System GMM GDPG	FGLS Model GDPG
L.GDPG	0.381***	0.168*	0.381***	-0.0196	0.381***
	(0.0744)	(0.0817)	(0.0744)	(0.151)	(0.0717)
FDI	0.0274	0.104	0.0274	0.360**	0.0274
	(0.0405)	(0.0945)	(0.0405)	(0.103)	(0.0391)
NODA	0.121	0.0655	0.121	-0.640	0.121
	(0.0743)	(0.180)	(0.0743)	(0.358)	(0.0716)
GDS	0.0573	0.128	0.0573	0.228**	0.0573*
	(0.0299)	(0.0666)	(0.0299)	(0.0761)	(0.0288)
POP	0.983	-0.502	0.983	-0.344	0.983
	(0.659)	(1.590)	(0.659)	(2.634)	(0.635)
LEXP	0.00627	-0.447	0.00627	-0.435	0.00627
	(0.0540)	(0.246)	(0.0540)	(0.398)	(0.0520)
ELEC	0.0186	0.0752	0.0186	0.112	0.0186
	(0.0164)	(0.0571)	(0.0164)	(0.110)	(0.0158)
NATR	-0.0134	0.204*	-0.0134	0.388**	-0.0134
	(0.0483)	(0.102)	(0.0483)	(0.111)	(0.0465)
EDU	-0.00410	0.0569	-0.00410	0.262**	-0.00410
	(0.0174)	(0.0624)	(0.0174)	(0.0749)	(0.0168)
_cons	-1.972	19.33	-1.972		-1.972
	(3.886)	(15.37)	(3.886)		(3.744)

Variables	Pooled Effects Model GDPG	Fixed Effects Model GDPG	Random Effects Model GDPG	2 Step System GMM GDPG	FGLS Model GDPG
N	140	140	140	120	140
R^2	0.2715	0.0063	0.2715		
Groups	20	20	20	20	20
Instruments				16	
AR(1)				-0.63	
AR(2)				-0.50	
Sargan				25.80	
Hansen				10.56	

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX 18:
MODEL RESULT SUMMARIES FOR FDI AS DEPENDENT VARIABLE (FULL PERIOD 2000-2018)

Variables	Pooled Effects Model FDI	Fixed Effects Model FDI	Random Effects Model FDI	2 Step System GMM FDI	FGLS Model FDI
L.FDI	0.789***	0.645***	0.789***	0.567***	0.789***
	(0.0338)	(0.0394)	(0.0338)	(0.0910)	(0.0333)
NODA	0.000727	-0.0330	0.000727	-0.494*	0.000727
	(0.0368)	(0.0441)	(0.0368)	(0.221)	(0.0363)
GDPG	0.0218	0.0718	0.0218	0.0422	0.0218
	(0.0518)	(0.0521)	(0.0518)	(0.0952)	(0.0511)
GDS	-0.0581**	-0.153***	-0.0581**	-0.211*	-0.0581**
	(0.0202)	(0.0318)	(0.0202)	(0.0896)	(0.0199)
POP	0.358	0.990	0.358	1.114	0.358
	(0.486)	(0.895)	(0.486)	(1.957)	(0.479)
LEXP	-0.0472	-0.0863	-0.0472	-0.468*	-0.0472
	(0.0342)	(0.0662)	(0.0342)	(0.183)	(0.0337)
ELEC	0.00968	0.0347	0.00968	0.0474	0.00968
	(0.0131)	(0.0332)	(0.0131)	(0.0513)	(0.0129)
NATR	-0.0356	-0.147**	-0.0356	-0.159	-0.0356
	(0.0300)	(0.0547)	(0.0300)	(0.0825)	(0.0296)
EDU	0.00590	0.0486*	0.00590	0.235*	0.00590
	(0.00969)	(0.0195)	(0.00969)	(0.100)	(0.00955)
_cons	2.757	1.125	2.757		2.757
	(2.306)	(3.428)	(2.306)		(2.274)

Variables	Pooled Effects Model FDI	Fixed Effects Model FDI	Random Effects Model FDI	2 Step System GMM FDI	FGLS Model FDI
N	360	360	360	340	360
R^2	0.6522	0.5529	0.6522		
Groups	20	20	20	20	20
Instruments				19	
AR(1)				-0.63	
AR(2)				-0.80	
Sargan				18.62	
Hansen				10.38	

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX 19:
MODEL RESULT SUMMARIES FOR FDI AS DEPENDENT VARIABLE (PRE CRISIS 2000-2006)

Variables	Pooled Effects Model FDI	Fixed Effects Model FDI	Random Effects Model FDI	2 Step System GMM FDI	FGLS Model FDI
L.FDI	0.732***	0.290***	0.732***	0.177**	0.732***
	(0.0705)	(0.0614)	(0.0705)	(0.0488)	(0.0675)
NODA	0.00993	0.0896*	0.00993	0.0791*	0.00993
	(0.0559)	(0.0433)	(0.0559)	(0.0282)	(0.0535)
GDPG	0.0659	0.156*	0.0659	0.288***	0.0659
	(0.0944)	(0.0697)	(0.0944)	(0.0699)	(0.0904)
GDS	-0.108**	-0.367***	-0.108**	-0.341***	-0.108**
	(0.0355)	(0.0474)	(0.0355)	(0.0299)	(0.0340)
POP	1.291	0.0875	1.291	-1.824	1.291
	(0.982)	(1.168)	(0.982)	(3.754)	(0.940)
LEXP	-0.108	0.473*	-0.108	1.282**	-0.108
	(0.0814)	(0.217)	(0.0814)	(0.361)	(0.0780)
ELEC	0.0560*	-0.0127	0.0560*	-0.00364	0.0560*
	(0.0273)	(0.0710)	(0.0273)	(0.0838)	(0.0261)
NATR	-0.143*	-0.437***	-0.143*	-0.509***	-0.143*
	(0.0584)	(0.0782)	(0.0584)	(0.107)	(0.0559)
EDU	0.0131	-0.0367	0.0131	-0.260	0.0131
	(0.0173)	(0.0448)	(0.0173)	(0.250)	(0.0165)
_cons	2.692	-12.57	2.692		2.692
	(5.773)	(10.24)	(5.773)		(5.527)

Variables	Pooled Effects Model FDI	Fixed Effects Model FDI	Random Effects Model FDI	2 Step System GMM FDI	FGLS Model FDI
N	120	120	120	100	120
R^2	0.5960	0.0892	0.5960		
Groups		20	20	20	20
Instruments				19	
AR(1)				-1.07	
AR(2)				0.67	
Sargan				30.73**	
Hansen				12.54	

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX 20:
MODEL RESULT SUMMARIES FOR FDI AS DEPENDENT VARIABLE (DURING CRISIS 2007-2010)

	Pooled Effects Model	Fixed Effects Model	Random Effects Model	2 Step System GMM	FGLS Model
Variables	**FDI**	**FDI**	**FDI**	**FDI**	**FDI**
L.FDI	0.516^{***}	-0.0467	0.516^{***}	-0.219^{*}	0.516^{***}
	(0.135)	(0.183)	(0.135)	(0.103)	(0.123)
NODA	0.201	0.299	0.201	1.833^{**}	0.201
	(0.115)	(0.240)	(0.115)	(0.599)	(0.105)
GDPG	0.0316	-0.0221	0.0316	0.0419	0.0316
	(0.129)	(0.140)	(0.129)	(0.241)	(0.118)
GDS	0.0253	0.135	0.0253	-0.137	0.0253
	(0.0546)	(0.147)	(0.0546)	(0.215)	(0.0498)
POP	0.988	-2.022	0.988	-3.396	0.988
	(1.580)	(7.000)	(1.580)	(8.765)	(1.442)
LEXP	-0.0457	-0.357	-0.0457	0.367	-0.0457
	(0.0846)	(0.481)	(0.0846)	(0.496)	(0.0772)
ELEC	0.0364	0.0719	0.0364	-0.233	0.0364
	(0.0375)	(0.155)	(0.0375)	(0.325)	(0.0342)
NATR	0.0374	-0.00349	0.0374	0.0330	0.0374
	(0.0606)	(0.174)	(0.0606)	(0.118)	(0.0553)
EDU	-0.00998	0.00129	-0.00998	-0.145	-0.00998
	(0.0284)	(0.125)	(0.0284)	(0.138)	(0.0259)
_cons	-0.732	23.15	-0.732		-0.732
	(7.951)	(37.85)	(7.951)		(7.259)

Variables	Pooled Effects Model FDI	Fixed Effects Model FDI	Random Effects Model FDI	2 Step System GMM FDI	FGLS Model FDI
N	60	60	60	40	60
R^2	0.3274	0.0020	0.3274		
Groups	20	20	20	20	20
Instruments				15	
AR(1)				-0.76	
AR(2)				-0.81	
Sargan				1.69	
Hansen				8.86	

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX 21:
MODEL RESULT SUMMARIES FOR FDI AS DEPENDENT VARIABLE (POST CRISIS 2011-2018)

	Pooled Effects Model	Fixed Effects Model	Random Effects Model	2 Step System GMM	FGLS Model
Variables	**FDI**	**FDI**	**FDI**	**FDI**	**FDI**
L.FDI	0.851***	0.194*	0.851***	-0.268	0.851***
	(0.0401)	(0.0921)	(0.0401)	(0.135)	(0.0387)
NODA	0.0767	0.0337	0.0767	0.0188	0.0767
	(0.0763)	(0.171)	(0.0763)	(0.167)	(0.0736)
GDPG	0.0800	0.101	0.0800	0.677**	0.0800
	(0.0834)	(0.0908)	(0.0834)	(0.178)	(0.0803)
GDS	-0.00665	-0.0308	-0.00665	0.0326	-0.00665
	(0.0317)	(0.0670)	(0.0317)	(0.157)	(0.0306)
POP	-0.483	0.768	-0.483	5.745	-0.483
	(0.685)	(1.563)	(0.685)	(4.998)	(0.660)
LEXP	-0.0299	-1.000***	-0.0299	-2.353***	-0.0299
	(0.0563)	(0.229)	(0.0563)	(0.371)	(0.0543)
ELEC	0.00836	0.0821	0.00836	0.302*	0.00836
	(0.0171)	(0.0556)	(0.0171)	(0.122)	(0.0164)
NATR	0.0231	-0.177	0.0231	-0.319**	0.0231
	(0.0498)	(0.0997)	(0.0498)	(0.0983)	(0.0480)
EDU	-0.00827	-0.0589	-0.00827	-0.346**	-0.00827
	(0.0179)	(0.0616)	(0.0179)	(0.113)	(0.0173)
_cons	3.064	66.94***	3.064		3.064
	(4.054)	(14.25)	(4.054)		(3.906)

Variables	Pooled Effects Model FDI	Fixed Effects Model FDI	Random Effects Model FDI	2 Step System GMM FDI	FGLS Model FDI
N	140	140	140	120	140
***R*²**	0.8295	0.0871	0.8295		
Groups	20	20	20	20	20
Instruments				19	
AR(1)				-0.95	
AR(2)				-1.45	
Sargan				14.91	
Hansen				11.66	

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX 22:
MODEL RESULT SUMMARIES FOR NODA AS DEPENDENT VARIABLE (FULL PERIOD 2000-2018)

	Pooled Effects Model	Fixed Effects Model	Random Effects Model	2 Step System GMM	FGLS Model
Variables	**NODA**	**NODA**	**NODA**	**NODA**	**NODA**
L.NODA	0.497***	0.223***	0.497***	0.328***	0.497***
	(0.0445)	(0.0509)	(0.0445)	(0.0772)	(0.0439)
FDI	-0.0200	-0.0823	-0.0200	-0.00949	-0.0200
	(0.0417)	(0.0495)	(0.0417)	(0.102)	(0.0411)
GDPG	0.0670	0.0843	0.0670	0.0864*	0.0670
	(0.0643)	(0.0630)	(0.0643)	(0.0341)	(0.0634)
GDS	-0.127***	-0.158***	-0.127***	-0.190**	-0.127***
	(0.0250)	(0.0393)	(0.0250)	(0.0530)	(0.0247)
POP	-1.065	-0.289	-1.065	-7.773*	-1.065
	(0.605)	(1.087)	(0.605)	(3.553)	(0.596)
LEXP	0.0511	-0.00571	0.0511	-0.197*	0.0511
	(0.0427)	(0.0804)	(0.0427)	(0.0878)	(0.0421)
ELEC	-0.0844***	-0.0950*	-0.0844***	-0.0105	-0.0844***
	(0.0161)	(0.0402)	(0.0161)	(0.0298)	(0.0158)
NATR	0.0805*	0.173**	0.0805*	-0.0540	0.0805*
	(0.0369)	(0.0651)	(0.0369)	(0.0694)	(0.0364)
EDU	0.00186	-0.0450	0.00186	0.0552	0.00186
	(0.0122)	(0.0239)	(0.0122)	(0.0452)	(0.0120)
_cons	7.326*	15.46***	7.326*		7.326**
	(2.855)	(4.087)	(2.855)		(2.815)

Variables	Pooled Effects Model NODA	Fixed Effects Model NODA	Random Effects Model NODA	2 Step System GMM NODA	FGLS Model NODA
N	360	360	360	340	360
R^2	0.6720	0.5616	0.6720		
Groups	20	20	20	20	20
Instruments				17	
AR(1)				-1.66	
AR(2)				-0.39	
Sargan				10.28	
Hansen				11.05	

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX 23:
MODEL RESULT SUMMARIES FOR NODA AS DEPENDENT VARIABLE (PRE CRISIS 2000-2006)

Variables	Pooled Effects Model NODA	Fixed Effects Model NODA	Random Effects Model NODA	2 Step System GMM NODA	FGLS Model NODA
L.NODA	0.299^{***}	-0.0206	0.299^{***}	-0.140^{*}	0.299^{***}
	(0.0862)	(0.0946)	(0.0862)	(0.0627)	(0.0825)
FDI	-0.0450	0.502^{*}	-0.0450	1.353^{*}	-0.0450
	(0.110)	(0.218)	(0.110)	(0.527)	(0.106)
GDPG	0.0102	-0.0259	0.0102	-0.634	0.0102
	(0.149)	(0.167)	(0.149)	(0.517)	(0.143)
GDS	-0.170^{**}	-0.0480	-0.170^{**}	-0.147	-0.170^{**}
	(0.0587)	(0.140)	(0.0587)	(0.494)	(0.0562)
POP	-1.576	0.759	-1.576	-1.696	-1.576
	(1.603)	(2.765)	(1.603)	(5.601)	(1.535)
LEXP	0.176	0.112	0.176	0.299	0.176
	(0.133)	(0.527)	(0.133)	(1.432)	(0.128)
ELEC	-0.145^{**}	-0.0978	-0.145^{**}	-0.161	-0.145^{***}
	(0.0441)	(0.168)	(0.0441)	(0.184)	(0.0422)
NATR	0.238^{*}	0.636^{**}	0.238^{*}	1.463^{*}	0.238^{**}
	(0.0937)	(0.206)	(0.0937)	(0.671)	(0.0897)
EDU	0.00122	0.00216	0.00122	0.381	0.00122
	(0.0283)	(0.106)	(0.0283)	(0.454)	(0.0271)
_cons	5.797	-1.837	5.797		5.797
	(9.389)	(24.55)	(9.389)		(8.989)

Variables	Pooled Effects Model NODA	Fixed Effects Model NODA	Random Effects Model NODA	2 Step System GMM NODA	FGLS Model NODA
N	120	120	120	100	120
R^2	0.5577	0.2472	0.5577		
Groups	20	20	20	20	20
Instrument				19	
AR(1)				-1.18	
AR(2)				-1.72	
Sargan				15.85	
Hansen				8.72	

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX 24:
MODEL RESULT SUMMARIES FOR NODA AS DEPENDENT VARIABLE (DURING CRISIS 2007-2010)

Variables	Pooled Effects Model NODA	Fixed Effects Model NODA	Random Effects Model NODA	2 Step System GMM NODA	FGLS Model NODA
L.NODA	0.729***	0.000293	0.729***	0.116	0.729***
	(0.0917)	(0.145)	(0.0917)	(0.135)	(0.0837)
FDI	0.142	0.159	0.142	0.241*	0.142
	(0.0998)	(0.128)	(0.0998)	(0.102)	(0.0911)
GDPG	0.0370	0.0557	0.0370	0.0642	0.0370
	(0.105)	(0.101)	(0.105)	(0.0446)	(0.0954)
GDS	-0.0564	0.0842	-0.0564	0.0537	-0.0564
	(0.0419)	(0.102)	(0.0419)	(0.0683)	(0.0383)
POP	-0.922	6.021	-0.922	8.078**	-0.922
	(1.290)	(4.998)	(1.290)	(2.650)	(1.178)
LEXP	0.0190	-0.285	0.0190	-0.110	0.0190
	(0.0685)	(0.351)	(0.0685)	(0.156)	(0.0626)
ELEC	-0.0432	-0.0110	-0.0432	-0.00414	-0.0432
	(0.0302)	(0.113)	(0.0302)	(0.0355)	(0.0275)
NATR	0.0530	-0.0204	0.0530	0.0476	0.0530
	(0.0495)	(0.126)	(0.0495)	(0.143)	(0.0452)
EDU	-0.00137	-0.0308	-0.00137	-0.0498	-0.00137
	(0.0233)	(0.0914)	(0.0233)	(0.131)	(0.0212)
_cons	4.464	9.559	4.464		4.464
	(6.430)	(27.84)	(6.430)		(5.869)

Variables	Pooled Effects Model NODA	Fixed Effects Model NODA	Random Effects Model NODA	2 Step System GMM NODA	FGLS Model NODA
N	60	60	60	40	60
R^2	0.8566	0.2038	0.8566		
Groups	20	20	20	20	20
Instruments				18	
AR(1)				-1.85	
AR(2)				-0.23	
Sargan				33.42***	
Hansen				14.15	

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX 25:
MODEL RESULT SUMMARIES FOR NODA AS DEPENDENT VARIABLE (POST CRISIS 2011-2018)

Variables	Pooled Effects Model NODA	Fixed Effects Model NODA	Random Effects Model NODA	2 Step System GMM NODA	FGLS Model NODA
L.NODA	0.601***	0.144**	0.601***	0.296**	0.713***
	(0.0559)	(0.0549)	(0.0559)	(0.0880)	(0.0507)
FDI	0.0242	-0.0463	0.0242	-0.0500	0.0245
	(0.0352)	(0.0529)	(0.0352)	(0.0718)	(0.0296)
GDPG	-0.0639	-0.0297	-0.0639	-0.145*	-0.0933
	(0.0618)	(0.0509)	(0.0618)	(0.0658)	(0.0604)
GDS	-0.0715**	-0.0843*	-0.0715**	-0.0736*	-0.0505*
	(0.0259)	(0.0360)	(0.0259)	(0.0340)	(0.0221)
POP	0.450	0.0226	0.450	0.879	0.503
	(0.554)	(0.868)	(0.554)	(1.210)	(0.485)
LEXP	0.0580	0.0436	0.0580	-0.335	0.0293
	(0.0499)	(0.136)	(0.0499)	(0.168)	(0.0402)
ELEC	-0.0480***	-0.0669*	-0.0480***	0.0142	-0.0340**
	(0.0140)	(0.0306)	(0.0140)	(0.0258)	(0.0119)
NATR	-0.0217	0.118*	-0.0217	0.0822*	-0.0443
	(0.0413)	(0.0554)	(0.0413)	(0.0362)	(0.0353)
EDU	0.0207	-0.116***	0.0207	0.109***	0.0183
	(0.0150)	(0.0324)	(0.0150)	(0.0272)	(0.0127)
_cons	-1.048	17.68*	-1.048		-0.455
	(3.457)	(8.183)	(3.457)		(2.896)

Variables	Pooled Effects Model NODA	Fixed Effects Model NODA	Random Effects Model NODA	2 Step System GMM NODA	FGLS Model NODA
N	140	140	140	120	140
R^2	0.8754	0.2678	0.8754		
Groups	20	20	20	20	20
Instruments				19	
AR(1)				-2.36	
AR(2)				-0.60	
Sargan				9.13	
Hansen				8.88	

Standard errors in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

APPENDIX 26:
OPTIMAL LAG LENGTHS

Optimal lag lengths with GDPG as the dependent variable.

GDPG FDI NODA

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-3248.421	NA	14042.15	18.06345	18.09583	18.07633
1	-2876.083	736.4008*	1865.491*	16.04491*	16.17444*	16.09641*

Optimal lag lengths with FDI as the dependent variable.

FDI NODA GDPG

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-3248.421	NA	14042.15	18.06345	18.09583	18.07633
1	-2876.083	736.4008*	1865.491*	16.04491*	16.17444*	16.09641*

Optimal lag lengths with NODA as the dependent variable.

NODA FDI GDPG

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-3248.421	NA	14042.15	18.06345	18.09583	18.07633
1	-2876.083	736.4008*	1865.491*	16.04491*	16.17444*	16.09641*

APPENDIX 27:
ETHICAL CLEARANCE CERTIFICATE

UNISA | university of south africa

UNISA DEPARTMENT OF FINANCE, RISK MANAGEMENT AND BANKING ETHICS REVIEW COMMITTEE

Date: 19 April 2021

Dear Mr FC Wehncke

ERC Ref #2021/CEMS/FRMB/007
Name : Mr FC Wehncke
Student #:46108874
Staff #:

Decision: Ethics Approval from 01 May 2021 to 30 June 2026

Researcher(s): Name Mr FC Wehncke

E-mail address: 46108874@mylife.uniusa.ac.za, telephone 0725792774

Supervisor: Name: Prof PL Makoni

Email address: makonipl@unisa.ac.za, telephone 076 753 8234

Working title of research: Exploring the relationship between Foreign Direct Investment, foreign Aid and Economic Growth: Evidence from Africa

Qualification: Doctor of Philosophy in Management Studies

Thank you for the application for research ethics clearance by the Unisa DFRB Ethics Review Committee for the above-mentioned research. Ethics approval is granted for the period 01 May 2021 to 30 June 2026

*The Negligible **risk application** was **reviewed** by the DFRB Ethics Review Committee 28 April 2021 in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment*

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APPENDIX 28:
PROFESSIONAL LANGUAGE EDITORIAL CERTIFICATE

Retha Burger
B.A.(H.E.D.)
tel : 012 807 3864
cell : 083 653 5255
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e-mail : retha@skillnet.co.za
Independent Skills Development Facilitator

Dear Mr Wehncke

This letter is to record that I have completed a language edit of your doctoral thesis entitled, "EXPLORING THE RELATIONSHIPS BETWEEN FOREIGN DIRECT INVESTMENT, FOREIGN AID AND ECONOMIC GROWTH: EVIDENCE FROM AFRICA".

The edit that I carried out included the following:

-Spelling	-Grammar
-Vocabulary	-Punctuation
-Pronoun matches	-Word usage
-Sentence structure	-Correct acronyms (matching your supplied list)

-Captions and labels for figures and tables
-Spot checking of 10 references

The edit that I carried out excluded the following:

-Content
-Correctness or truth of information (unless obvious)
-Correctness/spelling of specific technical terms and words (unless obvious)
-Correctness/spelling of unfamiliar names and proper nouns (unless obvious)
-Correctness of specific formulae or symbols, or illustrations.

Yours sincerely

Retha Burger

18 November 2021