The nexus between Official Development Assistance, Foreign Direct Investment and Economic growth in Selected African Countries

by

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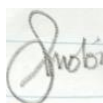
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ABSTRACT

Government alone cannot fund all national projects from its limited financial resources. Oftentimes, capital has to be drawn from other sources, both domestically and externally. Domestically, funds can be raised from private investors through the local financial markets, and these can be directed at productive sectors of the economy. Where domestic financial markets are adequately developed, supported by strong institutional quality to a country is able to attract inward international capital flows in the form of foreign direct investment (FDI) and foreign portfolio investment (FPI). However, there are situations wherein a developing country turns to other official flows to provide relief funds such as official development assistance (ODA), which do not need to be repaid. While seemingly good for the government, some scholars argued that ODA creates dependency, which tends to retard economic growth. Africa is losing a substantial amount of ODA and other official flows, partially due to donor fatigue and domestic government policies and actions that shun such funds. This problem has also been aggravated by the global financial crises of the past decade, which saw a significant reduction in FDI capital flows, thus placing increased pressure on ODA.

The current study aims to explore the relationship between official development assistance (ODA), foreign direct investment (FDI) and economic growth in selected African countries using annual data from 1990 to 2018. Multiple econometric methodologies are applied to address the research objectives herein. These include the two-step Generalised Method of Moments (GMM), Autoregressive Distributed Lag Model (ARDL), and threshold analysis approaches.

Specifically, the current study seeks to confirm the key determinants of ODA and FDI, respectively. The empirical evidence reveals that economic growth, foreign portfolio investment, population growth, trade openness, domestic investment, human capital development, consumer price index (CPI), natural resources and government consumption are the key ODA and FDI determinants into African countries. ODA, population growth, trade openness, domestic investment, and CPI were found to have a positive and significant impact on FDI, while human capital development yielded a weak positive influence on FDI. Economic growth, foreign portfolio investment, natural resources and government consumption exert a

negative impact on FDI. Moreover, FDI, population growth, domestic investment, consumer price index, natural resources and government consumption had a positive effect on ODA, while economic growth, foreign portfolio investment, human capital development and trade openness reveal negative effects on ODA.

This study furthers assesses the direction and robustness of causality between ODA, FDI, and economic growth in selected African countries, by employing the Dumitrescu-Hurlin Causality test. It emerged that there is no causal relationship between FDI and economic growth, as well as ODA and FDI. We did however find bi-directional causality between ODA and economic growth for the African countries under review. Moreover, the current study examines ODA, FDI and economic growth long-term relationships in selected African countries. It emerged that a negative and significant association exists between FDI and ODA, while there is a positive and significant relationship between FDI and economic growth in the long run. Lastly, taking into account threshold levels - the current study unearthed a positive coefficient of 0.0620 which indicates a favourable link between FDI and economic growth. On the other hand, the negative coefficient of 0.0683 indicates a negative link between ODA and economic growth.

Keywords: ODA; official aid; FDI; economic growth; GMM; causality; threshold regression analysis, pooled mean group

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LIST OF ABBREVIATIONS

ADF	Augmented Dickery Fuller
AEG	Augmented Engle-Granger
AfDB	African Development Bank
AIC	Akaike Information Criteria
ARDL	Autoregressive Distributed Lag Model
ASEAN	Association of Southeast Asian Nations
AU	African Union
BMA	Bayesian Model Average
BOP	Balance of payment
CEMAC	Central African Economic and Monetary Community
CPI	Consumer Price Index
CPIA	Country Policy and Institutional Assessment
DAC	Development Assistance Committee
DFE	Dynamic Fixed Effects
DINV	Domestic Investment
DOLS	Dynamic Ordinary Least Squares
DRC	Democratic Republic of Congo
DWH	Durbin-Wu-Hausman Test
ECM	Error Correction Method
ECOWAS	Economic Community of West African States
ECT	Error Correction Term

EU	European Union
FDI	Foreign Direct Investment
FE	Fixed Effects
FGLS	Feasible Generalised Least Square
FHT	First Hitting Time
FMD	Financial Market Development
FPI	Foreign Portfolio Investment
GAVI	Global Alliance for Vacancies and Immunisation
GCNS	Government Consumption Spending
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GLS	Generalised Least Squares
GMM	Generalised Method of Moments
GNI	Gross National Income
GNP	Gross National Product
GR	Growth rate
HC	Homogenous Causality
HCD	Human Capital Development
HDI	Human Development Index
HR	Human Resource
ICT	Information and communication technology
IDA	International Development Association

IDI	Infrastructure Development Index
IFAD	International Fund for Agricultural Development
IMF	International Monetary Fund
LDCs	Least Developed Countries
LLC	Lin and Chu
LLKE	Local Linear Kernel Estimator
LR	Likelihood Based
M&A	Mergers and Acquisitions
MENA	Middle East and North Africa
MG	Mean Group
MNCs	Multinational Corporations
MSDA	Mobilisation of Sustainable Development Assets
NAT	Natural Resources
NGO	Non-Governmental Organisation
ODA	Official Development Assistance
OECD	Organisation for Economic and Co-operation and Development
OLI	Ownership, Location and Internationalisation
OLS	Ordinary Least Squares
OO	Official funds
OOF	Other Official flows
OPEN	Trade Openness

PDI	Private Domestic Investment
PMG	Pooled Mean Group
POP	Population
PP	Phillips-Peron
RE	Random Effects
SDGs	Sustainable Development Goals
SEA	South East Asia
SIC	Schwarz Information Criteria
SSA	Sub-Saharan Africa
UECM	Unrestricted Error Correction Model
UNCTAD	United Nations Conference on Trade and Development
VAR	Vector Auto Regression
VECM	Vector Error Correction Model
2SLS	Two Stage Least Square

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CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Foreign capital inflows, particularly in host countries, have a crucial role in boosting economic growth. According to Adusah-Poku (2016), foreign capital inflows are a critical source of funding that assists developing countries in expediting their economic development by transferring advanced technologies and discoveries from developed countries to emerging markets. However, although most empirical and theoretical studies show a positive association between foreign capital inflows and economic growth, this relationship varies from one nation to the next and from one group of countries or regions to the next (Tiwari and Pandey, 2012; Adusah-Poku, 2016). Furthermore, the precise relationship between foreign capital inflows and economic growth can vary depending on the type of foreign capital utilised (Adusah-Poku, 2016).

There are numerous types of foreign capital, including official development assistance (ODA), remittances, foreign direct investment (FDI), and foreign portfolio investment (FPI) (Makoni, 2016). However, this current study differs from others because it conducts a panel study on the relationship between foreign capital inflows and economic growth, utilising two of the four primary sources of foreign capital inflows, namely ODA and FDI. The reason for focusing on these two (ODA and FDI) is that they are Africa's most crucial foreign capital inflows.

Fazily (2014) defined ODA as an instrument that establishes strong influence when used to recover infrastructure and production. In contrast, Jakupec and Kelly (2015) stressed that ODA must provide a necessary improvement in developing countries for ODA to qualify as an economic growth incentive. In addition, Ciplak (2016) defined ODA as the flow of aid from official mechanisms of the states to the other instruments such as states or internationally recognised development agencies that work to alleviate poverty and strengthen economic and social development in needy states.

ODA has become a significant source of funding for underdeveloped countries ever since the period after World War II (Bhandari, Pradhal, Dhakal, and Upadhyaya, 2007). The attention of academia, policymakers, and investors has long been stimulated by ODA, particularly since the level of ODA has increased at an unprecedented rate since the 1940s (Jakupec and Kelly, 2015). According to Pitzen (2016), the expansion of ODA flows has resulted from innovative sustainable development methods, complexities between emerging and existing donors, and the role of ODA in the foreign policy profile of the donor. Therefore, Fan and Yuehua (2008) interrogated ODA determinants in the Post-Cold War period. To achieve this, Fan and Yuehua (2008) theoretically assessed expansion aid rules and practices in industrialised countries using panel data analysis for the 21st Development Assistance Committee (DAC), OECD members, with data from 1990 to 2005. However, the study results by Fan and Yuehua (2008) indicate that ODA as a proportion of gross national income (GNI) is negatively related to the country's economic situation, public social spending, and trade openness.

Moreso, Hien (2008) highlighted that the funding of large-scale infrastructural undertakings could play an important role, particularly in ODA, because, through ODA, governments can stimulate instigations from the private sector for maximising national and international wealth. Additionally, Brautigam (2011) pointed out that resource-rich countries do not receive large amounts of ODA. However, countries granted concessional loans based on their ability to pay or the condition that the funds must finance income-generating projects.

In 2019, the highest ODA recipients in Africa were Nigeria, Kenya, the Democratic Republic of Congo (DRC), Tanzania, Uganda, Mozambique, Mali, Niger, Senegal, Malawi, Cote d`Ivoire, Rwanda, Burkina Faso, Tunisia, and South Africa. On the other hand, Ghana, Morocco, Madagascar, Central African Republic, Chad, Sierra Leone, Guinea, Togo, Namibia, Guinea-Bissau, Gabon, Comoros, Swaziland, Botswana, and Mauritius received the lowest ODA recipients in Africa. Such funds came predominantly from the United States (US), European Union Institutions (EUI), International Development Association (IDA), the United Kingdom (UK), Germany, and the United Arab Emirates (UAE), with 43% of the fund commitments directed to social objectives,

while economic and production concerns received 18% and 10%, respectively (OECD, 2018). On the other hand, the top FDI recipients in Africa were South Africa, Morocco, Nigeria, Kenya, Ghana, Cote d`Ivoire, Tunisia, Uganda, Tanzania, and Mozambique. On the other hand, countries such as the Democratic Republic of Congo, Mali, Niger, Senegal, Malawi, Rwanda, Burkina Faso, Madagascar, Central African Republic, Chad, Sierra Leone, Guinea, Togo, Namibia, Guinea-Bissau, Gabon, Comoros, Swaziland, Botswana, and Mauritius received less of FDI in 2019. Therefore, the current study employed the 30 countries mentioned above to answer the research objectives. From 1990 to 2018, the selected African countries had similar economic growth rates and gradually witnessed more trade and financial openness.

Figure 1 below compares the trend of ODA and FDI to Africa during the period 1980 to 2016.
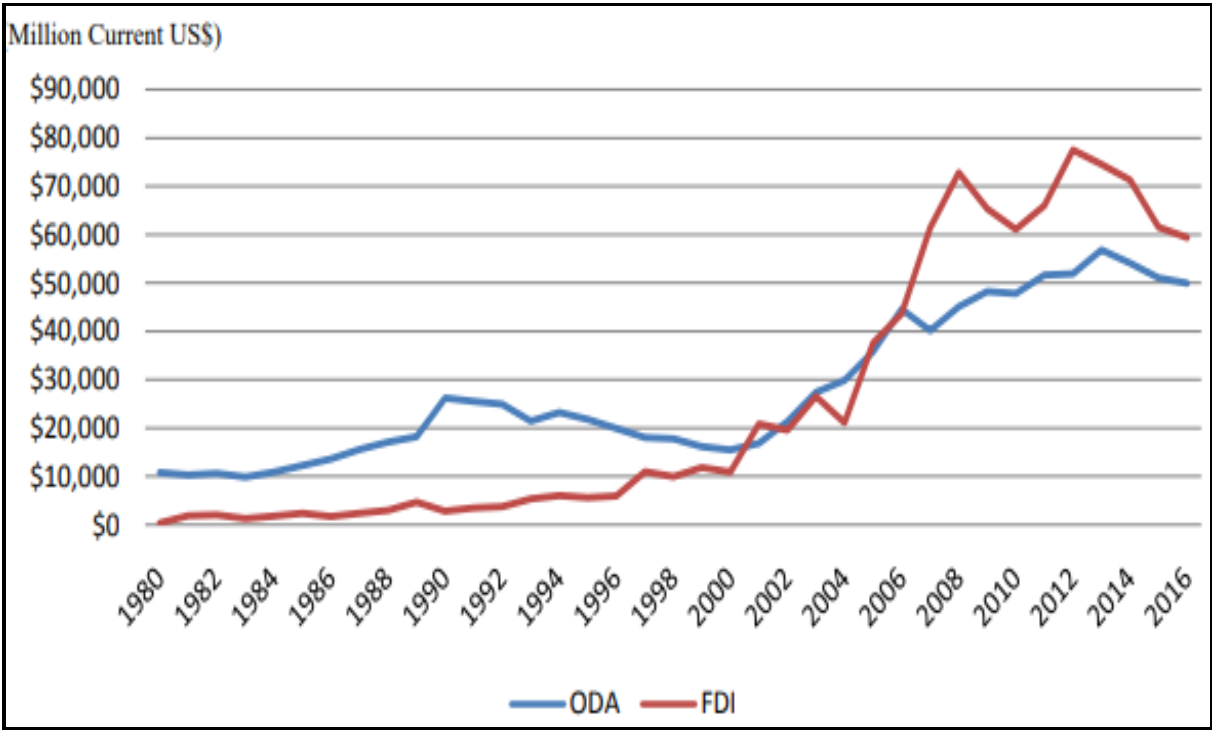
Figure 1: FDI and total Net ODA disbursements for Africa from 1980 to 2016

Source: UNCTAD, 2017

Figure 1 indicated that ODA inflow to Africa from 1980 until 1990 had always been a steady rise after specific periods of uncertainty. From 1990 to 1992, figure 1 shows a

drastic ODA rise to almost $25 million. Figure 1 global data on ODA display that total ODA flows took a dip in Africa from 1992 to 2001, with Africa enduring notable reductions to almost $16 million in 2001. From 2002 to 2005, figure 1 displayed a significant increase in ODA to nearly $45 million. Due to the global financial crisis from 2006 to 2008, figure 1 indicated the ODA downturn to $40 million. Africa saw a significant increase in ODA to almost $58 million from 2009 to 2014. Figure 1 displays the dip of ODA in Africa to $50 million in 2016.

Further expositions on reducing Africa's ODA flows showed that the debt relief portion of ODA flows to Africa has increased significantly since 2001 (Akinkugbe and Yinusa, 2010). Hence, Vollmer (2013) lamented that the inability of ODA to achieve noticeable attribution is one of the reasons for its lack of efficiency; investors continue to invest in new ventures without courtesy to cover operating or maintenance costs. On the other hand, FDI in figure 1 displayed a steady rise to $10 million from 1980 to 1997 in Africa. Figure1 revealed that from 1998 to 2000, FDI was stagnant at $10 million. Africa saw a significant rise to $25 million in FDI from 2000 to 2004, as displayed in figure 1. From 2004 to 2005, as depicted in figure 1, there was a dip to $20 million in Africa. Figure 1 demonstrated a significant increase in FDI from 2006 to 2008 to almost $72 million. From 2008 to 2012, Africa saw a decline in FDI to $60 million. 2010 to 2014, as displayed in figure 1, shows that Africa saw a significant rise in FDI to almost $78 million. Figure 1 global data on FDI display that total FDI flows considerably declined in Africa from 2014 to 2016, with Africa enduring notable reductions to almost $60 million in 2016.

The argument that ODA and FDI promote economic growth has primarily been investigated using time series or cross-sectional data (Ndambendia and Njoupouognigni, 2010). However, only a few research studies focus on panel studies of a significant handful of nations throughout time to draw on their experiences. Furthermore, the few studies that have conducted panel analyses ignore Africa, one of the most excellent receivers of foreign capital inflows in recent decades.

Hence the study of Ndambendia and Njoupouognigni (2010) analysed the relationship between ODA, FDI, and economic growth in the sub-Saharan African region. ODA and FDI have a positive and significant impact on economic growth (Ndambendia and Njoupouognigni, 2010). Further evidence produced by Ndambendia and Njoupouognigni (2010) stressed that various institutional elements such as intellectual ability, basic infrastructural facilities, and the suitability of institutions supported the nexus between FDI and ODA. Sound policy and economic stability in the host country are essential preconditions for FDI to be appealing. Still, good policy and financial stability are insufficient to strengthen the favourable association between FDI and economic growth (Ndambendia and Njoupouognigni, 2010). Ellahi and Ahmad (2011) also contended that ODA has contributed to economic and social development, either alone or by engaging with FDI factors, thereby fostering foreign trade activities and ensuring macroeconomic stability overall.

On the other hand, FDI is the ownership or absolute control of 10 percent of the enterprise voting shares or the proportional interest in the self-governing business (Griffin and Pustay, 2007). According to Makoni (2021), FDI emerges whenever a host country's investor secures an asset in the recipient country to control that asset. For an investment to qualify as FDI, that investment should be significant enough to permit the foreign investor some influence in the management of the domestic company. To reach a sustainable position beyond that of an investor in a host country's economy, the International Monetary Fund (IMF) (1993) treats FDI as an investment with the simple aim of an investor's advantageous position in management. In addition, the investment objective must be to create a long-term relationship with the host country (Cossa, 2015). FDI initiative is any company located in a single economy where an investor currently stationed from another economy controls 10% or more directly or indirectly or if combined, or the equivalent for a separate enterprise (OECD, 2013).

FDI flows into Africa dropped considerably from 40% in 1986 to 26 % in 1989. In addition, between 1990 and 1999, 2000 to 2009, Africa saw a decline in total FDI inflows from 76% to 70%, respectively (Economou, Hassapis, Philippas, and Tsionas, 2017). Hence, Miyamoto and Biousse (2014) stressed that the share of Africa's FDI in

2012 was 5%, compared with about 30% and 20%, respectively, between Asia and Latin America. Recently, African countries witnessed stagnant growth in their economies, particularly in FDI (Mazenda, 2014).

Figure 2 below displays FDI patterns in developing economies, Africa, America and Asian region.
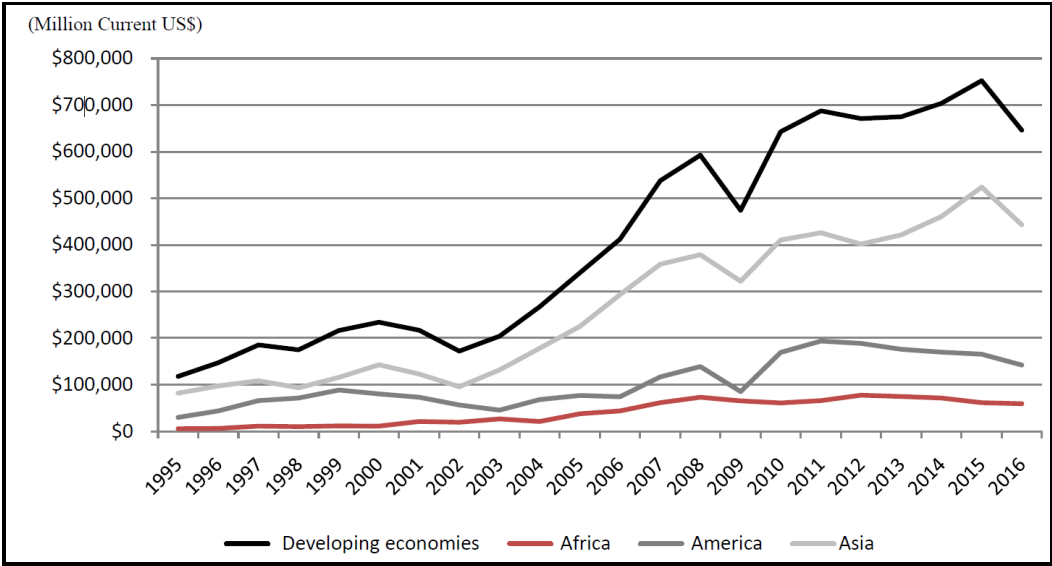
Figure 2: FDI trends in developing economies, Africa, America and Asian region

Source: UNCTAD, 2017

Figure 2 compared FDI trends between Africa and developing countries, Africa and America, Africa and the Asian region. Figure 2 indicates that Africa's FDI inflows from 1995 to 2000 were constantly stagnant and below $100 million per annum while developing countries saw a rise in FDI to almost $205 million per annum. On the other hand, America and the Asian region saw a surge in FDI to nearly $98 million and $150 million, respectively, from 1995 to 2000. From 2001 to 2008, global FDI data in figure 2 displayed that Africa saw a steady rise in FDI to almost $98 million while developing countries saw a significant increase in FDI share to $600 million. Regarding America and the Asian region from 2000 to 2008, figure 2 displayed the surge of FDI share to $130 million and $398 million, respectively. Figure 2 showed that Africa had stagnant FDI inflows from 2009 to 2016, remaining at almost $98 million, while developing countries saw a rise in FDI inflows to $650 million. Compared to Africa from 2009 to

2016, figure 2 displayed an increase in FDI in America and the Asian region to almost $135 million and $450 million, respectively. It is noted in figure 2 that Africa, from 1995 to 2016, was unable to attract FDI compared to developing countries, America, and the Asian region. Hence, this current study seeks to close that gap by identifying key ODA and FDI determinants in selected African countries.

Based on the background alluded to above, together with the statistical evidence presented above, it is clear that there is a need to pursue an empirical study to examine the relationships between FDI, ODA, and economic growth within the African context. From a policy perspective, knowledge of the relationship between ODA, FDI inflows, and economic growth will be vital in designing and adopting friendly policies to attract more external funding into the region. Furthermore, ODA and FDI inflows enhance economic growth, raise the people's standard of living, and visibly reduce poverty to an acceptable level (Adusah-Poku, 2016). Therefore, there is a need to conduct this current study to understand better the direction governments can pursue to ensure sustainable economic growth in their respective countries through various policy instruments.

1.2   Evolution of ODA, FDI and economic growth in Africa

As previously stated, ODA promotes economically impoverished Third World countries to become self-sufficient. According to Bhandari, Pradhan, Dhakal, and Upadhyaya (2007), the goal of ODA is to reduce disparities and inequalities to prevent the globe from becoming further divided between the haves and have-nots, the privileged and the less affluent. In addition, the goal of ODA was to help disadvantaged people worldwide improve their lives and living conditions (Ndambendia and Njoupouognigni, 2010).

Various international organisations, such as the Bretton Woods Institutions, the World Bank Group, the Inter-American Development Bank, the African Development Bank, the Asian Development Bank, and the International Monetary Fund, were established to achieve ODA goals (Ali and Zeb, 2016). The World Bank established the International Finance Corporation (IFC) in 1956 and the International Development Association (IDA) in 1960, both of which had the primary mission of providing loans to the world's poorest countries at rates lower than market rates (OECD, 2013). The United Nations (UN) and

several specialised agencies were also established (OECD, 2018). According to Ndambendia and Njoupouognigni (2010), the majority of these new UN bodies were founded to address specific development and humanitarian concerns. Together with many of these international aid agencies, there are several governments and institutions at the national scale that are responsible for allocating assistance to various countries for variety objectives (OECD, 2013). According to the OECD (2019) Africa at a glance, the United States Agency for International Development (USAID), the Australian Agency for International Development (AusAID), the New Zealand Agency for International Development (NZAID), and the United Kingdom's Department for International Development (DFID), the Swedish International Development Cooperation Agency (SIDA), and the Japan International Cooperation Agency (JICA) are just a few examples.

According to OECD Africa at a glance (2019), Ethiopia, Nigeria, Kenya, the Democratic Republic of the Congo, Tanzania, Uganda, Mozambique, Mali, Somalia, and Egypt are the top ten ODA recipients. In other words majority of ODA shares go towards the above countries in Africa. Various modifications in the mode of aid delivery mechanisms have occurred during the last three decades. Food aid, humanitarian aid, health aid, and technical aid have been the most important forms of ODA (JICA, 2012). Table 1 below indicates the top ten geostrategic aspect share of ODA received by each country in the last three decades.

Table 1: 2019 top ten geostrategic aspect ODA recipients in Africa

Country	Food Aid Share	Humanitarian Aid Share	Health Aid Share	Technical Aid Share
Ethiopia	$428.8 million	$866 million	$649 million	$623 million
Nigeria	$200.9 million	$970 million	$787 million	$682 million
Kenya	$102.1 million	$271 million	$690 million	$262 million
DRC	$273.3 million	$599 million	$427 million	$45.55 million
Tanzania	$20.0 million	$102 million	$559 million	$288 million
Uganda	$94.5 million	$347 million	$540 million	$45.55 million
Mozambique	$65.3 million	$34 million	$745 million	$204 million
Mali	$39.7 million	$91 million	$84.95 million	$45.55 million

| Somalia | $303.7 million | $1087 million | $84.95 million | $45.55 million |
| Egypt | $18 million | $33 million | $84.95 million | $260 million |

Table 1 above indicates that Ethiopia, DRC, and Nigeria received more than $200 million in food aid in 2019, while Kenya received just above $100 million. On the other hand, countries such as Tanzania, Uganda, Mozambique, Mali, Somalia, and Egypt received less than $100 million in food aid in 2019. In addition, it is noted in Table 1 that Somalia, Nigeria, Ethiopia, DRC, and Uganda received more than $300 million of humanitarian aid in 2019, while Kenya and Tanzania received more than $100 million. On the other hand, countries like Mozambique, Mali, and Egypt received less than $100 million. On the other hand, Table 1 displays that countries such as Nigeria, Mozambique, Kenya, Ethiopia, Tanzania, Uganda, and DRC received higher health aid in 2019, while Mali, Somalia, and Egypt received an equal share of health aid. Furthermore, Mali, Uganda, and DRC share equally technical aid, while other countries received more than $200 million of technical aid.

Table 2 below indicates the top ten geopolitical aspects of ODA donors in Africa in the last three decades.

Table 2: 2019 top ten geopolitical aspects of ODA donors in Africa

Donor	Food Aid	Humanitarian Aid	Health Aid	Technical Aid
USAID	$19.3 million	$29.2 million	$4732 million	$712 million
IDA	$0.3 million	$1.7 million	$777 million	$1820 million
France	$0.7 million	$0.4 million	$97 million	$789 million
Germany	$5.7 million	$12.9 million	$306 million	$504 million
Japan	$4.4 million	$7.0 million	$136 million	$307 million
EU Institution	$0.3 million	$10.7 million	$601 million	$251 million
Norway	$4.0 million	$18.5 million	$66 million	$153 million
Sweden	$0.1 million	$15.1 million	$210 million	$145 million
Italy	$1.8 million	$8.6 million	$74 million	$113 million
UK	$11.7 million	$36.8 million	$445 million	$78 million

Table 2 above indicates that USAID is the largest donor in Africa regarding food aid and health aid. The United Kingdom (UK) is the biggest donor in Africa concerning humanitarian aid, while the International development association (IDA) contributed more in technical aid.

According to OECD (2019) Africa at a glance, Africa received a total ODA of $13618 million in the economic sector in 2019. The current study selected 30 countries, and therefore the economic analysis looked at the selected countries. The large amount in the economic sector in Africa in 2019 allocated to Morocco with $881 million, Tunisia with $868 million, Senegal with $754 million, Kenya received $746 million, and Tanzania shared $689 million, and Cote d`Ivoire got $638 million. An average amount in the economic sector in Africa shared by countries such as Madagascar, Mozambique, the Democratic Republic of Congo, Nigeria, Ghana, Rwanda, Burkina Faso, and Niger received a share of $496 million, $413 million, $362 million, $350 million, $314 million, $312 million, $270 million, and $226 million, respectively.

In addition, South Africa shared $191 million, Mali shared $183 million, Uganda received $183 million, Togo shared $107 million and Sierra Leone $100 million, sufficient to boost their economic growth. Countries such as Malawi received $86 million, Namibia shared $83 million, Guinea got $66 million, and Guinea-Bissau allocated $59 million to promote economic growth. In addition, in their attempts to attract ODA, the Central African Republic received $46 million, Comoros received $35 million, Mauritius received $9 million, Chad shared $3 million, and Botswana received $1 million. According to OECD Africa at a glance (2019), Gabon and Swaziland's economic sector was not active; hence they received no share.

On the other hand, in the twenty-first century, FDI accounts for a sizable portion of Africa's investment stock (UNACTD, 2016). According to the AfDB (2020), FDI accounted for around 16 percent of domestic investment in Africa from 2001 to 2011, compared to an average of 11 percent internationally. In recent years, FDI has outperformed other conventional sources of external finance for Africa, such as ODA and remittances (UNACTD, 2016). Even though the mining sector has received the majority of FDI inflows in Africa, inflows to the services sector have been noteworthy in

recent years. In recent years, FDI inflows into Africa have been spectacular compared to the 1970s and 1980s.

While developing nations received almost triple FDI inflows, boosting revenues from less than $6 billion in 1970 to 1979 to an average of $20 billion from 1980 to 1989, inflows to Africa only doubled in the same time, growing from little more than $1 billion to $2.2 billion. As a result, Africa's proportion of FDI relative to developing countries fell dramatically, from 19.5 percent to 10.7 percent. Its global FDI share fell from 4.7 percent to 2.37 percent within the same period (AfDB, 2020). However, things have changed since the late 1980s and, more importantly, the 1990s. The above is mainly because several measures encourage private sector engagement, openness, and macroeconomic stability (UNCTAD, 2016).

OECD (2019) attributes Africa's relative political stability and attractive economic development in recent decades, increased natural resource competitiveness, and fast middle-class rise. Furthermore, numerous African governments have established legislation and joined agreements to protect FDI, such as the Multilateral Investment Guarantee Agency and the Convention on the Settlement of Investment Disputes. As a result, Africa's FDI policy framework is now comparable to other global regions. However, creating government-supported investment promotion centers in nearly all nations to directly attract international investors has been a radical approach. As a result, the 1990s proved to be a watershed moment for Africa regarding FDI, with average inflows rising to $6.8 billion from $2.2 billion in the previous decade.

Regardless, Africa's contribution to the global and developing economies has shrunk by about half from the previous time (AfDB, 2020). Its proportion in developing nations plummeted from 10.7% to 5.9% as its global share dropped from 2.4 percent to 1.74 percent. From 2000 to 2009, Africa saw unprecedented growth. As a result, its FDI share in the global and emerging nations expanded significantly over the preceding years. Between 2000 and 2009, FDI inflows into SSA increased. Despite an upward trend in inflows to Africa in 2010 and 2011, inflows to Africa dropped in 2013 and 2014. It declined from $56.44 billion in the preceding quarter to $53.97 billion in 2013 and $53.91 billion in 2014 (AfDB, 2020).

Political unrest in Northern Africa and the Ebola epidemic in West Africa, according to economists, caused the drop in inflows during these years (OECD, 2018). Northern Africa is an example that supports the above evidence. Inflows dropped from $17.15 billion in 2012 to $13.66 billion in 2013 and $12.24 billion in 2014. Inflows into West Africa fell from $14.21 billion in 2013 to $12.76 billion in 2014. While Africa declined from 2012 to 2014, SSA showed a slight increase, from $42.00 billion (2013) to US42.95 billion (2014). The spike in inflows to Middle Africa throughout the era might explain this increase (AfDB, 2020).

FDI inflows to Africa have been rising in general over the years, but their percentage of global and emerging nations has not been promising (OECD, 2018). For example, Africa's global share fell from 4.72 percent from 1970 to 1979 to 1.71 percent from 1990 to 1999, whereas developing Asia's share increased from 7.99 percent to 17.65 percent during the same time. Though it began to rise after the 1990s, it now amounts to just approximately 4.4 percent of GDP (2014), which pales compared to developing Asia's 38 percent. On the other hand, emerging nations' global GDP has been steadily growing, from 24.19 percent in 1970 to 31.53 percent now (2000 to 2009). Furthermore, it has increased its participation from 43.66 percent in 2010 to 55.47 percent in 2014, exceeding developed nations' share (40.61 percent) (AfDB, 2020).

As a result, Africa only makes up 7.91 percent of developing nations worldwide, despite a growing percentage of developing countries. The above suggests that Africa, the world's second-biggest continent with roughly a billion people and one of its fastest-growing areas, has to rethink its strategy (OECD, 2018). Since the 1990s, the stock of FDI in Africa has risen in lockstep with inflows. For example, from an average of $45.15 billion from 1980 to 1989 to $89.71 billion from 1990 to 1999, and then Africa's FDI stock quadrupled. SSA's FDI stock increased from $30.26 billion to $57.52 billion, following a similar pattern. From 2000 to 2009, the amount in Africa increased from the 1990s to an average of $289.77 (AfDB, 2020).

The stock of FDI was $586.5 billion in 2010, and it increased to $709.17 billion in 2014. Although figures are encouraging for Africa, the continent's proportion compared worldwide has shrunk over time, falling from 12.14 percent in 1980 to 8.5 percent in

2014 as a percentage of developing countries and 4.20 percent to 2.881 percent as a share of the world. Although natural resources play a significant role in FDI inflows to Africa, it is critical to highlight the role played by economic progress in recent decades. In recent years, economies like Sierra Leone, Niger, Cote d'Ivoire, Liberia, Ethiopia, Burkina Faso, Rwanda, Mozambique, Zambia, and Ghana have achieved outstanding growth rates due to the increase in FDI inflows (AfDB, 2020).

Africa's economic progress has been uneven, particularly in the post-independence 1960s and 1970s. According to UNCTAD (2016), the continent's poor economic performance, particularly in the 1970s and 1980s, impacted FDI revenues during that period. Compared to economic growth rates in the 1980s and 1990s, the new millennium's average growth rate has been more significant than the global economy. From 2001 to 2010, Africa's average economic growth rate was 5.29 percent, somewhat lower than the average for developing nations (5.83 percent), but it surpassed developed countries (1.49 percent) and the global average (2.62 percent). Despite a robust economic performance in 2010, the economy grew at a dismal 0.96 percent in 2011. The performance in 2011 was the lowest since 1994. The economy, on the other hand, improved in 2012 (5.05%), exceeding growth rates in developing nations (4.66%), developed countries (1.07%), and the rest of the globe (2.18 percent). Although Africa's growth rates fell in 2013 and 2014 compared to 2012, it outperformed the developed world and the rest of the globe throughout the time (AfDB, 2020).

Although agriculture has historically contributed the most to the economy, the service sector has grown in importance in recent years, fueling economic expansion. From 2001 to 2004, the percentage of services climbed from 45.8% to 49.0%. UNCTAD (2016) highlighted that from 2009 to 2012, the services share increased from 45.8% to 49.0%. Services provided more than 50% of GDP development in 21 African nations from 2009 to 2012. In Seychelles, it accounted for up to 80%. The rising percentage of FDI flows into this sector might be explained by the increased contribution of services to economic growth. In 2012, for example, services contributed 48 percent of total FDI in Africa, compared to 21 percent and 31 percent for manufacturing and primary industries, respectively (UNCTAD, 2016).

According to AfDB (2020), service sector accounted for 40% of FDI inflows in 2012 (up from 24% in 2011). Services FDI doubled between 2001 and 2012, making it the largest sector in Africa's FDI portfolio. North Africa, particularly Morocco, leads Africa in terms of FDI in services. In SSA, however, the stock of FDI in services is concentrated in South Africa. The banking industry receives the most FDI in services, followed by infrastructure. OECD (2018) describes the services sector as a magnet for attracting FDI, given its centrality to Africa's economic transition in recent years.

The current study recognises the importance of Country Policy and Institutional Assessment (CPIA) indices such as fiscal policy strength, monetary policy strength and resource mobilisation strength. According to Mohr (2015), fiscal policy refers to the government's decisions about the amount and composition of spending, taxes, and borrowing. The budget is the primary fiscal policy tool, and government expenditure and taxation are the two policy variables (Weinstock, 2020). According to Dornean and Oanea (2014), government expenditure and taxes are two fiscal policy variables that may impact the amount of aggregate demand, production, and income in the economy. Furthermore, government spending impacts the demand for commodities. Hence government spending is essential (Dornean and Oanea, 2014).

AfDB (2020).reported that fiscal policy stood at 5.50 in Rwanda, 5.30 in Swaziland, 5.20 in Nigeria, and 5.00 in Burkina Faso in 2020. Guinea, Mali, Senegal, and Tanzania's fiscal policy is 4.50. The fiscal policy in Botswana stood at 4.20, while Ghana, Niger, Togo, Uganda, and the Central African Republic stood at 4.00. In contrast, fiscal policy in Namibia stood at 3.75 while Cote d'Ivoire, Sierra Leone, Kenya, Democratic Republic of Congo, Madagascar, Malawi, and South Africa stood at 3.5. In addition, Mauritius's fiscal policy stood at 3.20 while Gambia and Chad stood at 3.00. Moreover, the fiscal policy in 2020 stood at 2.70 and 2.50 in Gabon and Guinea-Bissau, respectively. Finally, Mozambique and Comoros fiscal policy stood at 2.00 in 2020.

On the other hand, monetary policy refers to the actions taken by monetary authorities to impact the amount of money or the rate of interest to achieve price stability, full employment, and economic growth (Mohr, 2015). Furthermore, monetary policy refers to macroeconomic regulators' deliberate actions to influence macroeconomic variables

such as credit availability, interest rates, and exchange rates to influence monetary demand, output, income, prices, and the balance of payments (Mohr, 2015). According to AfDB (2020), countries such as Rwanda, Senegal, Tanzania, Uganda, Burkina Faso, Guinea, Kenya, Malawi, Mali, Togo, Chad, Cote d'Ivoire, Ghana, Madagascar, Mozambique, and Niger had ratios above 3.5 percent. While Central African Republic, Democratic republic of Congo had the ratio equal 3.5 percent. In contrast, Guinea-Bissau, Sierra Leone, and Comoros had ratios less than 3.5 percent (AfDB, 2020).

Finally, resource mobilisation is all efforts involved in gaining new and more resources (UNCTAD, 2016). Several African governments have been wealthier during the last 15 years, with nominal and real GDP rises (Boly, Nandelenga and Oduor, 2020). Domestic revenues, including grants, grew by 2% on average between 2008 and 2016, rising from $497 billion in 2006 to $575 billion in 2012, and then dropping to $460 billion in 2016, resulting in slower GDP growth and a commodity price shock. However, the funds collected are insufficient to satisfy development requirements, significantly when other funding sources, such as ODA, are diminishing or constrained, such as borrowing and private sector financing (Boly, Nandelenga and Oduor, 2020).

Between 2008 and 2020, Africa's average revenue to GDP ratio was 31%, compared to 48% in the European Union in 2020, with wide variations among countries (OECD, 2019). For example, Senegal, Rwanda, Mali, Cote d'Ivoire, Togo, Kenya, Tanzania, Malawi, Burkina Faso, Ghana, Guinea, Uganda, and Mozambique had ratios above 3.5%. While, Niger, Sierra Leone, Madagascar, Gambia, Central African Republic, Chad, Democratic Republic of Congo, Guinea-Bissau, and Comoros, had ratios below 3.5 percent. Amid these differences, a common feature is a significant reliance on a narrow tax base, namely trade taxes. Trade taxation accounted for 46 percent of total tax revenues in Africa between 2008 and 2020, while direct and indirect taxation accounted for 28.3 and 22.9 percent, respectively, over the same period (Boly et al, 2020).

Oil-export taxes provided over 60% of taxable income to resource-rich nations, including South Africa, Tanzania, Morocco, the Democratic Republic of Congo, and Nigeria (UNCTAD, 2016). The significant dependence on trade taxes reveals a lack of fiscal

capability. According to Boly et al. (2020), collecting trade taxes, on the other hand, may necessitate significant investments in enforcement and compliance mechanisms throughout the economy, whereas collecting income or sales taxes may necessitate major expenditures in enforcement and compliance systems throughout the economy. Taxation typically rises in level as countries grow, but it also changes in pattern. Countries have shifted away from trade taxes and toward non-trade tax bases like income, property, or value-added taxes (Boly, Nandelenga and Oduor, 2020).

1.3 Problem statement

Africa is losing substantial ODA, and other official flows, partially due to donor fatigue and domestic government policies shun such funds (Charron, 2011). Moreover, according to Brautigam (2011) and OECD (2019), other official flows (OOF) provided by OECD members to Africa have generally been lower than the funds provided on ODA terms. To make matters worse, despite all the spillover effects on the economies of African countries, Africa remained unable to draw sufficient foreign capital amounts in the form of the FDI (Makoni, 2021). Further, the problem can be traced back, in part, to the global financial crises of the past decade, which saw a significant reduction in FDI capital flows and increased pressure on ODA.

As a result of the above dilemma, African countries have tried to formulate investor-friendly policies to enhance their attractiveness to foreign investors in recent years. However, despite these efforts, Asiedu (2006) and Rao, Sethi, Dash and Bhujabal (2020) recognised that developing countries, Africa in particular, remains incapable of using external private sector financing, criticising excessive government bureaucracy, weak governance, and political uncertainty for the low rates of FDI inflows to Africa. With less and less financial support from ODA, countries will not be able to develop their economies to be free of these ODA. This continued dependence on donors that is obviously not good for economic growth.

On the other hand, Nxumalo and Makoni (2021) argued that developing countries need to attract multi-faceted FDI that can be channeled towards productive sectors of the economy, thereby creating employment and improving institutions' productivity and thus economic growth. The constraining factor includes the burden of massive foreign debt.

In addition, authorities must improve governance in certain African countries and eliminate socio-political violence and government agencies to attract ODA and FDI inflows.

Dependence on ODA means African countries will always be indebted to the developed world, dancing to their tune or facing cut-off. Some countries, such as Zimbabwe, face economic sanctions and cannot access ODA, resulting in the social and economic status of the populous declining (Moyo, 2009). Therefore, ODA dependence implies that donors tend to foster dictatorship and undermine African democracy (Alemu, 2017). In addition, ODA can be narcotic, stimulating African addictive behavior. By nurturing this addiction, aid donors have allegedly weakened the African states' determination to act on behalf of their citizens. Finally, depending on the ODA, overstretches resource flow through the lumping of grants and loans (Alemu, 2017; Goldsmith, 2001).

Less and less support from ODA will have to concern African governments and their populations. The reason for the above is that African governments need to increase the levels of ODA and FDI to feed and supply the increasing population with productive employment and reduce poverty. Poor saving rates in Africa make it difficult to fund investment projects required to improve economic growth and development. Thus, African governments need to discover feasible techniques to attract FDI to fill this resource gap by providing investment for development resources (Sani, Ahmad, Abdullahi, Adamu, and Funmilayo, 2021). In terms of financial market growth, Africa lags behind all the world economies. AfDB (2020) laments that African governments have stringent company, financial market regulations, legislation, and policy to prevent big foreign institutional investors from exploiting and restricting exposure (risk) to world financial crises; their national and public markets remain protected.

The World Bank observed that Africa's litany of development issues was underpinned by a crisis of governance more than a century ago. Poor quality bodies, the standard rule of law, the lack of accountability, close monitoring of data, and elevated corruption rates still characterise many African countries (Brautigam and Knack, 2004; OECD, 2018). In many areas of Africa, official levels of development assistance have decreased over the previous decade. Many of Africa's poorest nations receive

substantial net transfers of official development assistance, and this enormous amount of aid adversely affects African governance (Brautigam and Knack, 2004; Sabra and Eltalla, 2016). Papanek (1972) argued that reliance on ODA might decrease domestic savings by raising total revenue and consumption.

So far, relatively few studies in impoverished countries, especially African ones, have investigated the link between the ODA, FDI, and economic growth. In Vietnam provinces, Hein (2008) has evaluated the influence of ODA inflow through infrastructure on FDI in 64 provinces from 2002 to 2004. Hein (2008) noted that, through a direct and indirect channel, regression results indicate the excellent benefits that ODA has on infrastructure influences in the appropriate province on flows of FDI, while the short-term impacts of the current ODA distribution level are questionable.

Employing system generalised methods of moments (GMM) to estimate the parameters and solve the endogeneity problem, Gui-Diby (2014) investigated the effect of foreign direct investment on economic growth for fifty African countries with data ranging from 1980 to 2009. Gui-Diby (2014) found that throughout the period 1980 to 1994, the effect of FDI on economic growth remained negative. The above findings are related to the inability of policymakers to adopt policies to attract foreign investors. In addition, during the period 1995-2009, it was found that the effect of FDI on economic growth was positive due to the improvement of the market climate and resource contribution to which the industries have focused on commodity exports to the economy (Gui-Diby, 2014). Using panel data, Park (2014) examined FDI determinants from Korea and investigated whether ODA attracted FDI inflows to Korea from 1995 to 2013. In conclusion, Park (2014) indicated that most variables such as governance, political factors, and economic factors positively influence FDI, while ODA positively impacts FDI in Korea (Park, 2014).

Indeed, most empirical research could not specifically concentrate on Africa first as a separate focus area means that the outcomes of these studies provided less general awareness of the African context. The high rates of sustained economic growth in infrastructural investment countries, including Japan, Korea, China, and Vietnam, have been high in the past decade (Momita, Matsumoto, and Otsuka, 2019). Some research

studies have considered the relationship between FDI, ODA, and economic development, concluding a positive relationship between FDI and economic growth. However, inconclusive findings emerged regarding the relationship between ODA and FDI, thus necessitating further investigation, particularly in developing countries (Hein, 2008; Yiheyis and Cleeve, 2018).

Drieffield and Jones (2013) and Rao, Sethi, Dash and Bhujabal (2020) highlighted that ODA is one of the most important instruments used to generate economic growth in developing countries, but academics seemingly less study it. ODA and FDI are significant sources of finance, job creation, poverty alleviation, economic growth, and development (Sani, Ahmad, Abdullahi, Adamu, and Funmilayo, 2021). However, whether ODA and FDI are treated as financial substitutes or complementary to one another, no consensus was reached on the attributes that explore the effectiveness of ODA and FDI inflow on economic growth in developing countries (Sani, *et al*, 2021; Drieffield and Jones, 2013). Hence, this current study extends the FDI-ODA-economic growth nexus investigation by employing variables representing various economic and financial developments.

The government's failure to attract more FDI and ODA to promote economic growth is the problem faced by the African continent. The problem mentioned above harms African society because the unemployment and poverty rate keeps rising in Africa. The problem lies in the African government officials with less skill to attract more ODA and FDI.

Admassu (2020) lamented that ODA is terrible in Africa, as it has made the poor worse off and has sluggish production. African countries have become more indebted, inflationary, vulnerable to the wild currency market, and less appealing for higher investment because of the insidious ODA culture. ODA runs the risk of civil conflict and unrest in the African continent. ODA is thus a political, economic, and humanitarian catastrophe without any mitigation.

From the aforementioned, it is apparent that ODA in the African setting does not stimulate economic growth, and domestic government policies are incapable of

attracting ODA. As a result, the current study raises questions regarding the discourses to better understand the factors of ODA and FDI inflows in Africa, and the associated threshold level of ODA-triggered FDI inflows. This creates a dynamic platform for the alternate solution and preferable information concerning ODA, FDI, and economic growth.

1.4   Research objectives

This section will present the primary and the secondary objectives of the study.

1.4.1   Primary objectives

The overall objective of the study was to assess the relationships between official development assistance, foreign direct investment and economic growth in selected African countries during 1990-2018 through analysing the co-integrating and causal relationships that arise among these critical variables.

1.4.2   Secondary objectives

- To determine the key determinants of ODA and FDI into selected African countries;
- To examine ODA, FDI and economic growth long-term relationships in selected African countries;
- To assess the direction and robustness of causality among ODA, FDI and economic growth in selected African countries;
- To determine the ODA threshold level required to trigger significant FDI inflows in selected African countries.

1.5   Research questions

This study attempted to examine the following questions in light of the above-mentioned objectives:

- What are the key ODA and FDI determinants into selected African countries?
- How are ODA and FDI to selected African countries related to economic growth in the long term?

- What is the direction of causality between ODA, FDI and economic growth in selected African countries, and how robust are those relationships?
- What is the threshold level of ODA required to trigger significant FDI inflows into the selected African countries?

1.6   Scope of the study

The research is restricted to examining the relationship of official development assistance, foreign direct investment, and economic growth in selected African countries from 1990 to 2018. The period 1990-2018 was selected to ensure a reasonable period to analyse relationships between the key concepts and variables in this current study, based on the available secondary data for each identified country.

Observing the precautionary approach, the current study initially aimed at including all fifty-four African countries in the sample but could not achieve this because certain countries covered the entire review period did not have any secondary data. From 1990 to 2018, the 30 selected African countries had similar economic growth rates and gradually witnessed more trade and financial openness. Africa has five regions: Northern Africa, Central or Middle Africa, Southern Africa, East Africa, and Western Africa. As a result, the current study considered the following countries in the African regions: Northern Africa (Morocco and Tunisia), Central or Middle Africa (Central African Republic, Chad, Democratic Republic of Congo, and Gabon), Southern Africa (Botswana, Namibia, South Africa ,and Eswatini (Swaziland), East Africa (Comoros, Kenya, Madagascar, Malawi, Mauritius, Mozambique, Uganda, Rwanda, and Tanzania) , and Western Africa (Burkina Faso, Cote d'Ivoire, Ghana, Guinea, Guinea-Bissau, Mali, Niger, Nigeria, Togo, Sierra Leone, and Senegal).

1.7   Limitations of the study

In the beginning, the current study wanted to include all African countries. However, it was impossible because secondary data for some countries was not available for the entire period under review. As a result, this current study excluded some African countries, and likewise - other possible variables were eliminated.

The current study also found time restrictions to be an issue. The usage of complementary primary data for policy implications and formulae purposes may have strengthened the precision of outcomes. There is no doubt that the insights and perspectives of policymakers have enriched the results of this current study at various levels within countries. In other words, comparing the outcomes of secondary and primary data analysis could have boosted the accuracy of the whole study. However, the researcher would not have been able to finish the study in a suitable time frame if mixed methodologies were utilised (primary and secondary data analysis).

Furthermore, since this study specifically focused on African countries, its findings may thus have limited generalisability to other countries at similar economic growth or development phases. On the other hand, to fit the needs of other countries, the current study is replicatable.

1.8   Significance of the study

While several studies exist concerning the position of domestic financial sector development and their contribution to economic growth, there is still a research gap on the interactions between ODA, economic growth, and FDI, respectively, and its causal direction, especially in the African countries. The fundamental explanation for this is the insufficient empirical research on the causal links between ODA and FDI, ODA and economic growth, and FDI and economic growth.

Furthermore, the interest in the role of ODA in global finances is a fashionable occurrence. Worldwide, rising economies have prompted academics to consider the need to pay attention to ODA. As a result, more research exists to investigate the impact of ODA on domestic and global investment strategies and the desirability of international capital flows in the participating nations, primarily developing countries.

Acknowledgment by earlier authors (Griffin and Enos, 1970; Fischer, 1991) states that ODA becomes extremely valuable. ODA also allows future researchers to discuss and analyse this flow (ODA) in different aspects. Globally and in Africa, the changing economic and political climate has created exciting challenges for investors, regulators,

governments, and academics. The current study intends to complement the existing ODA-FDI-economic growth nexus literature, predominantly in Africa.

The current study also aimed to identify and verify primary ODA and FDI determinants inflows in Africa. Furthermore, in the long run, the study required investigating the degree to which different economic development variables accounted for ODA inflows and FDI inflows in designated African countries. Ultimately, in determining the causality between the variables of FDI, ODA, and economic growth, the research aimed to determine whether ODA and FDI are substitutes or complements for one another and whether economic growth prospects are responsible for attracting either external capital flow to African countries.

Apart from Chauvet and Mesplé-Somps's (2006) study, neither ODA nor FDI flows to African countries were directly empirically investigated. However, research on the complementarity between the ODA and FDI, using the developed and emerging markets for comparison, was conducted previously by researchers such as Selaya and Sunesen (2012) and Karakaplan, Neyapti, and Sayek (2005). Kang and Won (2017) also looked at ODA's relationship with FDI in Korea, noting that Korea's ODA plays a crucial role in facilitating recipient countries' private investment. Therefore, the appropriate ODA policies favourable to private capital flows in Korea must be established.

Thus, we sought to balance the two external capital flows (FDI and ODA) sources. In light of the deteriorating state of ODA, FDI could offer an imperative substitute financing form for improved sustainable economic expansion in underdeveloped countries. If local financial markets are adequately developed, FDI might be complementary, or even a substitute as investors have a choice of investment.

Nonetheless, because the current study took the multiple variables in determining economic development into account, this argument could only be supported after data analysis since postulation would not necessarily have provided the same results for African countries due to the current economic situation. As a result, authorities were more likely to draw acceptable levels of FDI and ODA by expanding their domestic

financial sectors and guaranteeing a business-friendly framework to complement other domestic policies. Therefore, this current study could advocate for additional suitable international investment policies that encourage economic growth to decrease unemployment and poverty with the empirical evidence at hand.

The current study makes a concerted effort to support the development and international finance theories with practice by giving valuable empirical perspectives on ODA and FDI practices of developing African countries. In order to achieve the above, the current study considers many aspects of ODA trends and practices and their link with economic growth and foreign direct investment. To understand them, we will further consider the long-run relationship between our three variables. Finally, the current study examines the causal relationships between ODA, FDI, and economic growth to determine the direction of causality and the robustness of the respective relationships emanating thereof. The above will provide much-needed clarity on which concept precedes the others, highlighting the relative importance of pushing the economic development agenda of African countries.

Therefore, the conclusion of this current study had the potential to contribute significantly to international economic discipline by providing empirical evidence necessary and compelling about the increasing significance of ODA, complemented by FDI, and the presence of developing domestic economy, especially in the African context.

1.9   Outline of the study

The first chapter introduces the study by providing the introduction and the background, contextualisation of the problem statement, objectives of the study, questions in the research, scope of the study, the significance of the study, potential contribution to new knowledge, and the structure of the whole thesis. Chapter two discusses the literature relating to ODA, FDI, economic growth theories, and empirical evidence in this regard. It also highlights ODA and FDI determinants and how they relate to the theories examined.

The methodological strategy taken to address study objectives and research questions is presented in chapter three, while chapter four analyses the data and presents a detailed discussion of the research findings. Finally, chapter five presents the conclusions of the study based on the research outcomes. The chapter also outlines suggestions for further investigation. There will also be a brief note on the contribution to new knowledge emanating from the study.

1.10 Chapter summary

In this chapter, the current study was presented and contextualised. The problem statement, as well as objectives and questions, were straightforward. Also mentioned were the scope and limitations of the study, its importance, and the evolution of ODA, FDI and economic growth.

The next chapter presents a review of the existing literature relating to ODA, FDI, and economic growth theories and the relevant empirical evidence in this regard. It also highlights ODA and FDI determinants and how they relate to the theories examined.

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter's primary goal is to introduce and examine the theoretical and empirical underpinnings of official development assistance (ODA), foreign direct investment (FDI), and economic growth. This chapter will define significant concepts, along with their theoretical underpinnings. Finally, the chapter concludes with a summary of empirical scholastic viewpoints.

2.2 Official development assistance (ODA)

This section discusses the official development assistance theoretical framework, types of official development assistance, the sustainable development goals, and the determinants of official development assistance. In addition, this section articulated the definition of official development assistance.

2.2.1 Definition of official development assistance (ODA)

Official development assistance (ODA) is defined as legal support directed at advancing the economic growth and prosperity of developing countries with a donation proportion of at least 25 percent as the primary objective of the financial support (Hien, 2008). In addition, official development assistance can also be considered an instrument that exerts a strong impact whenever employed to rehabilitate infrastructure and production (Fazily, 2014).

The financial instrument employed to stimulate sustainable economic growth of the host countries and poverty reduction is known as ODA (Otor, 2014). Official development assistance occurs when one government or multilateral organisation provides grants or loans to a developing country to stimulate economic and social development (Bhattarai, 2014).

For ODA to qualify as an economic growth incentive, emphasis is placed on the fact that the ODA must provide a necessary improvement in developing countries (Jakupec and Kelly, 2015). Ciplak (2016) defined ODA as the flow of aid from official mechanisms of

the states to the other mechanisms such as states or internationally recognised development agencies that work to alleviate poverty and promote economic development and social welfare in needy states. Samim (2017) defines ODA as a concessionary aid from the government.

The allocation dimension distinguishes ODA from other financial market development initiatives (Marinov, 2018). However, the determination of governance differs from country to country. Some of them have significant symptoms and causes of poor governance that is an obstacle to poverty reduction (Momah, 2018). At an institutional level, the OECD's Development Assistance Committee (DAC) defined official development assistance as government support that promotes and precisely targets the economic development and well-being of developing countries (OECD, 2019).

This study adopts Hien's (2008) working definition of ODA because of its simplicity and capability to show the maximum percentage of which donors can donate in the receiving country. Therefore, the above implies that the ODA data used for this thesis is in line with this convention.

2.2.2 ODA theoretical framework

After World War II, in the late 1940s, and notably during the Cold War, ODA grew more relevant as developing-country solidarity gained traction (de Renzio and Seifert, 2014). Although multiple types of research exist to justify ODA, no consistent aid structure focused on any superior or general theory followed to rationalise ODA distribution (Kim, 2016). Chenery and Strout's previous work in 1966 forms the foundation of ODA theory. This theory can be linked back to the humanitarian motive hypothesis. The theory contends that economic aid is the core incentive for ODA, but the foreign policy view regards development aid as achieving a donor's objectives (Kim, 2016).

Sengupta (1993) explained the savings-investment gap approach for ODA theory. In a standard Keynesian open-economy multiplier model, the savings-investment gap theory observed ODA as a government instrument. Hence, policymakers choose its optimal value by promoting the national economic growth rate in question to the capacity restraints. However, the savings-investment gap theory has flaws because of the

significant challenge that poor developing countries attain high savings and investment rates. Moreover, developing countries' incapacity to promote economic growth in the short run is due to official and non-official blockages that keep their economic growth rate low (Pankaj, 2005). Additionally, introducing more savings in terms of ODA into developing economies can attain a higher economic growth rate than what is acceptable by their savings and investment rate (Pankaj, 2005).

Pagano (1993) established the endogenous growth theory that determines the influence of the expansion of the financial market on economic development in a closed economy. The endogenous growth hypothesis indicates that official development assistance (ODA) in developing countries is only there to offset inadequate domestic capital (Nyoni and Bonga, 2017). Therefore, according to Nyoni and Bonga (2017), the theory of endogenous growth maintains that less developed countries require ODA to maintain a stable economic growth level in the long run.

The endogenous hypothesis suggests that endogenous factors are insufficient to stimulate development, so ODA exists to support less developed countries because most developing countries have inadequate capital to stimulate real economic growth (Nyoni and Bonga, 2017). In principle, the theory of endogenous recognises that ODA complements insufficient savings in developing countries (Nyoni and Bonga, 2017).

The endogenous growth model further demonstrates the vital role that FDI plays in the evolution of human capital, resulting in higher technological progress or innovation that contributes to economic growth in the receiving country (Bende-Nabende and Ford, 1998). Bende-Nabende and Ford (1998) argued that FDI has a significant role in the growth phase because of the endogenous growth principle. Newman, Rand, Talbot, and Tarp (2015) further observed that FDI frequently comes with new technologies and inventions since they are theoretically the main driving force behind economic growth, which would otherwise enable the receiving country to draw near to the international technology threshold.

The Big Push Theory postulated by Rosenstein-Rodan (1943) is a strict variation of the balanced growth theory. According to Rosenstein-Rodan (1943), the big push theory focused on various practical premises about certain indivisibilities and improper functions of production. Bonga and Nyoni (2017) affirmed that the theory of a big push is another essential that backs the analysis of economic growth and ODA. According to the big push theory, developing countries must invest heavily to overcome economic growth constraints; however, the challenge is that the developing countries cannot organise that large sum of money to invest (Bonga and Nyoni, 2017).

According to the big push theory, ODA expedites the deficit of capital challenges of these less developed countries via the donation of a sufficient sum of international exchange reserves at a concessional rate (Bonga and Nyoni, 2017). Furthermore, the big push theory stresses a situation for take-off with thoughtful insights that a bit-by-bit investment program will not influence the required economic growth process (Umori and Onimawo, 2018).

The Public Interest Theory developed by Posner (1974) undertakes that the economic markets are exceptionally delicate. The public interest theory tends to function inadequately and in courtesy of individuals' concerns while overlooking society's position as a whole. According to the public interest theory, expected domination does not bring about the first-best resolution because of its significant encounter between allocation efficacy and productive efficacy and the public demand that the monopoly is regulated (Hantke-Domas, 2003). The public interest theory supports the analysis of economic growth and official development assistance because it proclaims that official development assistance is essential for economic development simply because it assists in closing the investment gap in the beneficiary country (Bonga and Nyoni, 2017).

The two-gap theory established by Chinery and Strout (1966) introduces the postulation that any imported goods not produced locally are crucial for producing investment goods. According to Akande (2011), the two-gap theory focused on a discrepancy between the country's resource provision and its absorption ability. The two gaps are affectionately known as the saving and foreign exchange gaps. The saving

gap is where invested savings fall short efficiently and productively. The foreign exchange gap is where savings fall short of foreign exchange earnings of the amounts required to buy the crucial foreign resources and mechanisms (Akande, 2011).

According to Bonga and Nyoni (2017), the two-gap theory argues that a developing country may require official development assistance inflows to assist in closing the trade gap if its domestic investment is below the required rate. In this case, official development assistance would positively impact economic growth.

The above-discussed theories provide the foundation upon which the current study relies. Moreover, the above theories underpin the proposition that existing relationships exist between ODA, FDI, and economic growth.

2.2.3 Types of official development assistance

Official Development Assistance (ODA) broadly classified into two groups: bilateral aid and multilateral aid, as discussed below:

2.2.3.1 Bilateral aid

According to Numayer (2003), bilateral assistance provision is one of the donor countries' international policy tools. The self-centeredness of the donor country and the need of the beneficiary country for assistance are, therefore, to some extent determined in the bilateral aid (Numayer, 2003). Bilateral aid is aid provided by a donor's government directly to another country's government (World Vision Australia, 2015). Bilateral aid generally constitutes the most significant proportion of total aid in a country and is influenced by geopolitical and humanitarian strategic objectives (World Vision Australia, 2015).

There are three types of bilateral aid: technical cooperation, loan aid and grant aid (JICA, 2012).

Technical cooperation is obtained through official development assistance once the transfer of country-specific rules is further promoted (Kimura and Todo, 2010). Ayinde (2011) stressed that technical cooperation alleviates infrastructural challenges and may support infrastructure development. Moreover, technical cooperation ensures cross-

cultural interactions and labour movement from surplus regions to disadvantaged areas and facilitates trade, investment, and other trading activities (Ayinde, 2011). ***Technical cooperation*** helps to establish and strengthen technologies that are relevant to specific situations while at the same time assisting in increasing the overall standard of technology and developing new institutional structures and organisations (Jica, 2012). Signh (2016) described technical cooperation (also known as technical assistance) as the availability of expertise in staff, formation, study, and associated costs.

Loan aid supports developing countries' efforts to advance by providing the necessary capital for long-term development at significantly lower interest rates than commercial rates (Jica, 2012). Brown (2013) concludes that loan aid is much more effective than grant aid and can stimulate more significant foreign investment in developing countries. By encouraging more foreign direct investment, loan aid helped boost gross domestic product (GDP) (Brown, 2013). However, according to Brech and Potrafke (2014), it is necessary to repay the principal amount and the accrued interest on a loan aid. Therefore, loan aid should exist on advantageous terms equal to at least 25 percent of the difference between the principal and the actual discounted value of repayment obligations (Brech and Potrafke, 2014).

Grant aid offers the requisite funds to promote sustainable development in developing countries with no commitment to repayment (Jica, 2012). According to Brown (2013), the distribution of official development assistance in grant aid tends to invest extensively in non-capital investments, such as human capital and technology, which boosts foreign direct capital inflows and improves established capital's marginal product. Brech *et al.* (2014) highlight that grant aid is different from loan aid because of no repayment requirement.

According to the OECD (2019), the United States, United Kingdom, Germany, France, Japan, Canada, Sweden, Norway, Netherlands, and Switzerland are the top 10 bilateral donors by the amount to Africa. While Ireland, Portugal, Netherlands, Belgium, Denmark, Sweden, Luxembourg, United States, United Kingdom, and Iceland are viewed as the top 10 bilateral donors by share of ODA to Africa.

2.2.3.2 Multilateral aid

Multilateral aid is in two ways: firstly, financial aid from the own resources based on capital initially invested by bilateral aid, and secondly, through trust funds and other vehicles financed by bilateral aid but managed by multilateral aid (Powell and Bobba, 2006). Powell and Bobba (2006) indicated that multilateral aid might fund their resources, usually from retained profits. According to Jica (2012), multilateral aid includes financial contributions and financing to foreign organisations. Multilateral aid is that government assistance to foreign organisations, such as the United Nations (UN), World Bank, or International Monetary Fund (IMF) (World Vision Australia, 2015).

The primary goal of these multinational organisations is to eradicate poverty in underdeveloped nations (World Vision Australia, 2015). It has been noted in the OECD (2019) that the top ten multilateral donors to Africa are as follows: International Development Association, EU Institutions, Global Fund, African Development Fund, Global Alliance for Vacancies and Immunisation, United Nations International Children's Emergency Fund (UNICEF), International Fund for Agricultural Development (IFAD), United Nations Development Programme (UNDP), International Monetary Fund (IMF) and Global Environment Facility.

The following is the graphical representation of the different types of official development assistance:
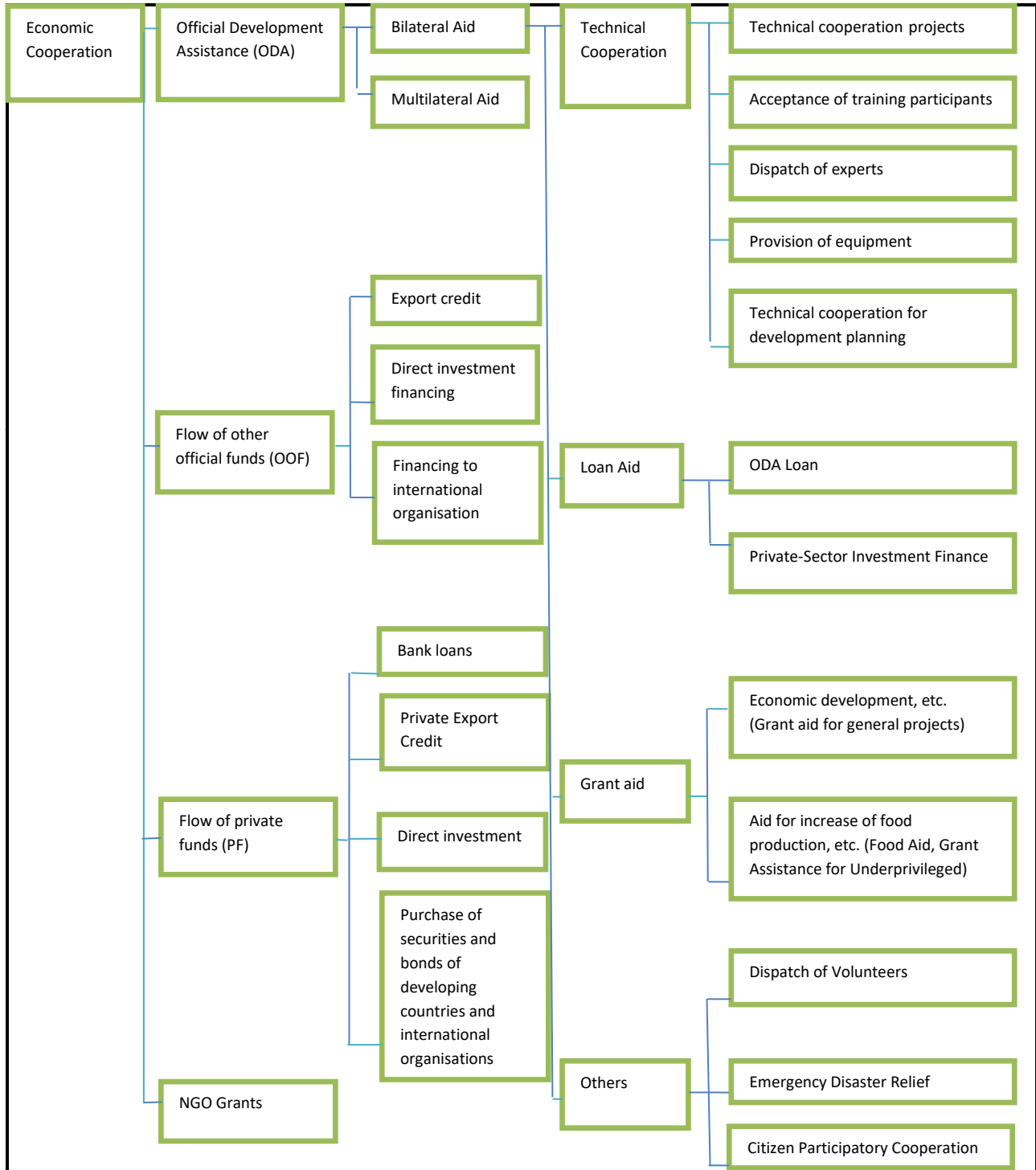
Figure 3: Types of official development assistance

Source: Jica (2012:18)

Figure 3 above displays the official development assistance provided by developed countries to developing countries. In the above figure, there are four types of economic cooperation: (1) official development assistance, (2) flow of other official funds, (3) flow of private funds, and (4) NGO grants. Figure 3 further highlights two types of official development assistance, namely bilateral and multilateral aid. Bilateral aid consists of technical cooperation, loan aid, grant aid, and others.

Acceptance of training participants, technical cooperation projects, technical collaboration for development planning, provision of equipment, and dispatch of specialists are all examples of technical cooperation, as shown in the figure above. In addition, ODA loans and private-sector investment finance make up loan aid. It is further noted from the above figure that grant aid consists of economic development, for example, development in terms of grant aid for general projects. The other aid in figure 3 above consists of dispatch volunteers, emergency disaster relief, and citizen participatory cooperation.

Export credit, direct investment finance, and financing to foreign organisations make up the flow of other official funds (OOF). On the other hand, the flow of private funds (PF), as shown in the above figure, shows private export credit, the purchase of securities and bonds of developing countries and international organisations, direct investment, and bank loans as the flow categories of private funds.

2.2.4 ODA and sustainable development goals (SDGs)

Kitaoka (2016) emphasised that the Sustainable Development Goals (SDGs) stress the importance of various types of cooperation amongst government, foreign organisations, and secondary institutions and amongst business enterprises, universities, and institutions of domestic research government. SDGs are global goals that all nations, including developed countries, realise (Kitaoka, 2016). As per the United Nations Conference on Trade and Development (UNCTAD) estimates, the annual investment needed for achieving the SDGs is $3.9 trillion, of which developing countries, through their initiatives (Kitaoka, 2016), can generate only $1.4 trillion. By comparison, developed-country ODA only totals $137.2 billion (Kitaoka, 2016).

Figure 4 below displays the challenges of financing sustainable development measurement:
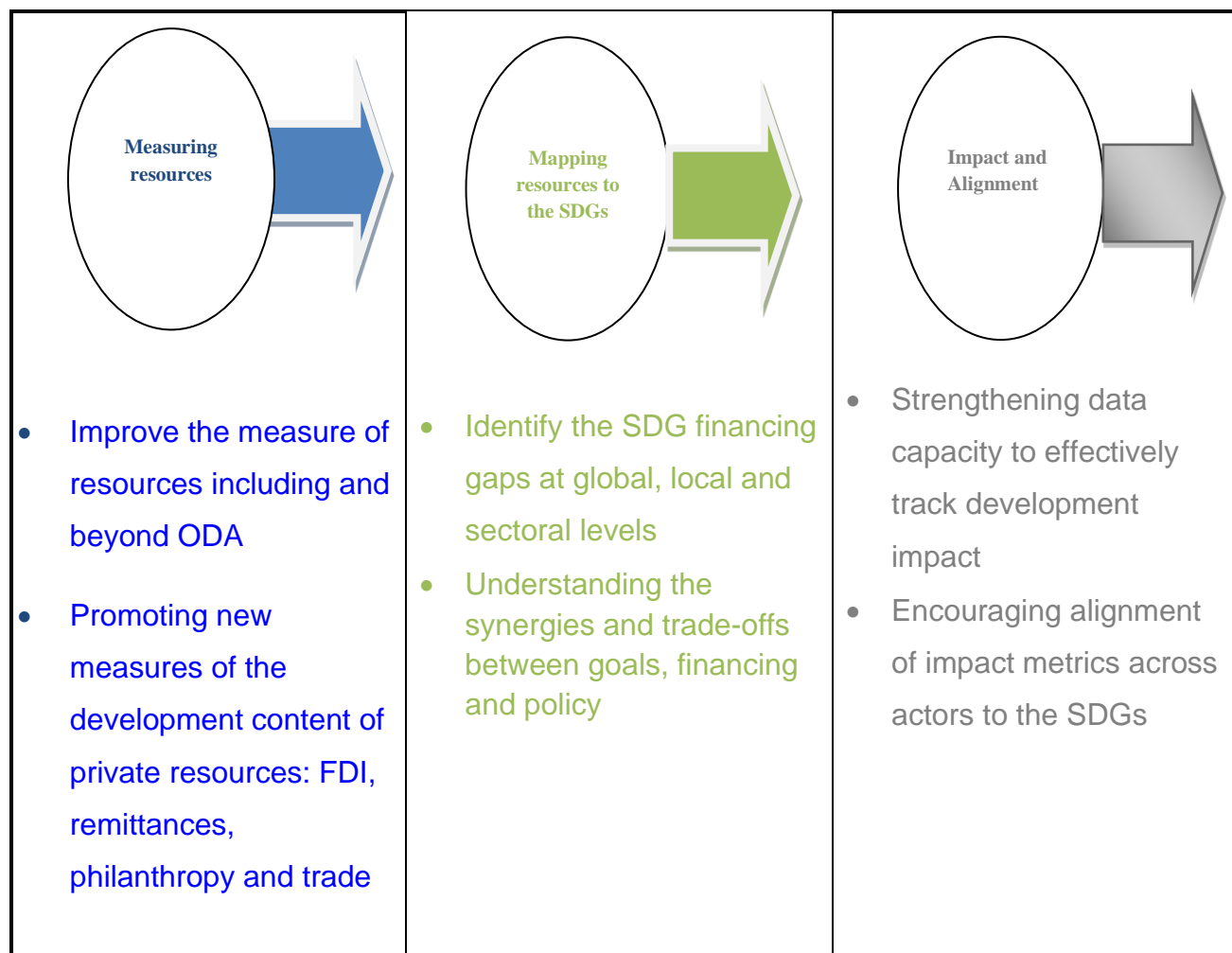
Figure 4: Challenges of financing sustainable development measurement
Source: OECD (2019:23)

Figure 4 above displays the challenges of financing sustainable development measurement in a three-pronged approach. Figure 4 indicates that the three-pronged approaches are measuring resources, mapping resources to the SDGs, and the impact and alignment. According to the figure above, measuring resources improves the measure of resources, including and beyond ODA. In addition, it promotes new measures of the development content of private resources such as FDI, remittances, philanthropy, and trade.

Figure 4 also shows that mapping resources to the SDGs identify the SDGs' financing gaps at global, local, and sectoral levels and understand the synergies and trade-offs between goals, financing, and policy. The last approach in the figure is the impact and alignment, which strengthens data capacity to track development impact effectively and encourages alignment of impact metrics across actors to the SDGs.

In advancing SGDs, ODA has played a crucial role and remains relevant (Espionanza, 2019). Some certain developing countries' income includes official development assistance (ODA), which is known as a significant source of funding and more, particularly in the least developed countries where it accounts for more than two-thirds of external funding. Even in unstable and conflict-ridden environments, ODA is frequently the only way to ensure that essential services are available (Espionanza, 2019). ODA is one of the most delicate mechanisms for funding the SDGs (Pincet, Okabe, and Pawelczyk, 2019).

The OECD (2019) affirmed that the concept of the sustainable development goals originated from the United Nations Conference on sustainable development in Rio de Janeiro in 2012. The primary aim was to create a set of common goals that would address the world's pressing environmental, political and economic challenges (UNDP, 2020).

Figure 5 below displays the relationship between official development assistance (ODA) and sustainable development goals (SDGs):
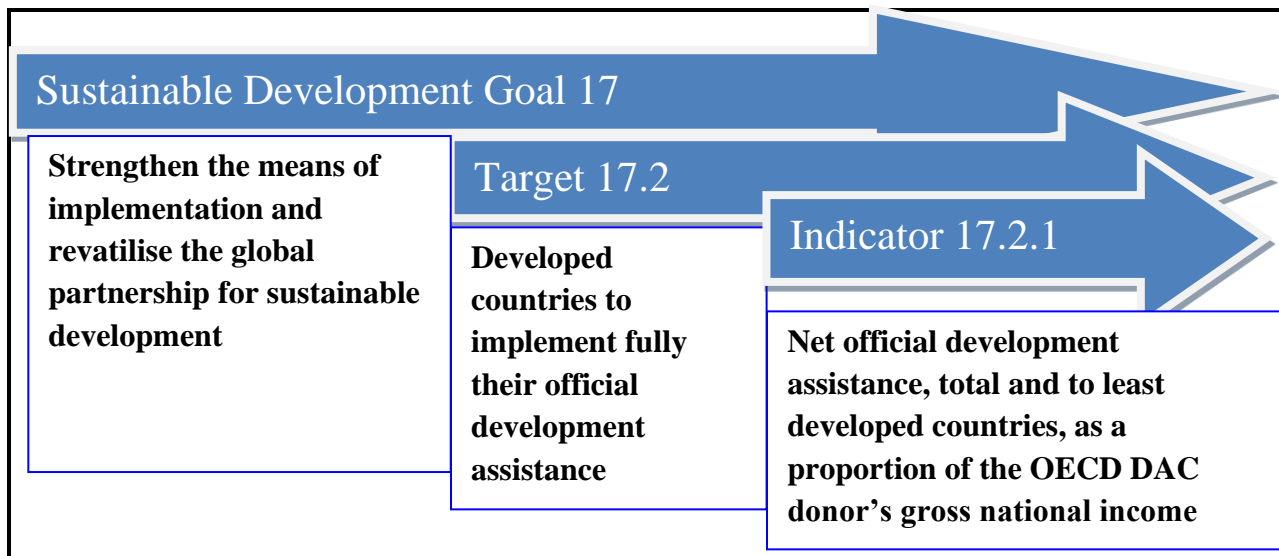
Figure 5: Link between ODA and the SDGs
Source: Espinoza (2019:137)

Figure 5 above shows the link between ODA and the UN's SDGs. The figure above has three tiers: firstly, SDG 17 strengthens the means of implementation and revitalises the global partnership for sustainable development. Secondly, the target SDG 17.2 indicates that developed countries have to fully implement their official development assistance commitments. Lastly, the indicator SDG 17.2.1, the net official development assistance, total and to least developed countries, as a proportion of the OECD DAC donor's gross national income (GNI).

2.2.5 Determinants of ODA

Determinants of official development assistance broadly classified into ten groups: foreign direct investment, government consumption, trade openness, domestic savings, economic growth, consumer price index, natural resources, human capital development, population and foreign portfolio investment as discussed below:

2.2.5.1 Foreign direct investment

Foreign direct investment (FDI) is widespread in governments and foreign cooperation agencies that foreign direct investment (FDI) and official development

assistance (ODA) are complementary sources of capital (Selaya and Sunesen, 2012). However, Selaya and Sunesen (2012) asserted that FDI and ODA are practically unrelated. The FDI decision is comparatively more related to physical capital in the private sector, while the ODA focused on supporting public budgets and funding investment in human capital.

2.2.5.2 Government consumption

Lohani (2004) defines *government consumption* as the amount a state spends on goods and services and employee compensation. Lohani (2004) emphasised that government consumption and official development assistance directly contribute to investment. According to Asongu and Jellal (2013), ODA channeled through government consumption expenditure promotes corruption. Asongu and Jellal (2013) stressed that corruption increased by official development assistance channeled into government consumption spending.

2.2.5.3 Trade openness

As illustrated in neoclassical and endogenous growth theories, trade openness is considered one of the best drivers to promote the necessary technological development (Sakyi, 2011). Trade openness enables developing countries to access more advanced countries' intermediate inputs and technology transfer, facilitates exports by reducing anti-export prejudice, creates positive spillovers by leveraging economies of scale, and promotes productivity and efficiency in domestic and foreign markets (Sakyi, 2011).

Trade openness indicates that trade liberalisation in several countries has increased growth. On the other hand, countries with adverse effects are primarily due to political uncertainty, disadvantaged macro-economic policies, and higher security barriers (Kumar, 2011).

2.2.5.4 Domestic Savings

The two-gap model developed by Chinery and Strout (1966) reported that the two-gap model and claimed foreign aid assists the recipient government in meeting the saving-investment gap. Donaubauer, Meyer, and Nunnenkamp (2016) suggest that ODA and FDI are the substitutes to complement domestic savings and foster economic growth in

low- and middle-income countries. Insufficient domestic savings is one of the main economic challenges in developing countries (Karamuriro, Ssemanda, and Bbaale, 2020). Karamuriro *et al.* (2020) averred that domestic savings are a convenient investment source, consequently influencing the capital formation and economic growth.

2.2.5.5 *Economic growth*

According to Maruta, Banerjee, and Cavoli (2020), the neoclassical growth theory of Solow (1956) is the best model to explain the relationship between official development assistance (ODA) and economic growth. If ODA flows proceed efficiently, more significant capital development will contribute to more remarkable economic development (Maruta *et al.*, 2020). In order to significantly boost economic growth and quality of life, developing countries need to do a lot by implementing and sustaining long-term cumulative approaches to improve physical and human resources, acquire advanced technology and cultivate growth-facilitating institutions. As generally conceived, the role of official development assistance is to support these long-term cumulative processes (Eze, Okpara, and Madichie, 2020). Adebayo, Awosusi, and Ajayi (2020) critically analysed the dynamic aid-growth relationship in Nigeria and found the positive impact between economic growth and aid in the long run. Eze *et al.* (2020) the study supports the two-gap theory, which says foreign assistance can bridge the investment and savings gap.

2.2.5.6 *Consumer price index*

Donmez (2005) stressed that ODA has a strong positive impact on inflation. Additionally, a rise in government spending coincides with an increase in aggregate demand when governments receive an increase in revenue following foreign aid inflows. In response to the increase in aggregate demand, prices increase the consumer price index (CPI) (Donmez, 2005). On the other hand, increased official development assistance to developing countries frequently contributes to growth crises, contributing to higher inflation and damaging the export sector's competitiveness, making inflation rate policy more challenging to implement (Ikpesu, 2020). Gnangnon (2020) highlights that; official development assistance is one of the inflation drivers that receive little attention from scholars. Gnangnon (2020) argues that official development assistance

on trade reduces inflation. Moreover, Gnangnon (2020) found that foreign aid flows on trade surprisingly had a more substantial negative impact on inflation in countries with more diverse export products, more FDI inflows, greater trade policy liberalisation, and trade openness.

2.2.5.7 Natural resources

Reilly (2013) stressed that countries such as China and Japan are best known for using ODA to secure access to strategic natural resources in developing countries. Moreover, ODA has generally been used to serve donor countries' strategic natural resources. Asongu (2019) investigated the linkages between natural resources exports, ODA, and terrorism in 78 developing countries with the data from 1984 to 2008 using the generalised method of moment (GMM). Asongu's (2019) study concludes that there is no significant relationship between ODA and natural resources with the unconditional effect, while terrorism has positive effects on fuel exports.

2.2.5.8 Human capital development

Asiedu and Nandwa (2007) assert that ODA affects education since it boosts skilled labour and improves education investment. Moreover, education aid can enhance the level and the standard of education in the host country (Asiedu and Nandwa, 2007). Donaubauer, Herzer, and Nunnenkamp (2014) argue that ODA for education helps to draw FDI inflows, more, in particular, where schooling and education appear to be deficient.

Donaubauer *et al*. (2014) concluded that ODA education effectively promotes FDI transportation to host countries. The education and qualification of foreign direct investors seem inadequate (Donaubauer *et al*., 2014). Official development aid for education appears to be valuable in improving the variables of educational outcomes. Donaubauer *et al*. (2014) found that ODA for education promotes primary education, even though the effect of ODA is relatively tiny and conditional on local governance.

2.2.5.9 Population growth

Wamboye, Adekola, and Sergi (2014) investigated foreign aid, legal origin, and economic growth in Africa's least developed countries from 1975 to 2010 using the

generalised moment (GMM) method. Wamboye, Adekola, and Sergi (2014) used population growth as a proxy for the rate of labour growth in production. Wamboye et al. (2014) found that the population growth rate is unpredicted. According to Zhukova (2020), ODA is a voluntary international transfer of resources from one country to another. Hence, in the form of either grants or loans, the transfer of official development assistance (ODA) intends to benefit the population of a developing country (Zhukova, 2020).

2.2.5.10   Foreign portfolio investment

Roopa (2020) alluded that due to their ostensibly brief lifespan, foreign portfolio investment (FPI) inflows have a negative perception, not just on the African continent but also worldwide. However, FPI plays a significant role in addressing temporary funding deficits in countries' balance of payment (BOP) (Roopa, 2020). Therefore, FPI remains necessary to pursue a macro-economic strategy that includes the use of FPI to bridge short-term funding shortfalls and secure and retain foreign aid. Until countries become independent of aid agencies, they will continue to use a mix of FDI, FPI, and official debt.

2.3   Foreign direct investment (FDI)

This section outlines the definitions of FDI and critically analyses the FDI framework, why multinational corporations invest abroad, modes of FDI entry, as well as the FDI determinants.

2.3.1 Definitions

FDI is the ownership or exerting the influence of 10 percent or above of such a venture's voting securities or the equivalent interest in an autonomous corporation (Almfraji and Almsafir, 2014). Following Tabassum and Ahmed (2014), FDI is that investment established to attain a lasting interest in the economy of a host country rather than of the investment firm, mainly with the intent of the investment firm being to have an advantageous position in the productive operation of the firm. To be deemed as FDI, the investment must be significant enough to permit the foreign investor to influence the management of the domestic company. In addition, the investment

objective is to establish a long-run correlation with the receiving investment firm (Cossa, 2015).

The above definitions point to similarities in need to have a minimum of 10% share and the intent to establish a permanent interest in an international enterprise. Hence, for this current study, FDI refers to 10% or more investments made by one entity in a home country to acquire a lasting stake in a foreign enterprise. FDI further refers to establishing a business enterprise in a country by a foreign corporation by setting up a new wholly-owned affiliate, acquiring a domestic firm, or establishing a joint venture in the recipient country.

2.3.2 FDI theoretical framework

Several theoretical contributions have been long established and emphasised the beneficial effect of FDI on innovation and eventually, economic development (Loukil, 2016). Since colonial times, foreign companies, mostly from Europe, have invested vast sums of money in Africa to acquire natural resources such as minerals, timber and petroleum (Jibir and Abdu, 2017).

Adam Smith (1976) developed the *theory of international trade*. This economic theory focused primarily on the division of labour between companies coordinated by markets, whereas multinationals realise the division of labour within companies, primarily coordinated by entrepreneurs (Kojima, 1973). International trade policy in direct relation to investment policy is necessary if all trade tariffs and non-tariff barriers are drastically changed, with possible comparative costs (Kojima, 1973).

International trade theory is a formidable foundation for describing and forecasting patterns of international foreign trade and multinational enterprises (MNEs) (Morgan and Katsikeas, 1997). International trade theory indicates that the production factors are inflexible between the countries in the world, complete information is publicly available on opportunities for foreign trade, and the traditional imports and exports are considered the only method of transferring goods and services across national boundaries (Morgan and Katsikeas, 1997).

The eclectic paradigm theory established by Dunning in the 1970s looks at the three drivers of FDI: ownership, location, and internalisation (OLI). Ownership (O) applies to derivative instruments solely controlled by the corporation, at least for quite some time. Either can be transferred at a reasonable cost between transnational corporations, resulting in more enormous revenues or reducing premiums.

As a result of ownership (O), investment firms have a relative advantage in modern technology, brand recognition, and people a resource, which has a favourable and significant impact on FDI inflows. The location (L) of a multinational corporation's activity is one of the most important causal factors. A good location (L) ensures monopolistic benefits for investing corporations through adequate infrastructure and political stability and significantly impacts FDI inflows.

Once the first two targets exist, internalisation (I) occurs; the organisation must exploit this advantage to be successful in connections with at least several factors outside the place of origin. First, internalisation (I) helps an organisation implement its competencies in trade sales, product sales, and business-to-business transactions. Because MNEs frequently externalise FDI, (I) ensures a significant benefit for investment businesses in market share and per capita income to ensure the efficient flow of FDI to the host country. The eclectic paradigm emerges from the attempts to understand why companies invest internationally, where they can invest, and how (Dunning, 1977).

Aliber (1970) suggested the theory of currency areas based on the areas in which economic productivity improved by sharing a single currency with a whole world. A vital tenet of the currency areas theory is to understand fiscal and monetary distinctions among countries (Letto-Gillies, 2007). This hypothesis (currency areas) assumes that countries with weaker currencies have significant benefits in bringing in foreign direct investment to obtain control over market capitalisation rate changes. The currency areas hypothesis deals with foreign direct investment (FDI) occurring in both the host and country of origin in line with the distinctive strength of each currency (Nayak and Choudhury, 2014).

Buckley and Casson's (1976) research resulted in the developing of the notion of ***internalisation theory***. The Internalisation hypothesis needs investment firms to maintain their imperfect market assumption to continue functioning under the standard economic profit premise (Williams, 1997). In addition, however, investment firms should have a maximum investment where all of the advantages of future transactions merely cover the associated costs (Casson, Dark, and Gulamhussen, 2009).

Underlying the internalisation theory is the notion that corporations are designing their internal operations to deliver benefits included in their products (Denisia, 2010). The internalisation theory principle does not require one particular organisation to be defined. Instead, the internalisation theory is the framework for a business that has access to resources from other companies at an equilibrium opportunity cost that will shift based on the quality of the goods and location of acquisition (Buckley and Casson, 2011).

Kindleberger (1969) developed ***the market imperfection theory***, which stressed that the capital markets' exchange rates are flawed. This theory attempts to provide an understanding of the FDI phenomenon. As far as market imperfection is concerned, every divergence from the requisite circumstances is called market imperfection (Jorgensen, Hafsi, and Kiggundu, 1986). Popovici and Calin (2014) divided up distinct types of imperfection, which drew foreign investment into four classes, notably quality variations, with the corresponding variance in marketing approaches and different customer expectations. Secondly, the imperfection in the market exposes capital markets and management abilities to an extreme level of risk. Thirdly, governmental interference imperfections such as tariff and non-tariff barriers, taxes, price controls, profit maximisation, and trade laws contributed to inequality. Last but not least, economies of scale imperfections played a significant role in enhancing the overall productivity and quality.

2.3.3 Why multinational corporations invest abroad

Dunning (1993) argued that three factors lie behind transnational enterprises investing in foreign countries, namely market-seeking, resources-seeking and efficiency-seeking.

Meyer (2005) suggests that the efficiency-seeking targeted places with low labour costs, considering the economic efficiency benefit of the economy's production scale. The efficient market analysis uses cheaper cost locations to target international economies (Meyer, 2005). Market-related factors such as market growth and size and domestic market structure enable host countries to enter the domestic market and invest abroad (Franco, Rentocchin, and Marzetti, 2008). The objective of the resource search is to obtain economical, physical, and human labour resources that are not available in the market and are capable of making cheaper inputs at some location (Faeth, 2009). Direct investments are often resource and market-seeking, whereas sequential investments are typically efficiency and strategic asset-seeking (Faeth, 2009).

2.3.4 Modes of foreign direct investment entry

Inward FDI flows take four forms: export strategy, joint ventures, cross-border mergers and acquisitions (M&A), and greenfield investments.

In light of the imbalanced technology transfer between two strategies (mergers and acquisitions and greenfield investment), MNEs favor M&A when assessing the consequences of the techniques (Kim, 2009). In the case of high fixed costs of investment by greenfield mode of entry, Raff, Ryan, and Stahler (2009) observed that MNEs prefer to invest in greenfield simply because greenfield profitability lowers the selling price for M&A and allows domestic companies to sign up to joint venture investment. In addition, cross-border acquisition permits a company to acquire costly access to the acquired firm's country-specific capabilities. Nagano (2013) highlighted that to maximise profits internationally, and the company expected to choose M&A to extend its operations as a strategy of an enterprise for international market operations.

Price exporting is preferable to a merger for sufficiently low trade rates (Raff *et al.*, 2009). Exports allow the company to internationalize without investing heavily (Gilroy and Lukas, 2006). In contrast to a lower risk profile, exports measured low resource commitment (Gilroy and Lukas, 2006). Nocke and Yeaple (2007) argue that companies can export to foreign markets. The sunk costs of exporting entail distribution networks' fixed research costs on compliance and advertisement (Helpman *et al.*, 2004).

Nagano (2013) claims that by going with greenfield foreign direct investment (FDI), the company avoids the danger of extraction that is related to cross-border M&A. Kim (2009) described greenfield investment as a sort of FDI that is beneficial to the economy since it is generous with welfare funds. Raff *et al.* (2009) further demonstrated that investment in greenfield projects has a dual effect: it determines the external option of acquisition targets and joint venture partners while also affecting the entrance strategy selected. When a company targets a larger market with substantial international experience, it embraces greenfield investment (Gilroy and Lukas, 2006). A greenfield FDI sector adds its skills to international operations (Nocke and Yeaple, 2007). Muller (2007) suggests that the best entry strategy is greenfield investment if the domestic competitor has inferior technology.

Kogut (1988) further stated that a joint venture happens when more than two corporations pool a percentage of their capital in a joint legal entity. Hennart and Reddy (1997) highlighted that joint ventures are encouraged when the prospective target and the buyer belong to various companies. According to Hennart and Reddy (1997), investment firms participate in joint ventures with their partners for risk mitigation. According to Raff *et al.* (2009), domestic companies and multinational corporations (MNCs) prefer joint ventures compared to mergers where investment is a feasible option for greenfield and where other methods of FDI require cheap fixed costs. The market composition for joint ventures remains constant since all companies tend to be autonomous (Raff *et al.*, 2009). The acceptance by the domestic company of a joint venture depends on greenfield's credibility (Raff *et al.*, 2009).

2.3.5 Determinants of FDI

According to the available scholarly literature reviewed, there are at least ten types of FDI determinants that are applicable in this current study: official development assistance, government consumption, trade openness, domestic savings, economic growth, consumer price index, natural resources, human capital development, population, and foreign portfolio investment.

2.3.5.1 Official development assistance

The Official Development Assistance (ODA) is when funds, either loans or grants, are given to specific countries on the development credit authority (DCA) list (Agusty and Damayanti, 2015). Nwaogu and Ryan (2015) employed a dynamic spatial framework to investigate FDI, foreign aid, remittance, and economic growth in developing countries. Nwaogu and Ryan (2015) reveal that ODA and FDI positively affect economic growth. However, according to Donaubauer, Meyer, and Nunnenkamp (2016), FDI and ODA are usually regarded as alternate ways for low- and middle-income nations to complement domestic savings while fostering economic development.

2.3.5.2 Government consumption

Jayasekara (2014) investigates the determinants of foreign direct investment in Sri Lanka using fully modified least squares (FMOLS) from 1975 to 2012. According to Jayasekara (2014), FDI discouragement comes from high government consumption. In many developing countries, consumption expenditure accounts for a large amount of government spending, and in many cases, total government revenue is insufficient to cover at least current expenditure (Jayasekara, 2014). Jayasekara (2014) reveals a negative relationship between FDI and government consumption. Abire (2018) used the ratio of government consumption expenditure to GDP to measure government consumption. The ratio of government consumption expenditure to GDP should directly impact economic growth and foreign direct investment because a higher level of government consumption should translate into more social infrastructure that should support production, growth, and FDI inflows (Abire, 2018).

2.3.5.3 Trade openness

According to Vijayakumar, Sridharan, and Rao (2010), openness to trade is a crucial driver of the FDI in the previous literature. Vijayakumar *et al.* (2010) stressed that much of the FDI is export-orientated and can require an imported additional intermediary and capital goods. In each case, the volume of trade increases, and the openness to trade will generally be a positive and significant driving force for the FDI. Furthermore, Grossman and Helpman (1991), Mina (2007), and Boateng *et al.* (2015) argued that liberal trade regimes and trade openness create positive investment climates.

Therefore, trade openness will boost the economic climate and foster investment leading to further inflows of FDI (Boateng *et al.*, 2015:4).

Nxumalo (2020) highlighted that the neoclassical growth model of Solow (1957) assumes that technological progress is exogenous and thus unaffected by the trade openness of a country, while the recent growth theories of Romer (1986) have been more persuasive about the position of trade openness. The trade openness of a country is related to spillover benefits, including accessibility to manufacturing inputs (both imported and exported), which will ensure the transfer of technology through more significant market sizes and the contagion effect (Nxumalo, 2020).

2.3.5.4 Domestic investment

According to You and Solomon (2015), FDI on the home country's domestic investment takes place in two ways: The first is through financial markets. FDI entails the flow of capital to host countries, implying that a portion of domestic savings flows from the home to abroad. As for the second technique, corporations can influence product markets by relocating manufacturing overseas. Typically, combining domestic and foreign manufacturing would lower costs and enhance the return on domestic output, increasing the likelihood of domestic investment. Duggal (2017) stressed that domestic investment can generate savings, consumption, and employment, while foreign direct investment has the potential to reduce the savings gap in the domestic economy. Ullah, Shah, and Khana (2014) examined the dynamic relationship between domestic investments, foreign direct investment, and economic growth in Pakistan for the period 1976 to 2010 using the Johansen cointegration approach. Ullah, Shah, and Khana's (2014) study reveal a long-term correlation between foreign direct investment, domestic investment, and economic growth.

2.3.5.5 Economic growth

Economists agree that FDI is a significant driver of economic growth (Chiwira and Kambeu, 2016). As a result, countries requiring rapid economic growth are generally encouraged to create conditions attracting foreign direct investment. However, Chiwira and Kambeu (2016) emphasised that the effect of FDI on economic growth is not inevitable and straightforward. It co-depends on how FDI is received and allocated in

the country. Assuming that merely rising FDI inflows would increase economic growth is incorrect. Thus, it is imperious for any country to evaluate the exact effect of FDI on its economy.

Grubaugh (2019) concurs with Chiwira and Kambeu (2016) that the correlation between the FDI - and economic growth nexus has been unreliable. Furthermore, Grubaugh (2019) indicates that several theoretical models exist to enlighten the different FDI methods that promote economic growth, such as spillovers, technology transfers, and human capital development. However, empirical evidence sometimes contradicts these assertions.

2.3.5.6 Consumer price index

According to Zheng (2009), rising inflation economies could discourage outflows of FDI, as inflation will deteriorate the domestic savings and that such investment made nominal means value in terms of receiving country currency, lower purchasing power and efficiency in the host country. Rising inflation will make foreign investors cautious about whether to invest in the host state. Based on the findings of the study by Boateng Hua Nisar and Wu (2015), the inflation rate is an indicator of a country's economic stability, internal economic pressure, and ability to balance its national budget. A tremendous inflation rate lowers the actual value of local currency earnings for inward investment firms. On the other hand, low inflation indicates internal national economic stability and promotes inward FDI flows. Conversely, low inflation demonstrates economic stability within the nation and attracts inward FDI.

2.3.5.7 Natural resources

Senkuku and Ghaeleghi (2015) investigated the determinants influencing foreign direct investment in Tanzania using ANOVA for 300 respondents. According to Senkuku and Ghaeleghi (2015), natural resources cover a comprehensive variety of FDI potentials, such as minerals, tourism attractions, and productive lands, which are possible areas waiting for FDI inflow. However, Senkuku and Ghaeleghi's (2015) study reveals no relationship between natural resources and foreign direct investment inflow in Tanzania. In sub-Saharan Africa, Rodriguez-Pose and Cols (2017) investigated the FDI determinants and governance role for 22 countries. They found that political stability,

lower corruption, and the rule of law attract FDI in Africa. Moreover, Rodriguez-Pose and Cols (2017) argued that natural resources' dominance as a primary source of FDI causes plenty of challenges. To begin with, the fact that FDI flows are determined mainly by the number of natural resources a country has suggests that these flows are significantly more volatile.

2.3.5.8 Human capital development

The quality of the labour force and its cost also concern foreign direct investors (Wahid, Sawkut, and Seetanah, 2009). A well-educated workforce could learn and implement emerging technologies quicker and more constructively (Wahid *et al.*, 2009). However, the effect and performance of FDI depend substantially on domestic policies and, specifically, human capital development, financial, physical, and institutional infrastructure development initiatives (Nxumalo, 2020; Cleeve, 2012). Makoni (2019) affirms that for FDI, it is not the specific educational level that counts but rather the different skills needed for projects to be accomplished. Makoni (2019) further emphasises that human capital development increases creativity in manual labour, research and development (R&D), and data processing ability. Finally, Makoni (2019) concludes that the impact of human capital development on foreign direct investment matters in African economies, as most undertaken projects are primarily labour intensive and capital intensive, thus boosting employment in these countries.

2.3.5.9 Population growth

Tampakoudis, Subeniotis, Kroustalis, and Skouloudakis (2017) argued that population growth is another vital determinant of attracting inward FDI. The above said so because enormous populations offer many prospects for improved sales of goods and services (a potential domestic market), whereas a substantial human resources pool is also available. Tampakoudis *et al.* (2017), for example, classified FDI into three categories: market-driven, resource-driven, and efficiency-driven, and identified population growth as one of the most critical characteristics that positively affect each of these categories. On the other hand, Nagano (2013) argued that the rise in the population growth of the host country makes it more appealing for both cross-border M&A and greenfield FDI investors to invest in the country.

According to Zheng (2009), FDI location for horizontal market seeking depends on population growth. In addition, the size of the population growth directly influences revenues and return on investment, and advanced market growth indicates possibly higher opportunities and prospects that are more enticing (Zheng, 2009). Consequently, foreign direct investment (FDI) flows into countries with larger markets and higher economic growth rates. Furthermore, FDI may take advantage of increased economies of scale and reap the financial rewards of ownership (Zheng, 2009). Likewise, Vijayakumar, Sridharan, and Rao (2010) concur that an investing country with a steady, high and the sustainable macroeconomic situation will obtain extra inflows of FDI than a more volatile economy.

2.3.5.10   *Foreign portfolio investment*

Nwosa and Adeleke (2017) used the E-GARCH approach to analyse the determinants of FDI and FPI volatility in Nigeria. The study by Nwosa and Adeleke (2017) confirmed that FDI and FPI volatility have a positive and significant impact on each other. Furthermore, Marozva and Makoni (2018) opined that foreign direct investors use foreign portfolio investment to test the waters in questionable host countries before making more permanent investments, thus confirming the direction of causality between inward FPI and FDI. More recently, Nxumalo (2020) assessed the relationship between FDI and FPI, in the presence of solid institutional quality, in twelve emerging market economies, from 2000 to 2017. Nxumalo (2020) concluded a positive relationship between FDI and FPI, with institutional quality playing an intermediation role.

2.4 Economic growth

The section provides the definitions of economic growth and discussed the economic growth theoretical framework.

2.4.1 Definitions

According to Ajide (2014), causes of economic growth, causes of unequal growth rates globally, and factors contributing to excessive national growth are some of the most important economic topics to date.

Economists say that economic freedom is the absence of state coercion and restraint over and above what is necessary for citizens to safeguard and maintain their liberties (Ajide, 2014). It is important to note that systems promoting a free market, competition in the enterprise and protecting property rights are essential to fulfilling economic development. An agreement is widespread that the economic growth of a sound financial sector increases the number of resources put to good use, leading to higher GDP.

Growth in the country's GDP per capita or other metrics of aggregate income is economic growth (Rana and Barua, 2015). Rana and Barua (2015) explained that the increases in population and the per capita amount of goods measured economic growth. In the current study, growth in GDP measured economic growth for selected African countries. To sum up, economic growth refers to an increase in economic output compared to an earlier period.

Nominal or real (inflation-adjusted) GDP also measured economic growth (Rana and Barua, 2015). Aggregate economic growth can be traditionally measured by either gross national product (GNP) or gross domestic product (GDP), whereas alternative metrics are often employed. The World Bank (2015) defined economic growth as an essential element in poverty reduction and refining the lives of the world's poorest. In addition, economic growth increases the demand for labour, which seems to be the key and quite often the only resource of the impoverished (World Bank, 2015).

This study will use GDP growth (annual %) lagged by one period to measure economic growth. The rise in per capita gross domestic product (GDP) or other metrics of aggregate income is considered economic growth (Rana and Barua, 2015). ODA-economic growth has a favourable association in the short term (Adams and Atsu, 2014). Gui-Diby (2014) suggests that FDI is the primary driver of economic growth and is essential in catalyzing conditional economic unions in East African countries. Gui-Diby's (2014) study showed that FDI had a favourable link with economic growth in East African countries.

2.4.2 Economic growth theoretical framework

Solow developed the *neoclassical growth theory* in 1956. According to Zebregs (1998), FDI comes nearby to the definition of foreign capital in the ordinary neoclassical model, which would be motivating to realise whether the neoclassical theory can explain the FDI flows designed for emerging countries. Furthermore, suppose the neoclassical model occurred plainly, with only capital and labour as inputs and similar technologies internationally. In that case, the less impoverished countries should have advantageous rates of return to capital and accordingly attract foreign capital (Zebregs, 1998).

FDI in less developed countries has vividly improved. However, the circulation of FDI flows is exceptionally not level, with only a minor number drawing enormous amounts of foreign capital (Zebregs, 1998). Proponents of the neoclassical approach argued that the critical weakness in the theory was that it did not distinguish between portfolio and direct investments (Asheghian, 2010). According to Asheghian (2010), investments will dwindle, and interest rates will increase in the non-existence of international investment.

The Mercantilists theory from 1650 until 1776, the mercantilists was widely known when Adam Smith published the book Wealth of Nations. Britain achieved rapid, highly trade-and trade-based economic growth during the enlightenment period. According to the Mercantilists, the export surplus is a source of growth, while the balance of payments (BOP) shortfall is considered a poor variable in growth. Thus, imports are discouraged from having export surpluses, and exports are encouraged to secure economic growth (Kar and Pentecost, 2000). However, petty (1986) is among the first Mercantilist theorists to recognise the adverse influence 0f a country's increase in the influx of gold bullions. According to Petty (1986), inflation is caused by an upsurge in the gold bullions inflow, decreasing a country's economic development. He further explains that inflation is reducing a nation's international competitiveness.

The increase in inflation makes the goods produced locally on the international market expensive, which decreases the demand for the international product. In these instances, exports decline, accompanied by a fall in economic growth (Kar and Pentecost, 2000). Furthermore, the principle of valueless and moneyless can be traced back to some regions in the world in which the export surpluses of minerals or coins are

analogous to the buildup of gold bars and coins. The above caused a spike in the price level because of the market's vast number of bars and coins. Therefore, though Mercantilists agree that a country has a net export surplus, they are cognizant of the further price rise the country experiences because of that surplus (Kar and Pentecost, 2000).

The Classical theory, the 1776 Wealth of Nations publication considered the discovery of the Classical Economic idea. Such an economic philosophy globally known in the 1936 issue of the primary employment philosophy, value of money, and interest questioned by Keynes (1936). Early great philosophers, especially Ricardo (1817) and Smith (1976), followed Quesnay's (1750) social and economic class analysis revising such groups as capitalism. Based on classical economists' self-interest postulation, capitalists compete with each other even in the labor market. This rivalry raises the cost of labour. The increasing production cost by raising labour wages reduces the profit of the workers who benefit from capitalism. The rate of profit reduction hinders the investors who are the engine of wealth formation. The price rise would consequently impose a harmful effect on the competitiveness of the capitalists, leading to a decrease in the rate of growth (Kar and Pentecost, 2000).

Keynesian theory, Richard Lipsey (1960) became the first Keynesian economist to provide a philosophical underpinning for the Phillips curve. Lipsey's (1960) study showed that compensation positively and significantly related to labour productivity and that labour demand negatively correlates with unemployment. Snowdon and Vane (2005) highlighted that labour and unemployment interactions are nonlinear. Such labour productivity is boosting the overall price level. In Keynesian theory, the expectation of full employment is reduced to constant income and zero inflation; an expansionary fiscal policy increases production, jobs, and revenue. For Keynesians, wages and costs do not change, so it takes time to stabilise the economy. Therefore, the short-term correlation between inflation and economic growth is not evident (Snowdon and Vane, 2005).

2.5   Empirical evidence on ODA, FDI and economic growth

This section intended to carry out a thorough study of the empirical studies performed in several geographical and economic clusters, using different analytical techniques on official development assistance, foreign direct investment and economic growth. The section begins with empirical studies on ODA, FDI, and economic growth outside the African region, and then moves on to studies on African regions.

Zobair and Uddin (2019) investigated the relationship between ODA, FDI, economic growth, and foreign remittance in Bangladesh. Zobair and Uddin (2019) identified the relationship between FDI and economic growth; however, the study of Zobair and Uddin (2019) did not explore the reason for such a relationship. For this reason, the current study examined the long-term relationship between ODA, FDI, and economic growth and seeks to explore the reason for such relationship. Zobair and Uddin's (2019) study employed the ARDL approach to answer the research objectives of their study from 1976 to 2017. Zobair and Uddin (2019) stressed that solid economic growth is required to control unemployment, reduce poverty, improve the standard of living, and promote educational quality and health conveniences in developing economies.

The study of Zobair and Uddin (2019) is in line with the growth model established by Solow in 1956. Zobair and Uddin (2019) recommended that Bangladesh authorities focus on creating a more user-friendly investment environment to ensure the continuity of foreign capital flows. Based on the recommendation of Zobair and Uddin (2019) to Bangladesh authorities, one can relate it to the African concept of a user-friendly environment. For example, African political instability has negatively impacted foreign direct investment; therefore, African countries should create a more user-friendly investment environment. The study by Zobair and Uddin (2019) found FDI as an important external factor for economic growth, while ODA played a negative role in economic growth. Zobair and Uddin (2019) employed the ARDL approach, which does not address endogeneity issues. The GMM approach, commonly used for panel data, produces reliable results in many forms of endogeneity such as predictability, unobserved variability, and omitted variables.

Hence, the recent study performed by Rao, Sethi, Dash, and Bhujabal (2020) employed the system GMM in South East Asia and South Asia to investigate the relationship between ODA, FDI, and economic growth between 1980 and 2016. The study of Rao *et al.* (2020) indicates that GMM estimates of ODA demonstrate a negative correlation with FDI, demonstrating the long-term negative impact of over-dependency on ODA. As a result, Rao *et al.* (2020) employed Harrod-Domar models and Chenery and Strout's (1966) standard two-gap models. The two-gap theory highlighted the investment-saving gap for a required level of growth, import requirements, and foreign exchange profits. In addition, Rao *et al.* (2020) revealed that FDI had a favourable impact on economic growth in South East Asia and South Asia from 1980 to 2018. Therefore, it is recommended in South East Asia to attract FDI inflows, absorb them, and reap their benefits while maintaining higher economic growth. Furthermore, the economies should focus on channeling ODA into the private sector for domestic investment, macroeconomic stabilisation, trade openness, and efficient utilisation of ODA flows (Rao, Sethi, Dash, and Bhujabal, 2020).

Moreover, the study by Rao *et al.* (2020) did not consider the threshold analysis. Nevertheless, the threshold technique analysis is a valuable tool for quantifying and incorporating preferences in benefit-risk analysis. The current study then introduces the threshold technique analysis to determine the ODA threshold level required to trigger significant FDI inflows in selected African countries.

According to this research, no other studies looked at ODA, FDI, and economic growth globally; hence, this study reviewed other studies that looked at ODA and economic growth, ODA and FDI, FDI and economic growth, and FDI and ODA.

Kang (2014) investigated if Korea's ODA promotes its economic growth by employing the Hausman-Taylor Method and system GMM with data period interest ranging from 1988 to 2012. Kang's (2014) results indicated a positive influence on total ODA, loans, grants, and economic assistance. However, non-economic (humanitarian) assistance negatively influenced economic growth. Kang's (2014) findings are consistent with the widely accepted two-gap theory developed by Chinery and Strout in the 1960s. However, even though the study findings of Kang (2014) are in line with the two-gap

theory known as the dual-gap theory, which this current study also employed, Kang's (2014) study failed to address the critical determinants of ODA. Africa according to literature has sluggish economic growth, financial and infrastructure gap; hence the current study seeks to identify and understand determinants that drive ODA and FDI to fill the financial and infrastructure gap. According to the study findings by Yoon and Moon (2014), the two-gap theory is equally valid.

Yoon and Moon (2014) employed cross-sectional time-series data analysis with data spanning 1991 to 2011. In addition, Yoon and Moon (2014) found that oil exporters, democratisation, and human rights show a significant positive correlation with ODA. The fundamental limitation of the cross-sectional analysis is that the temporal relationship between result and exposure is impossible to ascertain because they are both simultaneously evaluated. Cross-sectional data analysis has less information, variability, and efficiency than panel data analysis. Cross-sectional data cannot detect statistical effects, but panel data can.

From the above said, Hossain (2014) employed panel data analysis to investigate the relationship between foreign aid, better known as ODA, and economic growth in Bangladesh, focusing on the period from 1980 to 2012. A study by Hossain (2014) defined ODA as the economic assistance from one nation to another nation anticipated to offer humanitarian relief in crises, increase economic growth, or fund military expenditure. Bangladesh obtains its ODA mainly in food aid, commodity aid, and project assistance. Hossain (2014) found that ODA had a positive and statistically significant effect on the economic growth of Bangladesh. The study findings of Hossain (2014) were consistent with the public interest theory developed by Pigou (1932), which undertakes that the economic markets are very delicate to ODA and economic growth.

Hence, Hossain, Mitra, and Abedin (2018) employed a Vector Error Correction Model (VECM) to investigate the relationship between ODA and economic growth in Bangladesh from 1972 to 2015. As a result of the study analysis of Hossain, Mitra, and Abedin (2018), ODA has a detrimental impact on Bangladesh's economic growth both in the short and long term run. Hossain *et al.* (2018) identified the negative impact between ODA and economic growth and failed to explore the reasons for such a

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relationship. This current study examined and analysed ODA, FDI, and economic growth long-term relationships and provided reasons for such relationships. Hossain *et al.* (2018) contradicted the two-gap theory, which states that the saving gap promotes economic growth in developing countries. According to Hossain *et al.* (2018), a lousy policy environment and low human capital reflected the motives for the lack of efficacy of ODA for economic growth in developing economies and hamper economic growth.

A study from another country conducted by Arndt, Jones, and Tarp (2015) was reviewed in this current study to determine if it is in line with Hossain *et al.* (2018) results. Arndt, Jones, and Trap (2015) used simultaneous equations to assess the ODA's long-term contribution to economic growth in Denmark and Finland. The study of Arndt *et al.* (2015) used time-series data analysis from 1970 to 2007 and found that ODA and economic growth had a positive association over the long run, which is in line with the two-gap theory. Furthermore, ODA has done the following in the last four decades: It has helped speed up growth, support transformation, enhanced social conditions, and cut poverty in Denmark and Finland. Finally, ODA helped bring about favourable economic growth by helping to stimulate factors such as the increases in the volume of material assets and the stock of human capital. However, Arndt, Jones, and Trap's (2015) study are limited in assessing the relationship between ODA and economic growth. Therefore, this current study introduces a broader aspect by looking at the relationship between ODA, FDI, and economic growth.

Likewise, Sothan (2018) investigated the relationship between ODA and economic growth in Cambodia by employing the ARDL model from 1980 to 2014. Sothan (2018) revealed that trade openness had favourable short- and long-term effects on economic growth while domestic investment had long-term positive economic growth. In contrast, ODA had a positive short-term effect on economic growth. These data findings of Sothan's (2018) study support the neoclassical growth theory and the Keynesian theory. Robert Solow's neoclassical growth theory in the 1950s proposes that the relevance of savings helps determine how much raw materials can be accumulated and produced. Based on this theory, ODA plays a crucial role in promoting physical capital through its domestic savings contribution in the nations where physical capital is lacking. On the

other hand, based on the Keynesian theory, ODA might increase government consumption, which is the crucial economic growth determinant. This can leads to a proposition that ODA has a positive relationship with economic growth.

Moreover, Momita, Matsumoto, and Otsuka (2019) examined the relationship between ODA on economic growth in Japan using a panel data analysis of 117 countries from 1980 to 2010. Momita *et al.* (2019) highlighted that Japanese ODA positively contributed to their economic growth. The main benefit of Japanese ODA involved a focus on the economic infrastructure and self-help, geographical focus, and an enormous amount of concessional loans in Asia (Momita *et al.*, 2019). The study of Momita *et al.* (2019) was so crucial that it changed the strategies of donor countries towards providing ODA to countries with suitable policy environments. Momita *et al.* (2019) align with the two-gap theory, which indicates that conditional effects such as the saving gap, good policy environment, and the foreign exchange gap promote economic growth.

In another study that explored the relationship between ODA and economic growth in Bangladesh, Golder, Sheikh, and Sultana (2021) used the annual data covering the period 1989 to 2018. In Golder, Sheikh, and Sultana's (2021) study, the ARDL model was used to answer their research questions. Golder *et al.* (2021) also examined how ODA contributes to capital formation and domestic investment by bridging the savings gap and supporting economic growth in developing nations. According to Golder et al. (2021), the big push theory prominent stipulates the obligation of a minimum level of high investment figure for undertaking economic growth impediments in a developing country. The study of Golder *et al.* (2021) shunned the threshold analysis to determine the minimum ODA threshold level. The current study attempts to close that gap by determining the minimum ODA threshold level. Golder *et al.* (2021) revealed ODA's substantial and robust effect on economic growth. Moreover, domestic investment contributes significantly to Bangladesh's economic growth. Golder *et al.* (2021) study also indicated that trade openness has a significant favorable influence in the short run but that its impact is insignificant in the long run.

Based on the empirical evidence reviewed above, Badwan and Atta (2021) stressed that the scholarly community currently is divided on the empirical results on the relationship between ODA and economic growth. Badwan and Atta (2021) conducted a study in Palestine to examine the relationship between ODA on economic growth by considering time series data of the last twenty years from 2000 to 2019. Badwan and Atta (2021) employed time series analysis. Time series analysis has a variety of flaws, including difficulties in generalising from single research, getting proper metrics, and effectively finding the correct model to represent the data. Hence, this current study employed panel data analysis as it offers more information, variability, and efficiency. The study by Badwan and Atta (2021) employed the Partial adjustment model, which describes the optimal behaviour in the face of adjustment cost. Badwan and Atta (2021) highlighted that ODA to developing economies had been a crucial source of development finance in soft loans and grant loans for projects development and aid to meet emergencies and humanitarian requirements. The theoretical underpinning proposed by Badwan and Atta (2021) followed the growth model, which discovered that ODA has a positive and non-significant relationship with the gross domestic product (GDP). The outcome is insignificant because ODA in Palestine from 2000 to 2019 for humanitarian and social welfare was more than production activities in the real sectors.

Taking a different view from examining the relationship between ODA and economic growth, Kang and Won (2017) examined the relationship of Korea's ODA on FDI using a panel dynamic investigation for the period 1995 to 2012. A company's internalisation of its core operations is proxied by comparing the costs of contracts with those of outsourcing contracts (Kang and Won, 2017). In addition, ODA can reduce the expense by assisting an institutional development recipient. A study by Kang and Won (2017) indicated that Korea's total FDI stock in the host countries is positively influenced by ODA, infrastructural assistance, and technical assistance, while FDI in service had a non-significant impact on infrastructure. Technical assistance services are positive and significantly linked with service sector FDI.

Furthermore, the findings of the study of Kang and Won (2017) relied on the eclectic paradigm theory. The eclectic theory explains the investment decisions of MNEs.

However, the study of Kang and Won (2017) failed to formulate appropriate ODA policies favourable for private capital flow; hence the current study seeks to close the gap by formulating an ODA disclosure and transparency framework.

Shifting from the view of ODA and FDI, Feeny, Iamsiraroj, and McGillivary (2014) employed panel data analysis to examine the influence of foreign direct investment (FDI) on economic growth in 209 countries in the Pacific region between 1971 and 2010. The study of Feeny *et al.* (2014) indicated that the overall findings of FDI in the region result in a small positive economic growth return. FDI is essential for poverty reduction and increasing the growth of economies in developing countries, notably for small countries far from the primary trading markets (Feeny *et al.*, 2014). According to Feeny *et al.* (2014), long-term economic growth remains unchanged in the Pacific region if FDI does not affect technical advances. The study of Feeny *et al.* (2014) excluded the investigation of FDI determinants to increase the ways of investigating the economic growth impact of FDI in the Pacific region.

According to the empirical literature, Africa has slow economic growth and a financial and infrastructural deficit; hence the current study aims to identify and understand the drivers that drive ODA and FDI to address these gaps. Feeny *et al.* (2014) study follows the neoclassical and endogenous growth models. The neoclassical growth model shows that FDI affects only the income level. On the other hand, the endogenous growth model emphasises that FDI will enhance economic growth if it increases productivity through externalities and spillover effects such as advances in know-how and human capital.

Moreso, Hong (2014) used dynamic panel data to re-evaluate the relationship between FDI and economic growth in China and the critical FDI factor from 1994 to 2010. According to Hong (2014), economies of scale, pay rates, human capital, geographical disparities, and the degree of infrastructure all have a favourable impact on FDI. Hong (2014) has also advocated that when technological spillovers from international trade take place, these may result in further FDI, as FDI encourages the increase in economic growth worldwide. According to the economic growth theory, Hong (2014) set the control variable as capital stock per capita. The fixed-assets percentage signifies capital

stock per capita to the average number of industrial employees. It is supposed to be a positive and significant element of economic growth.

In another study by Popescu (2014), the relationship between FDI and economic growth was examined in Central and Eastern Europe (CEE) using previously completed research on FDI and economic growth. FDI strengthens domestic funds to cover all ownership and capital composition (Popescu, 2014). The study by Popescu (2014) found a positive connection between FDI and economic growth in CEE. The relationship between FDI and economic growth determinants was reviewed by Popescu (2014) using previous studies. In the study of Popescu (2014), previous completed research models, on the other hand, neglected to consider the impact of the ODA threshold required to spark substantial FDI inflows. As a result, the current study adds to the economic growth literature in the following ways: (1) the study uses a threshold regression analysis model to adjust for the ODA threshold, (2) the study clearly outlines and analysed ODA and FDI determinants, and (3) the study investigates the link between three variables (ODA, FDI, and economic growth) to give comprehensive aspects. Previous growth studies concentrated on finding internal and external factors that promote growth in emerging economies; however, these analyses did not consider the minimum ODA threshold required to spark significant FDI inflows into African countries.

While Iamsiraroj, Sasi, and Doucouliagos (2015) attempted to analyse the link between FDI and growth in less developed countries, they employed Meta-analysis to examine 946 estimates from 140 empirical studies. FDI is a crucial source of funding, knowledge transfer, and economic growth (Iamsiraroj *et al.*, 2015). Like Popescu (2014), Iamsiraroj *et al.* (2015) in Australia revealed that FDI and economic growth showed a strong positive link. In addition, Iamsiraroj *et al.* (2015) indicated that FDI in underdeveloped countries has a stronger correlation with growth. Market size and growth rate are the most prominent factors in Iamsiraroj *et al.* (2015) study, and the findings follow the eclectic paradigm theory. A meta-analysis is a statistical tool for combining, integrating and synthesising several research findings (Sasi *et al.*, 2015). However, meta-regression analysis has several weaknesses, including publication bias and

heterogeneity, and only deals with the main effects. The study of Sasi *et al.* (2015) could have used the panel data analysis to reduce multicollinearity by boosting degrees of freedom and specific attributes. The current study employed panel data analysis for such benefits.

Hence, Iamsiraroj (2016) used panel data from 1971 to 2010 in Australia to examine the relationship between FDI and economic growth. Iamsiraroj (2016) pointed out that FDI helps host countries absorb new contributions and modern technologies into their inventive structures. However, Iamsiraroj (2016) study highlighted that other factors such as labour force, trade openness, and financial independence are also important determinants of FDI. This can, in turn, encourage additional economic growth. The empirical findings of Iamsiraroj (2016) supported the endogenous growth theory. When it comes to human capital accumulation, the theory of endogenous growth considers these kinds of capital (Iamsiraroj, 2016). However, Iamsiraroj (2016) eliminated the threshold analysis, recognised for examining the sensitivity of judgments to future changes in evidence. The current study seeks to close that gap by employing threshold regression analysis.

Using the panel data analysis, Pegkas (2015) examined the relationship between FDI on economic growth in Eurozone countries from 2002 to 2012. Pegkas (2015) study revealed a favourable long-term cointegrating relationship between FDI and economic growth. According to the study findings by Pegkas (2015), FDI is a vital component that favourably contributes to economic growth in the Eurozone countries. Overall, the empirical results of the Pegkas (2015) study align with the theoretical reasons that FDI is a key economic growth factor. The Pegkas (2015) study's empirical results followed Dunning's eclectic paradigm model from the 1970s. In addition, Pegkas (2015) stressed that by bringing additional investment capital, access to modern technology, and managerial capabilities, FDI inflows promote economic growth.

Excluding panel data analysis with its benefit mentioned above, Gul and Naseem (2015) analysed the impact of FDI and trade openness on the economic growth of Pakistan using time series data ranging from five years from 2008 to 2013. Cointegration analysis, regression analysis, correlation, and Durbin Watson test were employed to

analyse Pakistan's long-run FDI and economic development relationship. Results in the study of Gul and Naseem indicated the positive long-run FDI relationship between domestic capital, trade openness, and economic growth in Pakistan. Gul and Naseem (2015) stressed that gross domestic product (GDP) is an economic growth proxy. Therefore, FDI increased GDP in Pakistan to achieve high economic growth policies reformulation, which is sorely required to attract large portfolios of FDI into the country. The study of Gul and Naseem (2015) followed the neoclassical and endogenous growth theory, which explains the causality flow from FDI to economic growth.

Ali and Malik (2017) avoided the neoclassical and endogenous growth theories, which are known to be capable of explaining the causation flow from FDI to growth. Similar to Kang and Won (2017), the study of Ali and Malik (2017) also followed the theory of the eclectic hypothesis, whereby the investment company's monopoly is secured by political stability and infrastructure, and FDI flows have a positive and substantial effect. In this case, Pakistan was a politically steady nation, and foreign investors were more fascinated and attracted to Pakistan (Ali and Malik, 2017). Ali and Malik (2017) used the Augmented Dickery Fuller (ADF) model to examine the short and long-term impact of FDI on Pakistan's economic growth from 1976 to 2015. The study of Ali and Malik (2017) revealed a favourable association between FDI and Pakistan's economic growth in the short term but a negative relationship in the long run. The study of Ali and Malik (2017) shunned the investigation and analysis of FDI drivers, which would have assisted authorities in determining which variables to focus on to attract FDI in Pakistan. According to the literature, Africa has slow economic growth and a financial and infrastructure gap, so the current study intends to identify and comprehend the drivers that drive ODA and FDI to fill the financial and infrastructure gap. FDI has brought many positive factors to the economic growth of a country such as Pakistan, including knowledge, skills, the life cycle of the country's people, sustainable environmental policies, commodity development, and job opportunities both nationally and globally, peace and tranquility, investment policies, public and private sector projects (Ali and Malik, 2017).

Like Ali and Malik (2017), Bermejo Carbonell and Werner (2018) employed panel data analysis to assess if FDI promoted economic growth in Spain from 1984 to 2010. The study of Bermejo Carbonell and Werner (2018) found that FDI had a favourable impact on economic growth in Spain. FDI into Spain was boosted by a well-developed infrastructure aligned with the eclectic paradigm theory (Bermejo Carbonell and Werner, 2018). However, in contrast to the eclectic paradigm theory, low labour costs and low trade openness did little to attract FDI to Asian countries (Ali and Mingque, 2018). With the assistance of a VECM, Ali and Mingque (2018) evaluated the relationship between FDI and economic growth in Asian developing countries from 1990 to 1994. Ali and Mingque (2018) revealed that FDI and economic growth do not have a one-way or a two-way relationship in the short term, but FDI has a positive and considerable impact on GDP in the long run.

To explore the influence of increasing financial development on the effect of FDI on economic growth in the USA for the 62 middle- and high-income economies, Osei and Kim (2020) used the GMM and Dynamic panel threshold model for the period 1987 to 2016. Because Osei and Kim (2020) excluded the threshold analysis, which is known for testing the sensitivity of judgments to future changes in evidence, the current study used it. It was shown in the study of Osei and Kim (2020) that improving a country's financial market development levels yields substantial positive effects on economic growth. The benefits of FDI bring not only the extra capital but also new technology and expertise, better managerial and marketing skills, and horizontal and vertical spillover effects from one company to another through integration and vertical and horizontal expansion (Osei and Kim, 2020). According to the study done by Osei and Kim (2020), which supported the notion that increased FDI economic growth but showed that the growth impact of FDI vanishes once the ratio of private sector credit to GDP is more than 95.6%. The study of Osei and Kim (2020) has found that expanding credit in the private sector generally correlates with higher economic growth.

The empirical research investigated and analysed ODA, FDI, and economic growth in the context of the African region are discussed below:

Nwaogu and Ryan (2015) employed a dynamic spatial framework to analyse the effects of ODA, FDI, economic growth, and remittances in 53 African countries. According to Nwaogu and Ryan's (2015) analysis, ODA and FDI contribute significantly to African economic growth. The study finding of Nwaogu *et al.* (2015) is in line with the growth theory literature, which states that countries with a low baseline GDP will rise relatively quickly, enabling them to close the gap to economies in the developed stage economic growth. In addition, Nwaogu *et al.* (2015) stressed that inward FDI gives emerging countries access to superior technologies, boosting GDP. In contrast, ODA boosts investment rates by augmenting available resources in the recipient country. According to Nwaogu and Ryan (2015), the only variables that have a constant impact on economic growth in Africa are initial GDP, trade openness, and government consumption. The relationship between ODA, FDI, and economic growth determinants used the traditional econometric techniques such as fixed and random effects, GMM, and ordinary least squares (OLS) over the years (Nwaogu and Ryan, 2015). These models, however, fail to account for the influence of the ODA threshold required to trigger significant FDI inflows. As a result, the current study contributes to the literature on economic growth in the following way: the study controls for the ODA threshold by applying a threshold regression analysis model. Previous growth studies focused on identifying internal and external factors that encourage growth in emerging economies; however, these analyses did not account for the minimal ODA threshold required to trigger significant FDI inflows into African countries.

Alemu (2017) investigated the impacts of ODA versus FDI on economic growth in African countries for 15 years. The GMM method, which is known for addressing the issue of endogeneity and the dynamic nature of economic growth, was employed in the study of Alemu (2017). Alemu's (2017) study indicated that middle-income African countries have a positive and significant relationship between FDI and economic growth. Furthermore, Alemu (2017) revealed the positive relationship between ODA and growth in low-income African countries. Alemu's (2017) findings are consistent with the growth theory literature, which suggests that countries with a low baseline GDP will grow relatively quickly, allowing them to narrow the gap with economies in the advanced stage of development. However, Alemu's (2017) study failed to provide the African

authorities with the policy implication; hence, the current study introduced the ODA disclosure and transparency compliance framework seeking to close that gap. In addition, Alemu (2017) did not consider the key ODA and FDI determinants and threshold analysis. It is also, for this reason, that this current study clearly outlined, discussed, and analysed the determinants of ODA and FDI and the minimum ODA threshold level required to attract significant FDI inflows seeking to fill the financial and infrastructural gap.

Likewise, Ozekhome (2017) also examined the impact of ODA, FDI, and economic growth in the Economic of West African States (ECOWAS) region. Ozekhome (2017) employed a GMM estimator for 2000 to 2015 to examine the relationship between ODA, FDI, and economic growth. Trade openness, FDI, real gross domestic capital formation, human capital, and lagged real GDP promote economic growth. Ozekhome's (2017) study results followed the endogenous growth model. The inadequacy of neoclassical theories to explain the underlying qualities of economies that drive them to grow over long periods gave rise to the endogenous growth model (Ozekhome, 2017).

Furthermore, ODA and FDI revealed a positive relationship with economic growth (Ozekhome, 2017). Ozekhome's (2017) study finding is consistent with the savings and foreign exchange gap (two-gap theory) for the claim that foreign capital, such as ODA and FDI, can drive economic growth. The savings gap arises from low domestic savings, which fall short of the required investment. In contrast, the foreign exchange gap arises from most developing countries' balance of payment deficits caused by their over-reliance on primary commodity exports, export instability, and internationally transmitted shocks (Ozekhome, 2017). However, Ozekhome's (2017) study intentionally shunned investigating the key ODA and FDI determinants and ODA threshold level required to trigger significant FDI inflows. According to the literature, Africa has slow economic growth and a financial and infrastructure gap, so the current study intends to identify and comprehend the drivers that drive ODA and FDI to fill the financial and infrastructure gap.

According to this research, there is a paucity of studies that integrated and examined ODA, FDI, and economic growth in Africa; hence, this study reviewed other studies that

looked at ODA and economic growth, ODA and FDI, FDI and economic growth, and FDI and ODA, respectively.

Gyimah-Brempong and Racine (2014) examined the relationship between ODA and economic growth in Africa using the two-gap theory and the modern growth theory. When the investment of the investing firm increases, making it conceivable to import complementary inputs, promote the productivity of current inputs, or refine investment institutions and the policy environment, the two-gap theory and modern theory apply (Gyimah-Brempong and Racine (2014). Gyimah-Brempong and Racine (2014) used the Local Linear Kernel Estimator (LLKE). The findings of the study by Gyimah-Brempong and Racine (2014) revealed the positive relationship between ODA and economic growth in Africa. In addition, Gyimah-Brempong and Racine (2014) stressed that good governance and a good policy environment discovered positive economic growth in Africa. However, the study of Gyimah-Brempong and Racine (2014) neglected panel data estimation. A substantially more extensive data collection is one of the advantages of using panel data. In addition, panel data analysis indicates that the variables will have more variability and less collinearity than cross-sectional or time-series data. For this reason, this current study employed panel data analysis to examine ODA, FDI, and economic growth long-term relationships in selected African countries.

Similarly, Adams and Atsu (2014) ignored the ODA disclosure and transparent compliance framework. Adams and Atsu (2014) employed the Ordinary Least Squares (OLS), where either the Akaike Information Criterion (AIC) or Schwarz Bayesian Criterion (SBC) selects the Autoregressive Distributed Lag (ARDL) with data from 1970 to 2011 to investigate the impact of ODA on economic growth in Ghana. The study of Adam and Atsu (2014) discovered that while ODA has a beneficial effect on economic growth in the short term, it has a detrimental impact on economic growth in the long run. Adam and Atsu's (2014) short-term findings are consistent with the two-gap theory, which states that ODA enhances economic growth by perfecting domestic resources and supplements domestic savings, crucial components of economic growth. Furthermore, ODA helps bridge the foreign exchange shortfall by providing access to current technology and managerial skills and facilitating access to the international

market. Adam and Atsu (2014) argued that ODA impacted economic growth from the following angles: ODA stimulates investment; ODA increases the capacity to import items or technology, and ODA increases the capacity to export products or technology; ODA increases capital efficiency and promotes endogenous technological change. The most common of the four mechanisms mentioned above is the investment viewpoint. The study of Adam and Atsu's (2014) long-term findings is inconsistent with Wamboye's (2012) findings, for instance, which discovered that ODA had a favorable impact on Ghana's economic growth from 1970 to 1997. The negative long-term findings of Adam and Atsu's (2014) study contradict the two-gap theory, which further states that ODA is a source of additional funds to supplement domestic resources and accelerate the economy's growth. The study of Adam and Atsu used the OLS model, which produces unreliable and skewed parameter estimation results when endogeneity is present. As a result, this current study employed the GMM model for panel data produced a reliable result in various forms of endogeneity, including dynamic omitted variables, multiplicity, and structural breaks.

Likewise, Girma (2015) also employed the ARDL approach to examine the long-term relationship between ODA and economic growth in Ethiopia, with the time series data ranging from 1974 to 2011. In the study of Girma (2015), findings revealed that the index of support policy indicates that ODA has contributed positively to economic growth. The study finding of Girma (2015) is in line with the theory of two-gap. According to the two-gap theory, the conditional effects such as the saving gap, a favorable policy environment, and the foreign exchange gap contribute to economic growth (Chinery and Strout, 1966). However, Girma 2015 used time-series data analysis which has much vulnerability, notable challenges with generalising results from a single study, getting proper parameters and issues with accurately finding the best model to represent the data. As a result, this current study employed panel data analysis with greater degrees of freedom and sample heterogeneity.

Taking use of the benefit of GMM mentioned above, Alemu and Lee (2015) used a sophisticated GMM to understand the complexity of economic growth and the development of endogenous issues. Alemu and Lee (2015) used panel data analysis to

investigate the relationship between ODA and economic growth in Africa, with the data period ranging from 1995 to 2010. The study of Alemu and Lee (2015) indicated that ODA and economic growth had a positive relationship. The study of Alemu and Lee (2015) is in line with the two-gap theory, which stresses the benefit of increasing the investment capabilities of the investing companies, which enables the company to import additional inputs and, by doing so, promotes economic growth. This current study is in line with Alemu and Lee (2015). However, this current study seeks to bring more to the literature by determining the ODA threshold level and analysing determinants of ODA. In addition, this current study seeks to investigate the broader aspect of the ODA, FDI, and economic growth relationship, and lastly examine the direction and robustness of causality among ODA, FDI, and economic growth, which Alemu and Lee (2015) study neglected.

In another study that also examined the relationship between ODA and economic growth in Africa, Sabra and Eltalla (2016) employed the simultaneous equations to assess the impact of ODA and local savings on economic growth in selected the Middle East and North Africa (MENA) countries from 1977 to 2013. According to Sabra and Eltalla (2016), ODA had a positive and robust influence on savings reduction, government consumption, increased inflation, and increased imports. However, Sabra and Eltalla's (2016) study revealed the negative relationship between ODA and economic growth in the MENA region. Bad environmental policy implementation and the Dutch disease led to a negative impact between ODA and the economic growth (Sabra and Eltalla, 2016). The study of Sabra and Eltalla contradicts Girma (2015), who found that the indicator of support policy indicates that ODA has contributed positively to economic growth.

With the negative relationship between ODA and economic growth in Sabra and Eltalla's (2016) study due to bad policy implementation, the current study seeks to close that gap by introducing the ODA disclosure and transparency compliance framework.

Like Sabra and Eltalla (2016), Ugochukwu, Okafor, and Azino (2016) also employed the simultaneous equation and Ordinary Least Squares to examine the impact of ODA on economic growth in Nigeria from 1980 to 2013. According to Ugochukwu *et al.* (2016),

several developing countries are considered poor due to their low savings rate, which results in a low investment rate, and weak investment rate results in low economic growth rates. In addition, poverty initially caused by low savings, weak investment, and low growth rates contribute to the poverty trap. Ugochukwu *et al.* (2016) stressed that the lack of domestic savings and investment means that developing countries must rely on ODA to promote economic growth and reduce poverty. Ugochukwu *et al.* (2016) revealed that Nigeria's economic growth is positively related to external debt, while ODA has a favourable relationship with economic growth. The study finding of Ugochukwu *et al.* (2016) is in line with Arndt, Jones, and Tarp's (2015) study. However, the study of Ugochukwu *et al.* (2016) neglected the omitted variables; hence this current study employed the threshold and GMM model, which are known for their ability to address the problem of endogeneity.

This current study additionally evaluated the study of Kossele (2017) and Tang and Bundhoo (2017) to determine if the same results as those of Ugochukwu *et al.* (2016) apply in another country. Kossele (2017) investigated the relationship between ODA and economic growth in Tanzania using the Vector Error Correction Model (VECM). ODA had a crucial role in closing the savings-investment gap, which accelerated investment and growth (Kossele, 2017). Kossele (2017) study advocated that most countries in sub-Saharan Africa rely too much on ODA and other development partners to maintain their annual budget to cover their deficits resulting from low domestic savings. This situation perpetuates continuous dependency on ODA instead of formulating investment and economic growth policies suitable for the domestic environment. Kossele (2017) also revealed the positive relationship between ODA and economic growth in Tanzania. Kossele's (2017) study finding is consistent with Ugochukwu *et al.* (2016). Kossele's (2017) study employed VECM and total ignored GMM, which is commonly known for its ability to address endogeneity problems. For this reason, this current study employed GMM to attempt to close that gap.

In another study that examined the relationship between ODA and economic growth, Tang and Bundhoo (2017) employed time-series cross-sectional data for selected 10 African countries from 1993 to 2012. Tang and Bundhoo (2017) used the OLS method,

such as pooled OLS, fixed effects, and random effects. However, OLS can produce biased and contradictory estimates of parameters whenever there is endogeneity. Therefore, tests of hypotheses can be highly deceptive when using OLS in the presence of endogeneity. Therefore, this current study only employed the OLS method for comparison purposes. Instead of OLS, this current study employed GMM to analyse the critical determinants of ODA and FDI and address the endogeneity problem. Tang and Bundhoo's (2017) study findings revealed that ODA had a positive relationship with economic growth. The study finding of Tang and Bundhoo (2017) is in line with previous literature such as Sabra and Eltalla (2016), Ugochukwu *et al.* (2016), and Kossele (2017).

Likewise, Civelli, Horowitz, and Teixeira (2018) analysed the relationship between ODA and economic growth in Uganda, applying spatial panel VAR to analyse the data ranging from 1996 to 2012. Unfortunately, little consensus has been reached on the impact of ODA on economic growth (Civelli *et al.*, 2018). One obstruction to the agreement is how to tackle the donors' endogenous distribution of ODA across beneficiaries making it difficult to establish causality between ODA and its effects (Civelli *et al.*, 2018). Nevertheless, the empirical study of Civelli *et al.* (2018) indicated a positive and substantial relationship between ODA and Uganda's economic growth. Civelli *et al.*, 2018, found statistically substantial and durable positive impacts on economic growth due to ODA. The study findings of Civelli *et al.* (2018) are in line with Kossele (2017). However, the study of Civelli *et al* (2018) ignored the ODA determinants and the minimum ODA threshold level. Hence, this current study seeks to close that gap by thoroughly outlining, discussing, and analysing determinants of ODA and threshold level. According to the literature, Africa has slow economic growth and a financial and infrastructure gap, so the current study intends to identify and comprehend the drivers that drive ODA and FDI to fill the financial and infrastructure gap.

Furthermore, Onyibor and Bah (2018) examined the relationship between ODA and economic growth in the five poorest African countries (Niger, Congo, Burundi, Malawi, and the Central African Republic) using the cointegration analysis for the period 1986 to 2015. Onyibor and Bah (2018) indicated that ODA and economic growth are positively

correlated in Niger and Malawi in the long run, while there is a negative correlation between ODA and economic growth in Burundi, Congo and the Central African Republic. The positive long-run relationship in the study of Onyibor and Bah (2018) is in line with Civelli *et al.* (2018), while the negative relationship between ODA and economic growth in Burundi, Congo, and the Central African Republic is in line with Sabra and Eltalla (2016). The study of Onyibor and Bah (2018) used the two-gap theory. According to the two-gap theory, domestic saving and fixed capital ratios drive economic growth (Onyibor and Bah, 2018). Onyibor and Bah (2018) stressed that ODA bridges the gap between investment and national savings (Onyibor and Bah, 2018). In addition, national savings comprise both foreign and domestic savings, alluding to the two-gap hypothesis, which emphasises the role of government savings in boosting economic growth. The study of Onyibor and Bah (2018) intentionally ignored granger causality, which examines the direction and robustness of causality. Hence this current study employed Hurlin Granger causality to assess the direction and robustness of causality among ODA, FDI, and economic growth.

Moreover, Sani, Ahmad, Abdullahi, Adamu, and Funmilayo (2021) investigated the link between ODA and economic growth in Nigeria. Sani, Ahmad, Abdullahi, Adamu, and Funmilayo (2021) employed Nigerian annual time series data from 1980 to 2015. Sani *et al.* (2021) study used the endogenous growth model, with the gross domestic product (GDP) as the study's primary variable. Sani *et al.* (2021) stressed that ODA is one of the most crucial drivers of economic growth in developing countries. In addition, ODA benefits Nigeria in a meaningful manner. Sani *et al.* (2021) used the granger causality and vector correction model (VECM) to assess the short and long-term relationship between ODA and economic growth in Nigeria. Sani *et al.* (2021) study revealed that ODA in the short run causes economic growth, while through the VECM; ODA has a positive correlation with economic growth. The above suggests that an increase in ODA causes an increase in economic growth in Nigeria. The study finding of Sani, Ahmad, Abdullahi, Adamu, and Funmilayo (2021) is in line with Onyibor and Bah (2018). The study of Sani *et al.* (2021) employed both Granger causality and VECM models in line with this current study; however, they shunned or ignored the GMM model estimation.

This study seeks to close that gap by employing GMM to analyse selected African countries' ODA and FDI determinants.

Using GMM, Nsanja, Kaluwa, and Masanjala (2021) investigated whether ODA affects Africa's economic growth. Nsanja, Kaluwa, and Masanja (2021) analysed data from 32 African countries from 2005 to 2017. The theoretical framework used in the study of Nsanja *et al.* (2021) followed the Harrod-Domar economic growth model, which claims that ODA causes more remarkable economic growth because it increases restricted domestic savings in less developed economies. Nsanja *et al.* (2021) stressed that the Harrod-Domar model has three pillars: growth, savings, and capital ratio. In addition, Nsanja *et al.* (2021) revealed that education assistance in primary education promotes economic growth in lower-middle-income countries. In contrast, the requirement for higher education in upper-middle-income countries is more vital for economic growth than primary education.

In conclusion, Nsanja *et al.* (2021) indicated that ODA positively correlated with economic growth in 32 African countries. However, the study of Nsanja *et al.* (2021) completely ignored the Hurlin Granger causality test. Therefore, this current study seeks to employ Hurlin Granger causality to assess the direction and robustness of causality among ODA, FDI, and economic growth in selected African countries.

In another study that examined ODA and economic growth relationship in Africa, Yahyaoui and Bouchoucha (2021) utilised fully modified ordinary least squares (FMOLS) and the dynamic ordinary least squares (DOLS) with data ranging from 1996 to 2014. The study of Yahyaoui and Bouchoucha (2021) added to the body of knowledge by adding an application of governance. The study by Yahyaoui and Bouchoucha (2021) revealed a negative relationship between ODA and economic growth in Africa. Furthermore, Yahyaoui and Bouchoucha (2021) recommended that good governance improves ODA in Africa; however, they have failed to provide policy recommendations on good governance. Hence, this current study seeks to close that gap by introducing the ODA disclosure and transparency framework.

Furthermore, the study of Yahyaoui and Bouchoucha (2021) employed the OLS model known for its inability to address endogeneity issues. However, whenever there is endogeneity, GMM can produce reliable parameter estimates. For this reason, this current study also employed GMM to analyse determinants of ODA and FDI in selected African countries. According to the literature, Africa has slow economic growth and a financial and infrastructure gap, so the current study intends to identify and comprehend the drivers that drive ODA and FDI to fill the financial and infrastructure gap.

Taking a different angle from examining the relationship between ODA and economic growth in Africa, Yiheyis and Cleeve (2018) examined the relationship between ODA and FDI in 41 countries under SSA. Yiheyis and Cleeve (2018) employed a simultaneous equation model implemented in a dynamic context reflective of partial adjustments and inertia. The research of Yiheyis and Cleeve (2018) concluded that ODA has no effect on FDI and the empirical outcome is inconsistent with the two-gap theory, which states that both foreign exchange revenue and domestic savings are crucial to growth in the least Developed Countries (LDCs). Furthermore, the study of Yiheyis and Cleeve (2018) ignored the minimum ODA threshold level required to attract significant FDI inflow. The current study seeks to close that gap by employing a threshold regression model to determine the ODA threshold level required to trigger significant FDI inflows in selected African countries.

Moving away from the perspectives of ODA and FDI, Gui-Diby (2014) used panel data analysis using the GMM approach for the period 1980-2009 to analyse the impact of FDI on economic growth for 50 African nations. The study's findings by Gui-Diby (2014) indicated that FDI had a considerable and favourable impact on economic growth in the African region over the study period. Gui-Diby (2014) has also noted the link between technological diffusion to FDI flows through various channels such as demonstration, limitation, labour mobility, exports, and forward-and-backward links with domestic enterprises and the competition. Furthermore, Gui-Diby (2014) emphasised that there is a possible relationship between FDI and economic growth through advanced technologies and human capital. Theoretically, Gui-Diby's (2014) study follows the economic growth and endogenous economic growth theory, which states that the main

factors of economic growth include physical capital investment, advanced technology, public capital, and human capital. However, Gui-Diby (2014) study failed to design policies to attract foreign investors. Hence, the current study seeks to close that gap by introducing the ODA disclosure and transparency compliance framework.

Likewise, Adams and Opoku (2015) employed panel data using the GMM estimation approach to examine the relationship between FDI and economic growth in 22 Sub-Saharan African (SSA) nations from 1980 to 2011. The study of Adams and Opoku (2015) discovered that regulations such as credit market rules, labour market regulatory requirements, total regulatory requirements, and business regulations and FDI had positive and considerable effects on economic growth. Furthermore, Adams and Opoku (2015) stressed that in the existence of practical and high-quality policies, FDI had a positive effect on economic growth. The study finding of Adams and Opoku is in line with the study of Gui-Diby (2014). As a result, the study of Adams and Opoku (2015) provides three additions to the literature by answering three significant concerns about the influence of FDI on economic growth, the moderating role of regulation, and the effect of different types of regulation on the FDI-growth nexus. Gui-Diby's (2014) study intentionally ignored the relationship between ODA, FDI, and economic growth. Hence this current study adds to the literature by examining the broader aspect of ODA, FDI, and economic growth long-term relationships in selected African countries.

Like Adams and Opoku (2015), Zekarias (2016) used panel data using the GMM estimation approach to examine the relationship between FDI and economic growth from 1980 to 2013 in 14 East African countries. Zekarias (2016) study indicated a significant positive relationship between FDI and economic growth in East African countries. The study finding of Zekarias (2016) is consistent with the eclectic paradigm theory, which gives an overall framework for describing the internationalisation process and the international trade theory of comparative advantage and differences in factor endowments between factors countries, as FDI and economics have a tight connection. In addition, Zekarias (2016) highlighted that FDI is the principal driver of economic growth and a catalyst for economic precondition integration in East African countries. However, Zekarias (2016) study failed to recognise the importance of FDI determinants

to promote economic growth. This current study then seeks to close that gap by identifying the key determinants of ODA and FDI in selected African countries. According to the literature, Africa has slow economic growth and a financial and infrastructure gap, so the current study intends to identify and comprehend the drivers that drive ODA and FDI to fill the financial and infrastructure gap.

From the above referenced empirical research, it has been demonstrated that ODA, FDI, and economic growth all yield varying results in different countries depending on their level of development. Therefore, by studying trends in ODA and FDI, identifying significant drivers of both ODA and FDI, and probing the relationship between ODA, FDI, and economic growth, this study seeks to contribute to the existing body literature.

Methodologically, we extend the previous studies by considering the threshold level of ODA required to be reached to generate significant inflows of FDI into selected African countries. With the current drive by governments to break the ODA curse in Africa, this study intends to propose policies that will augment the efforts of many sitting governments in their quest to boost economic growth by channeling increased inward FDI flows and receiving less ODA.

2.6   Conclusion

This chapter gave a detailed introspect on the theoretical foundations of the critical concepts under study. The theoretical foundations of the critical concepts understudy were ably supported by an analysis of existing empirical studies, which sought to confirm, amongst other things, the determinants of ODA and FDI, respectively. Most research in the theoretical literature used the eclectic paradigm and the two-gap theory, which give good explanations for the drivers of FDI and ODA inflows. The majority of the empirical studies examined used panel data. Some employed the error-correction reaction model and time series, resulting in ambiguous and inaccurate results. No empirical study examined used threshold analysis. As a result, the current study seeks to bridge that gap and add methodologically to the relationship between ODA, FDI, and African economic growth. There has been little research on the factors that influence ODA and FDI in African countries. The less research emphasises the importance of conducting empirical tests to determine significant ODA and FDI variables and threshold

analyses in the African setting. The few similar empirical research that focused on the African continent revealed divergent, diversified, and mixed findings and conclusions that differed on a standard list of FDI factors. In summary, the conclusions on FDI determinants in Africa have depended on the technique employed, the timeline of data collected, and the economies studied. As a result, this study aims to bridge that gap and contribute to the discussion of the factors that influence FDI in Africa. The next chapter discusses the research methodology adopted to fulfill the main objectives of this study.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

The preceding chapter summarised the literature that informed the current study, which intended to examine the relationship between ODA, FDI, and economic growth in a sample of African countries. This chapter fully describes the methodology employed to achieve the study's objectives, outlined in chapter one. The chapter clearly defines and outlines critical components to explore the relationship between official development assistance (ODA), foreign direct investment (FDI), and economic growth, particularly in Africa. In addition, the chapter describes the research approach and research design in detail. The final section of this chapter discusses ethical considerations relevant to this investigation.

3.2 Research approach

There are generally three types of research methods, quantitative, qualitative, and mixed methods research methods. The qualitative research method is employed when the researcher investigates a new field of study and anticipates determining and theorising prominent issues (Jamshed, 2014). According to Headley and Clark (2020), qualitative research approaches emerged as a formal research method to investigate the social sciences in the late 1800s and explained the nature of human experience in terms of the meaning individuals construct to participate in their social lives. On the other hand, qualitative researchers want to understand people's voices and see their perspectives to understand better how they interact in specific situations (Headley and Clark, 2020).

In contrast to qualitative research, quantitative research examines the correlation between factors to evaluate factual hypotheses. Most of these parameters use technologies that allow for the analytical analysis of numerical quantities (Creswell, 2014).

The current study adopts a quantitative research method to examine the relationship between ODA, FDI, and economic growth in selected African countries. The current study selected quantitative data collection methods to interpret quantitative data, which allows for a wide range of treatments for data and validation of data integrity (Amaratunga, Baldry, Sarshar, and Newtown, 2002).

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3.3 Population and sample

The population for the current study was all African countries. From a continental population of 54 countries located in Africa, a sample of 30 countries was purposefully selected based on complete data available for the period under review. Furthermore, through a preliminary data analysis, the current study identified only those countries that received ODA and FDI from 1990 to 2018. As such, the current study selected a sample of 30 countries as follows: Botswana, Burkina Faso, Central African Republic, Chad, Comoros, Cote d'Ivoire, Democratic Republic of Congo, Eswatini (Swaziland), Gabon, Ghana, Guinea, Guinea-Bissau, Kenya, Madagascar, Malawi, Mali, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, South Africa, Togo, Tunisia, Tanzania, and Uganda.

3.4 Variable definition

The data employed in the research relates to the period 1990-2018 in the annual series. The estimation period was chosen partially due to the recurring feature of ODA and FDI flows to the selected African countries over the era, making it worth exploring, and partly due to data availability. Furthermore, the estimation period employed 28 years of time-series observations in each nation to maximise the panel's cross-sectional aspect of 30 African countries. Data for the variables employed in this current study are publicly available from the World Bank development indicators database. Institutional factors

such as the rule of law, corruption, and government effectiveness were not the focus of the current study due to a lack of data from 1990 to 2018. Instead, FDI, ODA, economic growth, FPI, CPI, domestic investment, government consumption, natural resources, human capital development, population growth, and trade openness were thus the focus of the current study. This current study's dependent and independent variables came from existing theoretical and empirical literature following the study's objectives.

3.4.1 Dependent variables

Based on data obtained from the World Bank's WDI database, the dependent variables in this study are official development assistance (ODA) and foreign direct investment (FDI). The overall dataset used throughout the current study spans from 1990 to 2018. The estimation period was chosen partially due to the recurring feature of FDI and ODA flows to the African region over the era, making it worth exploring, and partly due to data availability. Furthermore, the estimation period employed 28 years of time-series observations in each nation to maximise the panel's cross-sectional aspect of 30 African countries.

- **Official Development Assistance (ODA)**

Jayaraj (2015) defines ODA as government-provided assistance to countries and multilateral development institutions having the core aim of stimulating economic development and being of a concessional type. ODA flows into developing countries are ultimately intended to aid the host countries in achieving sustainable development, including capital formation, sustained growth, poverty alleviation, and a reduced risk of mortality (Ugwuanyi Ezeaku and Ibe, 2017). According to Ezeaku, Onwumere, and Anisiuba (2017), net ODA inflows as a proportion of GNI support investment and increases physical and human capital in developing countries.

Even though ODA has a detrimental impact on economic growth, Driffield and Jones' (2013) study shows that the relationship between ODA and economic growth is not clear-cut. Nevertheless, it has been shown in various academic evidence that encouraging economic growth is one of the essential objectives of official development assistance (Neira, Lacalle-Calderon, and Portela, 2016; Chen and Singh, 2016; Sahoo and Bishnoi, 2016).

- **Foreign Direct Investment (FDI)**

Foreign direct investment is quantified using net FDI inflows (as a percentage of GDP). Current and prior inflows were significant in attracting additional foreign investment by signaling to potential foreign investors whether the host country's economic environment was friendly to FDI or not (Barrell and Pain, 1999). According to Walsh and Yu (2010), Tsaurai (2017), and Nxumalo (2020), the one-year time lag between FDI and current FDI flows enabled new investors to benefit from the beneficial spill-over advantages that existing foreign investors had already created.

3.4.2 Independent variables

Independent variables in this current study are economic growth, population, trade openness, and human capital development, which were analysed based on data collected officially from the World Bank WDI database. The data employed in the research relates to the period 1990-2018 in the annual series. The estimation period was chosen partially due to the recurring feature of FDI and ODA flows to the African region over the era, making it worth exploring, and partly due to data availability. Furthermore, the estimation period employed 28 years of time-series observations in each nation to maximise the panel's cross-sectional aspect of 30 African countries.

- **Economic growth (GR)**

GDP per capita measured economic growth in this current study. According to Rana and Barua (2015), a rise in per capita gross domestic product (GDP) or other aggregate measures of income indicates economic growth. Furthermore, Adams and Atsu (2014) concluded that official development assistance (ODA) has a favourable association with economic growth in the short term. On the other hand, FDI is the key driver of economic growth and a key player in creating and expanding the overall African economy. In addition, Gui-Diby (2014) stressed that FDI is a catalyst for economic growth.

- **Population growth (POP)**

This current study measured population growth as population growth percentage annual. Increased population expansion expands the market and increases demand for goods and services, attracting foreign capital inflows (ODA and FDI). Thus far, the evidence supports Jorgenson's output and market size hypothesis (1963). High

population growth in the host country increases the size of the labour force and lowers labor costs, positively influencing FDI, according to Dunning's (1973) eclectic paradigm hypothesis. Because most host nation governments anticipate foreign investors to take the lead in building local communities, high population growth deters ODA and FDI. According to Moloi (2019), the more extensive and more diverse the population, the higher the percentage of profitability set aside for the development initiatives from the foreign capital inflows.

- **Trade Openness (OPEN)**

According to Kandiero and Chitinga (2006), trade openness is the division of GDP between imports and exports and separately between the three sectors (primary, manufacturing, and services sectors). According to Babatunde (2011), empirical research shows that increased levels of trade openness result in positive and considerable foreign direct investment (FDI) inflows. The current study employed trade percentage to GDP as a proxy to measure a country's trade openness. As a result, this measure (trade-to-GDP ratio) is essential for international investors driven by the prospect of foreign trade. According to Nwaogu and Ryan (2015), trade openness is the gauge of an economy's external orientation, and it has a positive relationship with economic growth.

Host nations with open trade policies are more positioned to benefit from foreign capital inflows (Cuadros, Orts and Alguacil, 2004). Moloi (2019) makes a similar premise, claiming that foreign investors feel safe working in host nations with solid trade openness and participation in multilateral and preferential trade agreements.

- **Human Capital Development (HCD)**

With a low-cost, well-educated labour population, developed and emerging economies gain a competitive advantage in a technologically-driven world (Yussof and Ismail, 2002). Therefore, ODA has helped improve secondary school enrollment, promoting economic growth and attracting FDI (Hien, 2008). In addition, the internet is playing an increasingly important role in the advancement of human capital development; hence the quality of the workforce is likely to have a substantial and beneficial effect on FDI

(Salike, 2016). Individuals using the internet (% of the population) measured the human capital development in this current study.

3.4.3 Control variables

It was essential to consider control variables other than dependent and independent variables. Therefore, this current study used the control variables of the consumer price index (CPI), natural resources, government consumption, domestic investment, and foreign portfolio investment.

- **Consumer price index (CPI)**

The inflation GDP deflator measured the consumer price index in this current study. The consumer price index determines the rise in the cost of acquiring a set basket of goods and services (Schultze, 2003). Therefore, ODA decreases when the consumer price index increases, leading to an economic growth downturn (Loxley and Sackey, 2008). On the other hand, Mugableh (2015) stressed that decreasing the consumer price index increases FDI. Therefore, the low CPI encourages foreign investors to take on riskier FDI, contributing to more substantial long-term economic growth (Mugableh, 2015). Therefore, countries having a low long-term CPI tend to perform better economically.

- **Natural Resources (NAT)**

In the current study, the measure for natural resources is the total natural resources rent expressed as a proportion of GDP. Due to the abundance of natural resources in the host country, resource-seeking operations are more likely to trade than FDI (Baniak, Cukrowski, and Herczynski, 2005). Wahid, Sawkut, and Seetanah (2009) proposed that economies with abundant natural resources acquire more significant foreign direct investment (FDI), contrary to the eclectic paradigm theory. The eclectic paradigm proposition suggests that natural resources are considered a geographical advantage. Therefore, theoretically, natural resources could have a favourable or adverse effect on FDI. As a result, FDI in Africa focused on economies with abundant natural resources, notably oil (Onyeiwu and Shrestha, 2004).

- **Government Consumption (GCNS)**

General government final consumption expenditure percentage of GDP measured government consumption in this current study. According to Edwards (1990), Harrison and Revenga (1995), Ancharaz (2003), and Alavinasab (2013), government consumption is a component that will have a detrimental impact on economic growth. According to Ancharaz (2003), more government expenditure almost always leads to increased bureaucratic inefficiency and corruption, which significantly raises the economy's problematic capital investment. The more government spends, the more elaborate the bureaucratic system is, making the investment climate unattractive to foreign direct investment (FDI) and increasing the likelihood of increased taxes in the future (Filipovic, 2005). In addition, as a result of more lavish government spending, there are more opportunities for officials to misuse financial resources (Alavinasab, 2013).

- **Domestic investment (DINV)**

Gross fixed capital formation measured domestic investment in the current study. Suppose a company has a firm-specific advantage over its domestic competitors in market knowledge and local supplier ties. In that case, it will be able to compete in the global market (Letto-Gillis, 2005). Letto-Gillis (2005) stressed that companies' FDI is encouraged by their domestic investment. As a result of the modern theory of multinational corporations (MNC) and international investment, the firm-specific advantages find the relationship between domestic investment and foreign direct investment (Lautier and Moreaub, 2012). Graham and Krugman (1991) emphasised that because local firms possess superior expertise and exposure to local finances and markets, a foreign investor entering the market must compensate for the opportunities created by domestic firms.

Dutta, Mukherjee, and Roy (2014) used panel data from 1979 to 2008 to evaluate the relationship between ODA and domestic investment in Tanzania. According to Dutta *et al.* (2013), ODA contributes to economic growth by enhancing domestic investments. Furthermore, Dutta *et al.* (2013) stressed that ODA fails to promote domestic investment and economic growth. On the other hand, Tsaurai (2017) discovered that

FDI improved SSA's economic growth by raising domestic investment, enhancing efficiency, and transferring new technology, marketing, and managerial skills. Furthermore, Tsaurai (2017) asserts that FDI has a significant influence on the success of both domestic and foreign investments because of the general technological advantage it attracts.

- **Foreign portfolio investment (FPI)**

The crucial instrument in closing the saving and investment gap, particularly in emerging countries, is the foreign portfolio investment (FPI) (Garg and Dua, 2014). A study conducted by Baghebo and Apere (2014) examined the impact of foreign portfolio investment (FPI) on economic growth in Nigeria, and they discovered a positive association between FPI and economic growth over the long term. The current study used the external debt stocks percentage of GNI (Gross National Income) measured foreign portfolio investment. Previous research, such as those of Ejigayehu (2013), Ahmad, Draz, and Yang (2015), and Haider, Khan, and Abdulahi (2016), employed the external debt stock percentage of GNP to quantify foreign portfolio investment. The external debt stocks as a percentage of GNP were used in the primary research since it has been noticed that, in certain situations, the debt is abnormally significant to the borrower's economy, which might lead to capital flight and hamper foreign investment. Therefore, the external debt stocks percentage of GNI measured foreign portfolio investment.

Marozva and Makoni (2021) reiterate that FPI is driven by portfolio diversification to achieve liquidity, yield-seeking, and risk-reducing activities. Focusing on five emerging African countries (Egypt, Kenya, Mauritius, Nigeria, and South Africa) over the 2000-2020 periods, they found that liquidity of the stock market was the main factor giving rise to inward FPI. In addition, Marozva and Makoni (2021) concluded that foreign investors in host country financial markets reciprocally increased liquidity, thereby promoting portfolio diversification and risk-sharing between domestic and foreign investors. Likewise, we anticipate a positive outcome between FDI and FPI flows.

3.5   Summary of the key variables

Below is a summary of the key variables used for the current study:

Table 3: Summary of the key variables

Variable	Proxy	Source	Expected outcome sign
ODA	Net ODA inflow (% of GNI)	Yasin (2005); Asongu (2014); Yoon and Moon (2014); Roodman (2015); Ezeaku, Onwumere and Anisiuba (2017)	+/ -
FDI	Net FDI inflow (% of GDP)	Barrell and Pain (1999); Walsh and Yu (2010); Tsaurai (2017); Nxumalo and Makoni (2021)	+
FPI	External debt stocks as a percentage of GNI	Ejigayehu (2013); Ahmad, Draz and Yang (2015); Haider, Khan and Abdulahi (2016)	+/ -
POP	Population growth % annual	Laskavyan and Spatareanu (2005); Hein (2008); Nasir, (2016)	+/ -
OPEN	Trade (% of GDP)	Kohpaiboon (2003); Babatunde, (2011); Seyoum, Wu and Lin, (2014)	+
DINV	Gross fixed capital formation	Graham and Krugman (1991); Webb (1994); Letto-Gillis (2005); Li (2006); Hein (2008); Lautier and Moreaub, (2012)	+
HCD	Individuals using the internet (% of population)	Borensztein, De Gregio and Lee (1998); Gylfason (2001); Salike (2016)	+/ -
CPI	Inflation GDP deflator	Ali, Fiess and MacDonald (2010); Singhania and Gupta (2011); Mugableh (2015)	+/ -
NAT	Total natural resources rent (%	Onyeiwu and Shrestha (2004); Baniak, Cukrowski and Herczynski (2005); Wahid,	+/ -

	of GDP)	Sawkut, and Seetanah (2009)	
GCNS	General government final consumption expenditure (% of GDP)	Edwards (1990); Harrison and Revenga (1995); Ancharaz (2003); Filipovic (2005); Alavinasab (2013)	+/ -
GR	GDP per capita	Berthelemy and Tichit (2004); Wasseja and Mwenda (2015); Nouri and Soultani (2016)	+/ -

Source: Author's own compilation

In the above table, ODA is official development assistance, FDI is foreign direct investment, FPI is foreign portfolio investment, POP stands for population growth, OPEN stands for trade openness, DINV stands for domestic investment, HCD is human capital development, CPI stands for consumer price index, NAT stands for natural resources, GCNS is government consumption, and GR stands for economic growth. The current research employs the above variables to examine the relationship between ODA, FDI and economic growth in the African context.

3.6 The endogeneity problem

Tsaurai (2017) noted that several countries with robust financial systems had reduced their dynamic FDI process and efficiency to one ranking. On the other hand, they argued that countries with well-developed structures gain significant advantages from FDI. Therefore, Tsaurai's (2017) study weighed the rankings carefully against the numerous steps to improve the financial markets and the inclusion of other factors of economic growth.

According to Moloi (2019), the lagged FDI and the interdependence between FDI factors and financial sector development should receive greater attention. Rather than using a single period of lagged analysis, Moloi (2019) also argued for using annual panel data reviews in empirical determinants of FDI to examine the impact of the country's determinants of FDI changes.

Several factors must be considered when studying FDI variables to determine which FDI variables are the most important. These factors include the impact of foreign direct investment, endogeneity, and complementarities. The above said was also brought up by Xaypanya, Rangkakulnuwat, and Paweenawat (2015), who used panel data analysis as part of their methodology.

Fox, Negrete-Yankelevich, and Sosa (2015) assert that a country's self-determined FDI causes the correlation between FDI and economic growth rate. Fox *et al.* (2015) also claim that regressions across countries could be vulnerable to the presence of a country endogeneity. Therefore, the ideal method to take when undertaking complex analysis of any of these variables is to set up two-stage minimum squares to examine their interactions. In addition, Fox et al. (2015) point out that defining and estimating such a scheme of two-stage squares has a considerable detrimental effect.

Instrumental variables can mitigate the endogeneity issue. Nevertheless, there is still a core problem in that no appropriate instruments exist; most past studies were insufficient since they focused exclusively on how FDI methods generate value rather than on the consequences of intensive application of distinct mechanisms simultaneously (Fox et al., 2015). Borensztein and De Gregorio's (1998) study found that any neglected characteristics that promote capital return will also improve the inflow of foreign direct investment and the economy's growth rate. The outcomes may appear exaggerated if variables are endogenous (Borensztein and De Gregorio, 1998).

Soumare and Tchana (2015), like Li and Liu (2005), discussed the problems of describing and estimating simultaneous equations. The former elaborates on the two-stage econometric estimation technique, where instrumental variables generate values of factors that are assumed to be exogenous, such as FDI variables that are assumed to be uncorrelated with the error term. Nonetheless, Soumare and Tchana (2015) conclude that identifying non-instrumental variables is difficult. A consequence of this is that all instrument variable approaches to FDI endogeneity are subject to suspicion, which drives researchers to doubt the validity of these techniques.

In order to interpret the effects of foreign direct investment on the country's overall economic growth, greater attention must be paid to the simple equations and interdependencies between factors in FDI growth and the overall economic growth of the country (Li and Liu, 2005). The Durbin-Wu-Hausman test, commonly known as the augmented regression test and termed DWH, determines whether there is an endogenous relationship between FDI and GDP growth (Soumare and Tchana, 2015). Li and Liu (2005) stressed that Davidson and MacKinnon (1993) developed the DWH test and demonstrated that it could be done using residuals from each endogenous variable and those from all other exogenous variables in a regression model in which the original model serves as the dependent variable.

Tiwari (2011) studied the efficiency of ODA, FDI, and economic development in a panel framework using GMM for 28 Asian nations from 1998 to 2007. According to Tiwari (2011), ODA and FDI inflows were key variables impacting economic growth. Tawari (2011), on the other hand, believed that most growth studies assume ODA as an exogenous variable, even though ODA is supposed to be endogenous in growth regressions. Furthermore, Tawari (2011) emphasised that while examining the relationship between ODA and economic growth, both endogeneity and country heterogeneity should be considered. Sande and Gosh (2018) stressed that there are options that academics might use where endogeneity is less of a problem.

3.7   Econometric model specification

The analytical framework employed in this current study came from the literature review in chapter two. Chapter two identified theoretical and empirical literature, numerous possible ODA and FDI determinants such as population growth, trade openness, consumer price index, government consumption, human capital development, natural resources, economic growth, and domestic investment. Finally, the current study summarised the ODA and FDI determinants in the econometric model formulation based on theoretical and empirical literature (Hien, 2008; Samin, 2017; Kim, 2016; Ugwuanyi, Ezeaku, and Ibe, 2017).

This current study follows the empirical work of Hein (2008) to investigate the relationships between ODA, FDI inflows, and economic growth in selected African

countries for the period of 1990 to 2018.The following empirical model specifications were employed in the current study to confirm determinants of ODA and FDI, respectively:

$$\text{ODA}_{it} = \alpha_0 \text{ODA}_{it-1} + \alpha_1 \text{FDI}_{it} + \alpha_2 \text{GR}_{it} + \sum_{n=1}^{i} \beta X_{it} + \varepsilon_{it} \tag{1}$$

$$\text{FDI}_{it} = b_0 \text{FDI}_{it-1} + b_1 \text{ODA}_{it} + b_2 \text{GR}_{it} + \sum_{n=1}^{i} \beta X_{it} + \varepsilon_{it} \tag{2}$$

Where, *ODA$_{it}$* and *FDI$_{it}$* are the dependent variables measuring official development assistance, and the inflow of foreign direct investment as a percentage of GDP, into country *i* for time *t*, respectively. *ODA$_{it-1}$* and *FDI$_{it-1}$* represent the lag of ODA and FDI, respectively. *GR$_{it}$* is economic growth. *α_0* and *b_0* denote the constant term, while ε_{it} is a random error term. X_{it} denotes all other variables that explain the ODA and FDI inflows to our sample of African countries.

It is not uncommon for time series and panel data to be estimated using the Ordinary Least Squares (OLS). However, the approach is deemed problematic due to OLS unreliability when there is an endogeneity problem (Bascle, 2008). Therefore, the current study used the dynamic Generalised Method of Moments (GMM) panel analysis to show authentic results and improve the robustness of our findings by presuming that past values of the explanatory variables are uncorrelated with error terms to offer authentic results. As a result of the dynamic GMM estimation approach, cross-sectional estimation biases such as omitted errors, country-specific effects, endogeneity concerns, and lagged dependent regression variables are then often utilised and addressed in panel data regressions to a certain extent.

To test for the existence of correlations between ODA, FDI, and economic development, respectively, the current study adopted the autoregressive distributed lag (ARDL) method. The ARDL cointegration technique offers advantages in dealing with variables of different orders, I(0), I(1), as well as with robustness when a long-term link exists between the variables used in a limited sample (Nkoro and Uko, 2016). According to Nkoro and Uko (2016), the F-statistic (Wald test) measured the long-term relationship between the underlying variables. The key benefit of the ARDL method is its recognition

of the cointegrating vectors where several such vectors are present (Nkoro and Uko, 2016).

According to Ahamad, Chowdhury, and Muzib (2019), the ARDL cointegration technique does not require pre-testing the underlying series's unit root. As a result, ARDL can identify the presence of serial correlation without knowing about non-stationary time series data.

The Autoregressive Distributed Lag (ARDL) improves estimation validity, but it also improves estimation's explanatory abilities. Because of this, the current study has adopted the ARDL technique that makes it easier to handle heteroskedasticity. GMM regression equations are based on the lagged values of the explanatory variables, while comparisons of the explanatory variables use the lagged values of the different variables. As a result, despite the association between the levels of explanatory variables and country-specific impact, there will be no serial correlation between those variables in differences and the country-specific effect (Sghaier and Abida, 2013).

3.8 Estimation techniques: testing the relationships between ODA, FDI and economic growth in Africa

The current study employed unit root and serial tests for testing the relationships between ODA, FDI and economic growth in Africa.

3.8.1 Unit root and serial correlation tests

Before testing the pairwise Granger causality in this current study, the ODA, FDI, and economic growth variables must first be stationary. Then, the order of integrating variables will be determined using static tests for cointegration tests and regression analysis. Ahamad *et al*. (2019) state that the pre-testing variables for the preferred cointegration testing method are not required. Nkoro and Uko (2016) state that ARDL is only valid for the analysis of variables of order zero [I(0)] or order one [I(1)] and believe that unit root tests will provide insight as to whether or not ARDL was sufficient. Unit root tests and ARDL are, thus, complementary to each other.

The unit root test is the most popular method of determining stationarity or non-stationarity (Hadri and Kurozumi, 2012). As commonly known, most economical time series are nonstationary, but the rationality of this assumption still requires validation. Nkoro and Uko (2016) mentioned that there is a variety of alternative unit root tests to be used, and the selection of which one to be utilised solely relies on the power and size of the unit root test. In this current study, the most suitable unit root tests for our objectives are the ADF, Phillips-Peron, LLC, and Im Pesaran and Shin unit root tests.

Mushtaq (2011) further explains that if the additional lags of the first differentiated variable exist, for example, the ADF can make sense of the residual autocorrelation. To empirically quantify the number of the lagged difference term in the ADF technique, either Akaike Information Criteria (AIC) or the Schwarz Information Criteria (SIC) is utilised (Liew, 2004). To safeguard adequate conditions such that the error term is serially uncorrelated, allowing us to obtain an unbiased estimate of δ, the lagged yt-1 coefficient, the use of Akaike Information Criteria (AIC) or the Schwarz Information Criteria (SIC) is vital (Liew, 2004).

In order to determine the direction of causality, the number of lagged terms is crucial. Bruns and Stern (2018) argued that using Granger causality tests requires the introduction of sensitive data to the duration of lags. The ADF tests the null hypothesis that *αi = 0* against the alternative *αi< 0*. Hence, if the process has a unit root, then *αi = 0*; otherwise, the process is stationary, in which case *αi< 0* (Mushtaq, 2011).

As an alternative, Phillips-Perron (PP) solves error serial correlation using non-parametric statistical methods, which do not include lagged difference factors. The PP test outperforms the ADF test because its statistics are changed to show serial correlation and heteroskedasticity (Ncanywa and Makhenyane, 2016). Phillips-Perron (PP) test statistics interpreted as Dickey-Fuller statistics that enhanced the robustness of the heteroskedasticity- and autocorrelation-consistent covariance matrix estimator to serial correlation. The null hypothesis in the PP test is that the underlying factor has a unit root; the alternative explanation is that a stationary series generate the underlying variable. Ncanywa and Makhenyane (2016) aver that PP testing is comparable to ADF

testing but that ADF testing includes an automatic adjustment to account for automatically correlated residuals.

Onuoha, Okonkwo, Okoro, and Kingsley (2018) advocated that running the individual unit root tests per cross-section is less valuable than the Levin, Lin, and Chu (LLC) panel data tests. The null hypothesis states that each time series has a unit root instead of the alternative hypothesis that each series is stationary. When working with N between 10 and 250 and T between 25 and 250, the LLC allows for fixed effects, individual trends, and heterogeneous serially correlated flaws (Onuoha et al., 2018).

Lastly, due to bias correction, when including individual-specific patterns, the Im, Pesaran, and Shin (IPS) test can suffer from a loss of power (Onuoha et al., 2018). Therefore, Im, Pesaran and Shin (2003) allow for a heterogeneous coefficient of y_{it-1} and propose an alternative testing procedure based on averaging individual unit root test statistics. The null hypothesis is that each series in the panel contains a unit root $H_0: \rho_i = 0\ for\ all\ i$; against the alternative hypothesis that allows for some (but not all) of the individual series to have unit roots.

3.8.2 Cointegration tests

Two variables, which have a long-term or balanced relationship, are described as cointegrated (Herzer, 2008). According to Emirmahmutoglu and Kose (2011), the cointegration test is a pre-test in which spurious regression conditions are detected and prevented.

Onuoha et al. (2018) mentioned that to check for cointegration in heterogeneous panel models, one could employ tests such as augmented Engle-Granger (AEG) and augmented Dickey-Fuller (ADF), the residual-based LM, and the Pedroni test and the likelihood-based (LR) tests. Thus all of the techniques mentioned above are applied in cases where the underlying variables are integrated from order one [I(1)] while adding a further degree of complexity to the analysis of level relationships and requiring pre-testing (Nkoro and Uko, 2016).

For this current study, we adopted the autoregressive distributed approach lag (ARDL) developed by Pesaran, Shin, and Smith in 2001. The ARDL is commonly known as a

testing method for cointegration. The current study selected ARDL because the sample size was only about 28 years, which was not long enough to use alternative techniques such as Engle-Granger, residual-based cointegration test, and maximum likelihood test based on Johansen and Juselius methods.

There are various ARDL methodology advantages over cointegration tests. Hence, this current study selected ARDL. Unrestricted error-correction model (UECM) estimation is the heart of the ARDL technique. In addition, it is much easier to implement the UECM than the more complex Vector Error Correction Model (VECM). Therefore, the lagged variables are employed to estimate the long-term model in UECM, whereas differenced variables exist to estimate the short-term UECM model. VECM, on the other hand, implies that all variables in the model are endogenous, especially when using vector autoregression (VAR) (Nxumalo, 2020).

The VECM model accommodated all types of cointegration relationships, and the nature of those relationships imposes and dictates limits. According to Nyasha and Odhiambo (2014), there is one required cointegration requirement for the UECM Bounds test utilising the ARDL, and it is only used when incorporating either I(0) or I(1) into the regression model. There is, moreover, a critical requirement that none of the components be integrated I(2).

Pahlavani, Wilson, and Worthington (2005) argued that the ARDL method estimation is the mathematical approach to evaluate the cointegration relationship in small samples as in the Johnson techniques, which requires large data samples for validity. The ARDL model is known for eliminating the traditional cointegration pre-testing issues that necessitate factors categorised in I(1) or I(0) (Pahlavani *et al.*, 2005). The final advantage of using the ARDL bounds testing approach is that one can determine the bounds even when the explanatory variables are endogenous (due to simultaneous bias or bi-directional causality) (Asumadu-Sarkodi and Owusu, 2016).

As a result of the ARDL bounds testing technique, the following models have been defined and estimated in order to study the links between ODA, FDI, and economic growth:

$$\Delta ODA_{it} = \delta_0 + \delta_1 ODA_{it-1} + \delta_2 FDI_{it-1} + \delta_3 GR_{it-1} + \sum_{i=0}^{m} \delta_{1i} \Delta ODA_{it-1} + \sum_{i=0}^{m} \delta_{2i} \Delta FDI_{it-1} +$$

$$\sum_{i=0}^{m} \delta_{3i} \Delta GR_{it-1} + \varepsilon_{it} \tag{3}$$

$$\Delta FDI_{it} = \delta_0 + \delta_1 FDI_{it-1} + \delta_2 ODA_{it-1} + \delta_3 GR_{it-1} + \sum_{i=0}^{m} \delta_{1i} \Delta FDI_{it-1} + \sum_{i=0}^{m} \delta_{2i} \Delta ODA_{it-1} +$$

$$\sum_{i=0}^{m} \delta_{3i} \Delta GR_{it-1} + \varepsilon_{it} \tag{4}$$

$$\Delta GR_{it} = \delta_0 + \delta_1 GR_{it-1} + \delta_2 ODA_{it-1} + \delta_3 FDI_{it-1} + \sum_{i=0}^{m} \delta_{1i} \Delta GR_{it-1} + \sum_{i=0}^{m} \delta_{2i} \Delta ODA_{it-1} +$$

$$\sum_{i=0}^{m} \delta_{3i} \Delta FDI_{it-1} + \varepsilon_{it} \tag{5}$$

Where Δ indicates the first difference operator and the other variables remain as previously indicated. Although it was previously stated that testing for stationarity was not necessary in the ARDL framework, we will use the Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and Im, Pesaran, and Shin (IPS) unit root tests to ensure stationarity and that the variables were not integrated of order two.

3.8.3 Vector error correction model (VECM) and granger causality

The current study argues that both ODA and FDI have long-term and short-term impacts on economic growth for selected African countries. The short-term and long-term relationship of ODA and FDI on economic growth has been determined, as examining the long-term relationship solely would lead to inaccurate findings.

The current study, therefore, is going to estimate vector error correction model (VECM) of both short-run and long-run dynamics as follows:

$$\Delta \mathbf{ODA_{it}} = \delta_0 + \sum_{i=0}^{m} \delta_{1i} \Delta \mathbf{ODA_{it-1}} + \sum_{i=0}^{l} \delta_{2i} \Delta \mathbf{FDI_{it-1}} + \sum_{i=0}^{l} \delta_{3i} \Delta \mathbf{GR_{it-1}} + \delta_4 \mathbf{ECT_{it-1}} + \varepsilon_{it} \qquad (6)$$

$$\Delta \boldsymbol{FDI_{it}} = \phi_0 + \sum_{i=0}^{m} \phi_{1i} \Delta \boldsymbol{FDI_{it-1}} + \sum_{i=0}^{l} \phi_{2i} \Delta \boldsymbol{ODA_{it-1}} + \sum_{i=0}^{l} \phi_{3i} \Delta \boldsymbol{GR_{it-1}} + \phi_4 \boldsymbol{ECT_{it-1}} + \varepsilon_{it} \qquad (7)$$

$$\Delta \boldsymbol{GR_{it}} = \lambda_0 + \sum_{i=0}^{m} \lambda_{1i} \Delta \boldsymbol{GR_{it-1}} + \sum_{i=0}^{l} \lambda_{2i} \Delta \boldsymbol{ODA_{it-1}} + \sum_{i=0}^{l} \lambda_{3i} \Delta \boldsymbol{FDI_{it-1}} + \lambda_4 \boldsymbol{ECT_{it-1}} + \varepsilon_{it} \qquad (8)$$

In the above models, *ECT* is the error correction term obtained from the cointegration relationships, while its coefficients $(\delta, \phi, and \lambda)$ represent the speed of adjustment to long-run equilibrium. ε_{it} is the white noise error term, and all the other variables are as previously defined.

It was anticipated that after all of the models were run; the results would provide light on the links between ODA, FDI, and economic growth in the African countries under consideration.

3.8.4 Testing for Granger causality between ODA, FDI and economic growth
Most academic studies applied the Granger causality test to test for causality empirically. Granger (1969) established this causality test, and it remains credited to him as its inventor. Understanding Granger's causation is as simple as making the presumption that the historical value of one variable (X) tends to strengthen projections of another parameter (Y) (Dumitrescu and Hurlin, 2019). Therefore, if the X (Granger) variable affects the Y variable, then the X changes should precede the Y changes. Future events (Y) cannot affect past events (X). When past or lagged X values factor in a regression analysis of Y on other variables (including past values), and this significantly improves the prediction of Y, it can infer that the X (Granger) is the cause of Y (Alhakimi, 2018). If Y (Granger) stimulates X, the concept and explanation will be the same (Granger and Porter, 2009).

There are a few more significant issues regarding the Granger causality tests. First, Granger causality considers the variables are stationary. If this is not the case, thus obtaining the first difference between parameters renders them stationary if they are not already stationary in the level form. Second, Granger assumed that the error terms of causality tests have no relation to one another. However, Granger required a proper transition if the above is not the case. Finally, cause-and-effect in Granger causality

adapts to the selected lag period. As the causality path depends on the number of lags used in causality tests, the number of lags applied is critical. As a result, Liew (2004) stated that we utilise the Akaike information criterion (AIC) or the Schwarz information criterion (SIC) to evaluate the number of lags to be exploited, which is similar to the evaluation of distributed-lag models.

Failure to identify the underlying variable, which affects both key variables, is likely to lead to spurious causality. Wang and Hafner (2017) outlined spurious regression results as those outcomes that indicate a positive relationship between time series variables when no relationship of this kind is present in the data generation process under study. Dumitrescu and Hurlin (2011) have proposed that multi-equation systems like vector autoregression (VAR) be implemented to resolve this problem. Dumitrescu and Hurlin (2011) affirm that each endogenous variable describes the values of its lagged or past values and all other endogenous variables lagged in the model.

It can be challenging and overwhelming to establish causal relationships between variables using panel data, as one must account for dynamics. However, once we obtain the unit root test results and cointegration tests, the actual pair of Granger causation tests between ODA, FDI, and economic growth variables will be scientifically performed. Dumitrescu and Hurlin (2011) identify that there are four categories of causality relationships to examine: (1) homogenous non-causality (HNC), homogenous causality (HC), heterogeneous non-causality, and heterogeneous causality.

For evaluating Granger causality between these variables, we consider the following standard specification observed for T years and N individual subjects (Dumitrescu and Hurlin, 2011):

$$y_{it} = \alpha_i + \sum_{k=1}^{p} \gamma^k y_{it-k} + \sum_{k=1}^{p} \beta_i^k x_{it} + \varepsilon_{it} \qquad (9)$$

Where, x and y are two stationary variables, i is the country, k is the time lag, parameter ε_{it} are i.i.d $(0, \sigma_\varepsilon{}^2)$, p is the number of lags and $t \in [I, T]$. The fundamental supposition at this time was that the link between x and y holds for at least one subset of variables in our sample. In line with Dumitrescu and Hurlin (2011), we believe that γ^k are similar

for all individuals, and that the regression coefficients β_i^k may include an individual component.

3.9   Dynamic generalised method of moments (GMM)

Driffield and Jones (2013) employed the GMM panel estimators established by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998) as their technique. The first two reasons for selecting the GMM estimator were to observe country-specific effects, to the complexity of the regression formula; country-specific dummies could not be used. Secondly, the estimator also tests for simultaneity bias, which can be caused by the possibility that some explanatory variables may be endogenous since a higher output may attract additional FDI-seeking markets. Finally, one- and two-step GMM estimators are commonly used. Weighting matrices for one-step estimators are independent of estimate constraints. However, ideal weighting matrices for two-step GMM estimators allow the conditions underlying the current weight of the covariance matrices to be reliably estimated in two steps.

Ordinary Least Squares (OLS) estimation is frequently used for time series and panel data. However, there are also flaws in the OLS technique that highlight discriminatory behaviour and endogeneity issues (Raheem and Oyinlola, 2013). To avoid erroneous results and enhance robustness checks to our results, we selected to use dynamic Generalised Method of Moments (GMM) panel estimators for this study. This assumption assumes that the past value of the explanatory variables is uncorrelated with the error term. Some of the disadvantages of cross-sectional estimate biases, such as omitted variable errors, endogeneity issues, and the inclusion of lagged dependent variables in the regression, are avoided by using the dynamic GMM estimation approach.

The Arellano-Bond estimation is expressed as the first difference of equations **(10 and 11)** as follows:

$$ODAGDP_{it} - ODAGDP_{it-1} = \lambda 1\,(ODAGDP_{it-1} - ODAGDP_{it-2}) + \lambda 2\,(FDIGDP_{it} - FDIGDP_{it-1}) +$$
$$\lambda 3\,(GR_{it} - GR_{it-1}) + \sum_{J=1}^{n} \lambda_j\,(X_{it} - X_{it-1}) + (\varepsilon_{it} - \varepsilon_{it-1}) \tag{10}$$

$$FDIGDP_{it} - FDIGDP_{it-1} = \lambda 1\,(FDIGDP_{it-1} - FDIGDP_{it-2}) + \lambda 2\,(ODAGDP_{it} - ODAGDP_{it-1}) +$$
$$\lambda 3\,(GR_{it} - GR_{it-1}) + \sum_{J=1}^{n} \lambda_j\,(X_{it} - X_{it-1}) + (\varepsilon_{it} - \varepsilon_{it-1}) \tag{11}$$

Where:

$ODAGDP_{it}$ = the inflow of ODA as a percentage of GNI into country i for time t

ODA_{it-1} = effect of the previous period's ODA measured as the first lag of the ODA inflows scaled by GDP into country i for time t-1

FDI_{it} = the inflow FDI inflows as a percentage of GDP into country i for time t

FDI_{it-1} = effect of the previous period's FDI measured as the first lag of the FDI inflows scaled by GDP into country i for time t-1

GR_{it} = the economic growth in country i for time t

X_{it} = the set of control variables country i for time t

X_{it-1} = the set of control variables country i for time t-1

ε_{it} = the error term country i for time t

ε_{it-1} = country i for time t-1

3.10 Overview of the development of threshold regression models

The section defines threshold regression models; discusses the overview of the development of threshold regression models.

A regression threshold model refers to first hitting time (FHT) models with regression structures that accommodate data covariation (Lee and Whitmore, 2006). The word threshold refers to the FHT triggered within a boundary set by the underlying process, which reaches a threshold state (Lee and Whitmore, 2006). According to Girma (2005), the main problem at the heart of the threshold regression model is that since the threshold or cut-off value is uncertain, it must be determined, and that is why accurate

inference involves non-standard econometric theory. However, according to Caner and Hansen (2004), threshold regression models are better because they estimate the threshold parameters rather than using arbitrary values to define the threshold levels.

Tong (1983) created a threshold regression model for time series data analysis that anticipated the presence of external factors but ignored the endogenous variables of the threshold. A model of static panel regression threshold that included exogenous threshold variables was developed by Hansen (1999) using Tong's (1983) model of threshold regression threshold.

Although threshold models addressed the endogeneity issue, Wang and Lin (2010) observed that functional regression types could be more adaptable by dividing data with unknown threshold values. Finally, Kremer (2013) solved the endogeneity problem by using GMM estimates and a forward orthogonal transformation to handle the country's distinctive fixed effects.

Kremer (2013) developed dynamic panel threshold regression models to fill the gap left by previous threshold models in the following ways: (1) used the forward orthogonal transformation method to remove specific fixed effects from the country, as opposed to previous models that used the norm during transformation; (2) combined time-series and cross-section data in a panel threshold data analysis; (3) measures the endogenous regressor; (4) considered that the dependent variable could be influenced by its own lagged value; and (5) employed the GMM estimation method that considers the endogeneity problem.

3.11 Threshold levels

Non-dynamic panels with individual-specific fixed effects focus on threshold regression methods (Hansen, 1999). A threshold regression model determines that an observed variable serves to divide observations based on its value (Hansen, 1999).

To determine if the influence of foreign direct investment (FDI) on economic growth depends on different absorptive capacities, Jyun-Yi and Chi-Chiang (2008) used a threshold regression model to test this assumption. FDI has had a significant and favourable impact on growth in countries with more remarkable human capital

development and real GDP (Jyun-Yi and Chi-Chiang, 2008). Using the threshold method from 1975 to 2000, Jyub-Yi and Chi-Chiang (2008) reveal that human capital development and real GDP are crucial determinants of FDI. For their fundamental and clear economic implications, threshold methods exist in macroeconomics and financial analysis (Wang, 2015). Moreover, the threshold approach demonstrates how a correlation among variables jumps or breaks structurally.

Kurul (2017) employed the dynamic panel regression to examine if a particular level of institutional quality was required to attract more significant foreign direct investment. In addition, Kurul (2017) used the threshold regression analysis to account for the permanence of FDI flows and possible endogeneity problems. Kurul (2017) discovered that institutional quality negatively impacts FDI in 126 countries only after the metric exceeds a particular threshold level. Foreign direct investment and economic growth in ASEAN nations are examined by Nguyen and To (2017) using threshold regression analysis from 2002 to 2014. A new supply of investment capital, job creation, technology transfer, increased competition, and spillover benefits to domestic companies are all cited in the study of Nguyen and To (2017) as reasons why FDI is considered a boost to economies.

Moralles and Moreno (2020) examine Brazilian firms' FDI productivity spillovers and absorptive capacity. Employed threshold analysis from 2010 to 2014, the study of Moralles and Moreno (2020) indicated that Brazilian companies might suffer from negative spillover productivity when setting FDI at the threshold and regime-dependent variable only. When examining FDI as a threshold variable but with the level of absorption capacity as the regime-dependent variable, domestic companies collect positive spillovers in a low technological gap. Moralles and Moreno (2020) see the threshold regression approach as a design that appears to be robust in evaluating the specificities of developing economies. Moralles and Moreno (2020) emphasised the importance of testing the robustness and validity of the control variables prior to estimating the threshold model.

We contend that a framework especially powerfully equipped to detect the existence of contingency effects and to provide a valuable method of illustrating the impact of official

development assistance on the nature of FDI and economic growth is the following threshold specification:

$$GR_i = \alpha X_i + \begin{cases} \beta_1 FDI_i + \varepsilon_i, & ODA \leq \Upsilon \\ \beta_2 FDI_i + \varepsilon_i, & ODA > \Upsilon \end{cases} \qquad \textbf{(12)}$$

Where GR is the average economic growth rate over the1990 to 2018 period, FDI is foreign direct investment, and X is a vector of variables hypothesised to affect economic growth, including FDI, population growth, and human capital development (as previously defined), amongst others. ODA variables act as sample-splitting (or threshold) variables in this model. The above specification allows the effects of FDI on growth to take two different values depending on whether the level of ODA is smaller or larger than the threshold level Υ.

Two points are made here. The first is to determine the estimate of Υ and the slope parameters α and β's. We determine ŷ by experimenting the above equation 3.10 with all possible values of Υ, and ŷ is the minimiser of the residual sum of squares computed across all possible values of Υ and ŷ (Alfada, 2019). Once ŷ is identified estimates of the slope parameters follows trivially as α̂ (ŷ) and β (ŷ). The second issue is to test the significance of threshold parameterΥ. Since Υ is not identified under the null, we conduct inferences via a model-based bootstrap whose validity and properties have been established in Hansen (1996). In brief, our objective is to first measure the existence of the threshold, and if data supported it to assess the statistical significance of β_1 and β_2 in the above equation, and if it is supported by the data.

3.12 Ethical considerations

Maintaining strong ethical ideals in research is critical to ensuring that the study takes place with intellectual honesty. Mouton (2011) defines ethical behavior as doing the correct thing to guarantee that no deliberate or inadvertent damage occurs in the research process. Tustin *et al.* (2005) express similar ideas, defining ethics throughout the research as what is regarded respectable, appropriate, or beneficial. Tustin *et al.* (2005), state that ethical consideration should be an everyday business practice that

guides one's conduct to guarantee that academic honesty standards and ideals are respected.

Prior to any data collection, the researcher applied to the University of South Africa for ethical clearance to undertake the study. The data collection and analysis techniques were subjected to a thorough review procedure by the Department of Finance, Risk Management, and Banking Ethics Review Committee. The Ethical Clearance Certificate is appended at the end of this document. Furthermore, this PhD was run via Turnitin, a plagiarism-detection technology, to look for terms or sentences that matched earlier studies or publications. The researcher, in adhering to academic integrity, cited all sources in-text, and provided full details in the list of references at the end.

3.13 Conclusion

The primary goal of this chapter was to present the methodologies used to address the research objectives of this study. The chapter opened with a detailed overview of the research technique, population and sample, endogeneity problem, variables, and sources. In addition, the proposed empirical models are detailed, as are the related econometric estimation procedures and diagnostic tests. To summarise, we proposed employing various panel estimations and analyses to identify the direction and strength of the causal links between the variables under consideration. Finally, the chapter specifically examined various individual measures of official assistance development to derive conclusions regarding their impact on FDI and economic growth in selected African countries.

The initial step in the econometric analysis was to run simple pre-diagnostics tests to find the main variables' determinant relationships. Next, the unit root and serial correlation tests determine the variables for stationarity. Finally, the ARDL bounds test concept recommends and justifies cointegration testing. The following chapter presents data analysis and a summary of our empirical research findings.

CHAPTER FOUR

DATA ANALYSIS AND DISCUSSION OF FINDINGS

4.1   Introduction

The objective of this chapter is to respond to and interpret the research findings presented in the preceding chapter. The GMM and ARDL approaches were used in this study to evaluate the factors determining ODA and FDI and the long- or short-term linkages. Furthermore, ODA and foreign direct investment (FDI) causal effects on economic growth are also examined. Finally, using the techniques (GMM and ARDL) mentioned above, the empirical results of the data analysed are compiled and analysed in this study. The objectives of this study were to:

- To identify the key determinants of ODA and FDI into selected African countries;

- To examine ODA, FDI and economic growth long-term relationships in selected African countries;

- To assess the direction and robustness of causality between ODA, FDI and economic growth in selected African countries;

- To determine the ODA threshold level required to trigger significant FDI inflows in selected African countries.

The corresponding research questions this study attempted to answer were:

- What are the key ODA and FDI determinants into selected African countries?

- How are ODA and FDI to selected African countries related to economic growth in the long run?

- What is the direction of causality between ODA, FDI and economic growth in selected African countries, and how robust are these relationships?

- What is the threshold level of ODA required to trigger significant FDI inflows into the selected African countries?

The current study applied the system-generalised method of moments (GMM) to measure the deterministic connection between the independent variables selected and the indicators for the ODA, FDI, and economic growth. In addition, the current study

employed the ARDL to study the relationships between ODA, FDI, economic growth, and cointegration. Once cointegration exists between ODA, FDI, and economic growth, the VECM investigates short-term linkages between ODA, FDI, and economic growth. Another feature of the current research study is that it uses the ARDL system in conjunction with the pool mean group approach, which calculates long-term and short-term correlation. The current study employed panel Dumistrescu-Hurlin granger causality to examine direction and causal relationship between the variables in the analysis. Long-term causality means that long-term coefficients are significant, whereas short-term causality means the importance of short-term coefficients.

Section 4.2.2 and 4.2.3 of the chapter below contain the correlation analysis and descriptive data for the analysis variables. Section 4.3 discusses the unit root pre-test diagnostics conducted prior to examining the variables. In addition, section 4.4 reports on the economic model estimation, discussion, and analysis of the results. Finally, in Section 4.9, the study outlines its conclusion.

4.2 Data, Correlational analysis and Descriptive statistics

The section presents the data used, correlation analysis, and descriptive statistics employed in the current study.

4.2.1 Data

The current study used a dynamic short annual balanced panel data from 1990 to 2018. The data has a limited period and several individuals (groups). The research was unable to extend the time series of the data before 1990 because the data on variable measurements were not available prior to 1990.

4.2.2 Correlational analysis

A correlation matrix exists in the current study to perform a multicollinearity test on our variables at the 5% level of significance. Table 4 below presents the results of the correlation analysis between all variables included in the current study.

Table 4: Correlation matrix

Variables	CPI	DINV	FDI	FPI	GR	GCNS	HCD	NAT	ODA	POP	OPEN
CPI	1,0000										
DINV	-0,0367	1,0000									
FDI	-0.0712**	0.3328***	1,0000								
FPI	0.3631***	-0.1521***	-0.0918***	1,0000							
GR	-0,0066	0.1502***	0.0954***	-0.1839***	1,0000						
GCNS	-0,1751***	0,1606***	0,0461	-0,1583***	0,0162	1,0000					
HCD	-0,1616***	0,1629***	0,0452	-0,2315***	0,0546	0,1666***	1,0000				
NAT	0,1368***	0,1526***	0,2186***	0,2521***	-0,0348	-0,1996***	-0,1404***	1,0000			
ODA	0,3451***	-0,1873***	-0,0405	0,6034***	-0,0992***	-0,0850**	-0,2896***	0,1725***	1,0000		
POP	-0,0197	0,0029	0,0891***	0,0981***	-0,0545***	-0,1539***	-0,3285***	0,2808***	0,2594***	1,0000	
OPEN	-0,0733**	0,3411***	0,3216***	-0,1222***	0,0646*	0,3663***	0,1802***	0,1991***	-0,2727***	-0,3104***	1,0000

***, **, * denote statistical significance at the 1%, 5% and 10% levels, respectively.

Source: Author's own computations

Steed (1986) advises that a cut-off point of 0.7 indicates the correlation between variables. As a result, based on the data in Table 4 above, none of the results returned any high correlations between the variables under the current study. Hence, the current study concludes that multicollinearity is not present in the panel data set. Correlation analysis suffers from the flaw of not showing the direction of the relationship, making it difficult to make policy recommendations. In light of this, the current study only uses correlation analysis as part of pre-estimation diagnostics. Using correlation analysis, for instance, could allow one to determine whether multicollinearity exists before drawing primary conclusions.

The correlation results displayed in Table 4 can be grouped into four categories. A significant negative relationship between (1) foreign portfolio investment and FDI, (2) The non-significant negative relationship between ODA and FDI and (3) Government consumption and human capital development were both found to be positively but non-significantly related to FDI. Finally, the correlation analysis displayed that a significant

positive relationship existed between the following variables: economic growth and FDI, natural resources and FDI, population growth and FDI and trade openness and FDI.

4.2.3 Descriptive statistics

This section describes the summary statistics of variables utilised in the current study estimation. Table 5 below shows the descriptive statistics for the variables employed in the current study:

Table 5: Summary descriptive statistics

Variable	Obs	Skewness	Kurtosis	Jarque-Bera	Prob	Median	Mean	Std. Dev.	Range	Min	Max
CPI	870	3.04	17.90	9385.13***	0.00	6.19	9.58	14.46	120.07	-29.69	128.76
DINV	870	0.65	4.82	182.53***	0.00	19.64	20.07	7.99	57.3	-2.42	59.72
FDI	870	4.71	34.20	38506.22***	0.00	1.85	3.00	5.17	42.05	-8.59	50.64
FPI	870	2.64	13.54	5033.29***	0.00	43.56	58.92	60.26	503.48	1.00	504.48
GR	870	-1.55	26.38	20165.03***	0.00	1.79	1.55	4.87	-9.96	-47.50	37.54
GCNS	870	0.16	3.22	5.47*	0.00	14.06	14.05	5.48	30.64	0.91	31.55
HCD	870	2.80	10.58	3217.85***	0.00	1.00	6.34	12.09	64.80	0.00	64.80
NAT	870	2.01	8.11	1531.237***	0.00	7.37	10.23	9.91	59.62	0.00	59.62
ODA	870	2.79	16.39	7626.21***	0.00	6.89	9.28	10.08	94.76	-0.19	94.95
POP	870	0.14	7.02	588.16***	0.00	2.59	2.44	0.90	7.68	-0.44	8.12
OPEN	870	0.77	3.40	91.23***	0.00	60.16	66.99	29.93	169.41	1.00	170.41

***, **, * represents level of significance at 1%, 5% and 10%, respectively. Obs= Number of observations; Std. Dev. = Standard deviation. CPI is the consumer price index; DINV is domestic investment; FDI is foreign direct investment, FPI represents foreign portfolio investment; GR represents economic growth; GCNS is government consumption; HCD is human capital development; NAT is natural resources; ODA represents official development assistance; POP is the population growth and OPEN represents trade openness. The overall mean is 18.40 calculated by adding up the scores of the mean variables and dividing the total by the number of variable in this case 11.

The total number of observations for variables with a complete data set is 870, with the pooled estimation based on data from 1990 to 2018 primarily due to data availability. The current study included 30 countries in Africa as part of its scope.

There are two methods for determining the presence of outliers in data (refer to Table 5). To begin with, the overall range values for the consumer price index, foreign portfolio investment, and trade openness show that aberrant values or statistical outliers exist in each of these indicators. The standard deviation measurement of more than 1000, according to Moloi (2019), indicates that strange values exist in such multiple variables.

Table 5 showed no outliers or anomalous results after such an assertion. Finally, there is an equivalent distribution for data variables like trade openness and government consumption since their kurtosis values are close to three (Tsaurai, 2017). Consistent with Moloi (2019), the likelihood of the Jarque-Bera criterion for CPI, domestic investment, FDI, foreign portfolio investment, economic growth, government consumption, human capital development, natural resources, ODA, population growth, and trade openness, on the other hand, is zero. In light of the above, these variables do not have regular distributions of data.

Table 5 indicates the mean variables utilised in Africa from 1990 to 2018. The mean inflation GDP deflator (a proxy for consumer price index), net FDI inflow percentage of GDP (a proxy for foreign direct investment), GDP per capita (a proxy for economic growth), general government final consumption expenditure percentage of GDP (a proxy for government consumption), individual using the internet percentage of the population (a proxy for human capital development), total natural resources rent a percentage of GDP (a proxy for natural resources), net ODA inflow percentage of GNI (proxy of official development assistance), and population growth percentage annual (a proxy for population growth) are the variables that recorded the lowest mean, below the overall mean of 18.40 percent of GDP. On the other hand, gross fixed capital formation (a proxy for domestic investment), external debt stocks as a percentage of GNI (a proxy for foreign portfolio investment), and trade percentage of GDP (a proxy for trade openness)

were the only outliers in as far as data variables were concerned because mean variables over this period were well above the overall mean of 18.40 percent of GDP.

It is noted in Table 5 that the ODA as a percentage of gross national income (GNI) ranges from 94.95 to -0.19. Certain economies included in the current study receive extremely little official development assistance, with a threshold of -0.19. Low official development assistance suggests a failure to eradicate poverty and create jobs in developing economies through bridging the financial gap and emancipating people from poverty.

Table 5 indicates that trade openness (OPEN) ranges from 1 to 170.41. Business prospects, competitiveness, and competition-based innovation are enhanced when trade is more open.

As shown in Table 5, the consumer price index (CPI) reaches a record high of 128.76. A higher consumer price index (CPI) can mean higher inflation when goods and services are more expensive. Therefore, the CPI will increase over a short period, usually six to eight months. Eventually, if the inflation rate, measured as the consumer price index in the current study, is too high, it causes significant uncertainty and volatility. Hence companies prefer a low and stable inflation rate. In addition, high inflation rates are likely to increase the cost of raw materials, and workers are bound to demand higher wages in trying to adapt to higher living costs.

The countries sampled in this current study have a high rate of domestic investment (DINV). As a result, the rise in investment will help raise aggregate demand and economic growth in the short term. Moreover, if there is extra capacity, significant domestic investment and aggregate demand will boost the economic growth for the study's panel of countries since the maximum domestic investment rate in Africa was 59.72 from 1990 to 2018. In addition, the average domestic investment rate spread is 7.99, further indicating that the country's productive capacity is growing. Tan and Tang (2016) argued that countries with high domestic investment concentration would further stimulate economic growth.

Table 5 indicates that foreign direct investment (FDI) ranges from -8.59 to 50.64 from 1990 to 2018. According to OECD (2019), Africa escaped the global decline in foreign direct investment in 2018. The rise was fueled by rising demand for particular commodities and accompanying price increases and an increase in non-resource-seeking investment in a few economies. As a result, while FDI flows to some of the continent's largest economies, such as Nigeria and Egypt, decreased, they increased in others, most notably South Africa (OECD, 2019).

Foreign portfolio investment (FPI) recorded a maximum of 504.48 with a minimum of 1.00, as shown in Table 5. For example, a rise in FPI indicates a significant opportunity to sell than foreign direct investment (FDI). On the other hand, a lack of FPI may be attributable to Africa's underdeveloped financial systems. Most enterprises operate as conduits for domestic income generation rather than stock market investments (Marozva and Makoni, 2021).

To summarise, this current study's pooled results for African economies cover the period from 1990 to 2018, as shown in Table 5 descriptive statistics. Based on raw data before any transformation, the descriptive statistics show low Africa's economic growth as a proportion of GDP. For the period under consideration, the mean of economic growth (GR) was 1.55, with a standard deviation of 4.87. As noted in Table 5, the economic growth (GR) ranged from -47.50 to 37.54. According to Saqib, Masnoon and Rafique (2013) a negative economic growth indicates a country's economy is contracting, reflecting a drop in its gross domestic product (GDP) for any given quarter.

Government consumption (GCNS) recorded a mean of 14.05, with a standard deviation of 5.48. The minimum GCNS recorded in Table 5 was 0.91, and the maximum was 31.55. There were no outliers in government consumption expenditures, as all individual country mean values were near the overall African countries' mean values.

Human capital development (HCD), on the other hand, recorded a mean of 6.34. This outcome indicated the need for having sophisticated technological abilities to be hired profitably. Having access to the internet is assumed to have provided workers with a

foundation for learning, obtaining new knowledge, and communicating, which is necessary to understand fundamental instructions in their jobs.

Natural resource endowment (NAT) recorded a low mean of 10.23. Due to plentiful natural resource deposits, much of Africa is appealing to foreign investors. Between 1990 and 2018 in Africa, Table 5 above shows the minimum natural resources (NAT) of 0.00 percent, with the maximum amount being 59.62 percent. The outcome was in line with a previous study by Asiedu (2006), who hypothesised that countries that lack natural resources would attract FDI by improving their institutions and political climate.

The descriptive statistics in Table 5 indicate that between 1990 and 2018, the population growth rate (POP) had a mean of 2.44, with a maximum rate of 8.12 and a minimum of - 0.44, respectively. Regarding the population growth rate, there were no outliers because all the mean values for each country were within a few standard deviations.

4.3   Unit roots tests

It was necessary to conduct static tests to establish the sequence in which the study variables should appear for regression analysis and cointegration testing. Because of their robustness, unit roots tests were applied for regression analysis and cointegration tests to ensure no variables with a higher order of integration existed. Lag duration is selected automatically by Akaike information criteria (AIC) in eviews. The software chose a lag time between 0 and 1.

Following Granger and Porter (2009), the unit root was selected based on the measure's strength, including the test degree of significance). The power of the test explains the possibility of dismissing a false null hypothesis. Under the Levin, Lin, and Chu (LLC), Im, Pesaran, and Shin (IPS), Augmented Dickey-Fuller (ADF), and the Phillips-Perron (PP) tests, the null hypothesis is that the panel contains a unit root that the p-value is essential.

In addition, under the LLC, IPS, ADF, and PP tests, the rejection of the null hypothesis for the alternate explanation that perhaps the panel does not possess a unit root. Table

6 below outlines the unit root test findings of LLC, IPS, and ADF-Fisher-Fisher Chi-square and the estimation techniques for PP-Fisher Chi-square.

Table 6: Unit root tests

Variable	No trend	Intercept and Trend	Individual Intercept	Decision
Panel Unit root test using the LLC				
CPI	-11.7230***	-17.4446***	-17.7177***	I(0)
DINV	-23.8808***	-13.4212***	-16.2247***	I(1)
FDI	-3.93273***	-9.77178***	-6.74358***	I(0)
FPI	-22.6521***	-16.69.3***	-20.1506***	I(1)
GR	-12.7556***	-16.1517***	-16.2913***	I(0)
GCNS	-23.0309***	-13.5693***	-16.7357***	I(1)
HCD	-9.84566***	37.9185***	24.7040***	I(1)
NAT	-25.1302***	-10.8945***	-13.8168***	I(1)
ODA	-8.37241***	-6.43103***	-5.42063***	I(0)
POP	-9.88885***	-3.19217***	-2.96592***	I(1)
OPEN	-26.1502***	-12.2704***	-15.4992***	I(1)
Panel unit root tests using IPS				
CPI	-	-16.2419***	-16.0212***	I(0)
DINV	-	-17.1976***	-19.7652***	I(1)
FDI	-	-11.1624***	-7.62667***	I(0)
FPI	-	-17.3373***	-19.6501***	I(1)
GR	-	-18.0394***	-18.3381***	I(0)
GCNS	-	-15.9407***	-18.5770***	I(1)
HCD	-	-12.5362***	-10.8640***	I(1)
NAT	-	-14.5907***	-17.6388***	I(1)
ODA	-	-6.74427***	-4.66801***	I(0)
POP	-	-12.5908***	-7.14907***	I(1)

OPEN	-	-12.2704***	-18.7524***	I(1)

Panel unit root testing using ADF to Fisher Chi-square

CPI	323.320***	327.372***	349.418***	I(0)
DINV	623.145***	370.332**	447.942***	I(1)
FDI	97.2116***	231.874***	183.356***	I(0)
FPI	525.930***	337.360***	420.439***	I(1)
GR	400.598***	425.461***	410.281***	I(0)
GCNS	633.018***	359.125***	432.366***	I(1)
HCD	258.778***	356.429***	284.646***	I(1)
NAT	594.743**	312.831***	396.906***	I(1)
ODA	158.895***	145.904***	122.326***	I(0)
POP	235.586***	545.355***	176.492***	I(1)
OPEN	644.401***	389.992***	417.836***	I(1)

Panel unit root testing using PP - Fisher Chi-square

CPI	336.183***	475.363***	362.201***	I(0)
DINV	877.631***	850.336***	445.416***	I(1)
FDI	148.959***	228.129***	189.271***	I(0)
FPI	623.769***	365.000***	454.277***	I(1)
GR	537.165***	806.760***	525.644***	I(0)
GCNS	664.210***	693.487***	482.197***	I(1)
HCD	526.485***	583.818***	356.716***	I(1)
NAT	659.827***	577.651***	425.103***	I(1)
ODA	163.616***	154.204***	116.831***	I(0)
POP	234.970***	75.0828***	105.975***	I(1)
OPEN	734.298***	820.950***	478.133***	I(1)

***; **; * indicates that the null hypothesis of unit root tests is rejected at 1%, 5% and 10%, respectively. All the tests are at first difference (except where indicated otherwise.) Probabilities for all the tests assume asymptotic normality except for Fisher tests which are computed using the asymptotic Chi-square distribution. CPI is the consumer price index, DINV is the domestic investment, FDI is the foreign direct investment, FPI is the foreign portfolio investment, GR is the economic growth, GCNS is the government

spending, HCD is the human capital development. NAT is the natural resources, ODA is the official development assistance, POP is the population growth and OPEN is trade openness.
Source: Author's own computations

Except for the CPI, FDI, economic growth, and ODA, all the variables under the current study analysis are primarily first-order integration for the whole unit root test, as shown in Table 6.

4.4 Econometric model estimation results and discussion of findings

Based on the dynamic panel data estimation of the determinants of ODA and FDI, this current study established a causal relationship between ODA and FDI in the African context. The GMM panel method exists to study the correlation between ODA, FDI, and economic growth. This current study employed computed equations using several ODA and FDI proxies. This current study predominantly employed economic growth, foreign portfolio investment, population growth, trade openness, domestic investment, human capital development, consumer price index, natural resources, and government consumption as the variables of interest.

In addition, the current study examined the causal relationship between ODA, FDI, and economic growth using the panel autoregressive distributed lag (ARDL). Finally, the current study discusses the specific approaches and results in sections 4.5 and 4.6 of the current study.

4.5 System General Method of Moments (GMM)

The deterministic relationships between ODA, FDI, and economic growth in Africa were estimated utilising the GMM system technique. Other estimation methods such as the random effects (RE), fixed effects (FE), and the Feasible Generalized Least Square (FGLS) models existed for robustness tests and comparisons with the preferred method. The results of various methods are summarised in the tables following. With endogeneity issues in estimating variables, the preferred method above other estimations is GMM (Tsaurai, 2017). Furthermore, the GMM method is more resistant to heteroskedasticity and autocorrelation problems than other methods. However, Lee, Choi, Lee and Jin (2020) suggested that researchers consider ODA's heterogeneity

before assessing its effectiveness since it may be a factor impacting the recipient country's economic growth when ODA existed.

Furthermore, the GMM technique provides an arithmetically unbiased estimate of t-statistics without requiring the fixed effects model structure of the linear relationship (Naonori and Jen, 2015). Therefore, the GMM measurement method dealt with these challenges and was a favourite technique for the deterministic link between the ODA, FDI, and economic growth. Moreover, GMM is more efficient than ordinary least squares (OLS) and weighted least squares (WLS) in the presence of heteroskedasticity of unknown form with short panel type of data (Lu and Wooldridge, 2020).

The generalised moment of methods (GMM) system was used to overcome the differentiated GMM bias in finite samples, following the Arellano and Bover (1995) and Blundell and Bond (1998) studies. In addition, several existing GMM experiments use different estimating criteria to achieve robust results for adjusting a set of instruments for investigating correlations between ODA, FDI, and economic growth. Thus, to the best of our knowledge, there seems to be no direction regarding specific cut-off points for the number of instruments in GMM estimation provided in the literature of knowledge. However, Han and Phillips (2007) maintain that, even in illustrations where the instruments are few, the GMM estimator has a slight bias.

As with most rule-based methods, the number of instruments used in this study is determined using Roodman's (2009) fundamental rule that states that there should not be more instruments than groups. Unfortunately, the instrument collection collapsed to promote instrument proliferation, significantly impacting Hansen's statistics (Roodman, 2009). Therefore, the current study employed a two-step GMM methodology to measure the accuracy and consistency of the estimation. However, only the GMM two-step technique is detailed as it is more accurate and consistent than the one-step estimation technique (Blundell and Bond, 1998).

Results in Tables 7 and 9 indicate several estimated strategies (Pooled OLS, Fixed effects, random effects, and FLGS) compared to the System GMM (refer to the tables below for more details). For the Hausman tests, the current study employed fixed

effects while excluding the random effects, and therefore the estimated system GMM model represents a panel with fixed effects. The current study focuses on the GMM methodology, although other techniques such as pooled effects, fixed effects, random effects, and FLGS exist for robustness checks and comparison purposes.

The following eleven variables were employed to answer the research objectives of the current study: official development assistance, foreign direct investment, economic growth, foreign portfolio investment, population growth, trade openness, domestic investment, human capital development, consumer price index, natural resources, and government consumption. For ODA and FDI indicators, linear equations existed to estimate the dynamic panel. Hansen (1982) has verified the validity of the instruments' diagnoses, as the usefulness of the instruments relies on their diagnostic qualities. However, no Hansen statistics could rule out the instrument's validity in this study, even though all models used distinct ODA and FDI proxies. The above is significant because Hansen, in 1982, demonstrates it is prohibited to use type II errors (mistaking accurate data for misleading or erroneous data) to pool valid and inaccurate instruments.

There is consistency in the model estimates, as shown by the first-order AR (1) and second-order AR (2) serial correlation results utilising the Arellano and Bond model (1991). The current study presented the AR (1) in Tables 8 and 10 below, and the model is capable of first-order serial correlation. To give another example, Magwedere (2019) put out the concept of AR (2), which holds that the explanatory factors are not post-determined, which means that errors negatively affect the independent variables.

The results of the models do not disprove the null hypothesis of no second-order AR (2) serial correlation, as shown in Tables 8 and 10. In addition, a serial correlation impacts the accuracy of estimates in the error period. Using the Arellano-Bond AR (1) test, the researchers found that serial order one correlation exists. Moreover, employing the Arellano-Bond AR (2) test, the researchers could not discover any association between the instruments and the error term. Because of this, the null hypothesis of no second-order serial correlation cannot be refuted in any regression. Sobiech (2019) suggested

that the coefficient of the lagged dependent variable should be between the Pooled OLS and FE estimates as a requirement for GMM estimation accuracy.

For comparison purposes, Tables 7 and 9 below present the results of the pooled OLS, the Fixed Effects (FE), Random Effects (RE), and the Feasible Generalised Least Squares (FGLS) compared to the two-step difference GMM method. However, the main focus of this study is on two-step GMM because this approach better addresses the issue of endogeneity. In addition, Table 7 below present dynamic panel data estimations on the FDI determinants in African countries.

Table 7: Dynamic panel-data estimations on the determinants of FDI

Variables	Pooled Effects FDI	Fixed Effects FDI	Random Effects FDI	2 Step Diff GMM FDI	FGLS FDI
L.FDI	0.562***	0.394***	0.562***	-0.131	0.562***
	(0.0304)	(0.0331)	(0.0304)	(0.100)	(0.034)
ODA	0.0514***	-0.0212	0.0514***	0.529**	0.0514***
	(0.0188)	(0.0234)	(0.0188)	(0.198)	(0.0188)
GR	0.00722	-0.0168	0.00722	-0.495***	0.00722
	(0.0287)	(0.0284)	(0.0287)	(0.102)	(0.0285)
FPI	-0.00545*	-0.0111***	-0.00545*	-0.196***	-0.00545*
	(0.00305)	(0.00365)	(0.00305)	(0.0408)	(0.00303)
POP	0.308*	0.133	0.308*	21.97***	0.308*
	(0.185)	(0.234)	(0.185)	(5.858)	(0.184)
OPEN	0.0270***	0.0384***	0.0270***	0.314***	0.0270***
	(0.00611)	(0.0110)	(0.00611)	(0.0579)	(0.00607)
DINV	0.0935***	0.176***	0.0935***	0.444***	0.0935***
	(0.0193)	(0.0245)	(0.0193)	(0.0880)	(0.0191)
HCD	-0.00403	0.0105	-0.0040	0.0768	-0.00403
	(0.0123)	(0.0125)	(0.0123)	(0.0861)	(0.0122)
CPI	-0.0260**	-0.0253**	-0.0260**	0.122**	-0.0260**
	(0.0105)	(0.0112)	(0.0105)	(0.0582)	(0.0104)
NAT	0.0174	-0.0689**	0.0174	-0.430***	0.0174
	(0.0166)	(0.0292)	(0.0166)	(0.0836)	(0.0165)
GCNS	-0.0542*	-0.114**	-0.0542*	-2.321***	-0.0542*
	(0.0286)	(0.0451)	(0.0286)	(0.361)	(0.0284)
_cons	-2.320***	-1.168	-2.320**		-2.320***
	(0.752)	(0.960)	(0.752)		(0.746)
N	840	840	840	810	840
R^2		**0.393**			
Instruments				28	
Groups				30	

Standard errors in parentheses; * $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$

Notes: ***, **, * are statistical significance at the levels of significance of 1%, 5% and 10% levels, respectively. FDI is foreign direct investment, ODA is official development assistance, GR is economic growth, FPI is foreign portfolio investment, POP is population growth, OPEN is trade openness, DINV is domestic investment, HCD is human capital development, CPI is the consumer price index, NAT is natural resources and GCNS is government consumption
Source: Author's own computations

4.5.1 Foreign direct investment (FDI) determinants

In developing countries, FDI is remarkable and contributes significantly to a country's total economic growth. In Brazil, Russia, India, China, and South Africa (BRICS), Jadhav (2012) investigated the factors that influence FDI. Economic factors such as market size, trade openness, and natural resources emerged as more important than institutional (government effectiveness and regulatory quality) and political factors in BRICS economies when using panel data analysis for 2000 to 2009 (Jadhav, 2012).

Saini and Singhania (2018) investigated the foreign direct investment in developed and developing countries employing generalised moment of methods (GMM) from 2004 to 2013. In addition, Saini and Singhania (2018) employed GMM to capture the endogeneity, while the Hausman test indicates the applicability of random and fixed effects. As a result, Saini and Singhania (2018) found that FDI-related economic determinants such as gross fixed capital formation, trade openness, and efficiency positively affected economic growth in developing countries, while the freedom index positively affected economic growth in developed countries.

FDI measures the degree of interest of investors from other countries (home) in another country (host) by setting up business outside the owner's shore. In this current study, FDI determinants are as follows: ODA, government consumption, trade openness, domestic investment, economic growth, consumer price index, natural resources, human capital development assistance, population growth, and foreign portfolio investment for the 1990 to 2018 period. The current study employed the pooled effects, fixed effects, random effects, dynamic GMM (2-step), and FGLS techniques to ascertain the impact, individual and overall importance thereof. First, however, results will be discussed based on the GMM. Thus, we examined the effects of the regressors on the regressand as shown in sections 4.5.2 to section 4.5.12.

4.5.2 Foreign direct investment and lagged foreign direct investment flows

As shown in Table 7 above, the 2 step difference GMM shows that the FDI lag had a non-significant negative impact on FDI. Our GMM results contradict the findings by Walsh and Yu (2010). Walsh and Yu (2010) argued that foreign investors promote

investors looking to start new ventures to benefit from the financial and non-financial benefits they already enjoy. The Walsh and Yu (2010) study results are pretty similar to those of Barrell and Pain (1999), which found that having other, existing foreign investments present serves as a signal to investors about future investment. Our findings are due to the relatively low FDI inflows channeled towards African economies, and any previous FDI made does not influence current and future flows. Foreign investors are generally always on the lookout for opportunities, mainly in extractive activities found in the continent's natural resources.

4.5.3 Foreign direct investment (FDI) and official development assistance (ODA)

Foreign direct investment (FDI) and official development assistance (ODA) are the two significant funding sources for developing countries. An analysis of the relationship between ODA, FDI, and economic growth in South East Asia (SEA) and South Asia from 1980 to 2016, was carried out by Rao, Sethi, Dash and Bhujabal (2020) using the system generalised method of moments (SGMM). Rao *et al.* (2020) found that ODA negatively affected FDI and economic growth. Methodologically, Rao *et al.* (2020) believe that the system GMM is superior since it considers fewer instruments than the difference GMM. Moreover, the system GMM makes use of the lagged explanatory factors in the model's level and differenced lagged variables.

According to the 2-step difference GMM in table 7 above, FDI had a statistically significant and positive effect on ODA (at the 5% significance level). Theoretically, FDI has a strong influence since it acts as a conduit via which technological innovation is transferred from one economy to the other, maximising production and GDP in the recipient economy. These findings confirm that, because our focus is on developing countries, these economies tend to attract some ODA and FDI, depending on the need for funding.

4.5.4 Foreign direct investment (FDI) and economic growth (GR)

From 1970 to 2011 in ECOWAS, Philip and Adeyemi (2013) used the GMM panel estimate technique to examine the link between FDI and economic growth. Philip and Adeyemi (2013) demonstrated that contrary to prior studies, the system GMM in their

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study did not display any notable results since FDI made no substantial contribution and harmed economic growth in ECOWAS. Instead, relationships between FDI and economic growth existed by the signs of the partial slopes for economic growth (GR) in the dynamic GMM (2-step) model.

From Table 7 above, the two-step difference GMM model specification, the results indicate that FDI net inflows (%GDP) had a statistically significant but negative relationship to the economic performance of the African region from 1990 to 2018. Because the above implies that an economy with low economic growth prospects is unlikely to attract FDI inflows in the long run, as there would be minimal returns on investment for foreign investors. Our results contradicts Mohr (2015), who states that FDI creates additional employment in the domestic sector by physically creating innovative opportunities and indirectly by increasing domestic expenditures due to the recent personnel purchases of products and services. Those mentioned above, in turn, should have a positive multiplier effect on the economy.

4.5.5 Foreign direct investment (FDI) and foreign portfolio investment (FPI)

Roopa (2020) revealed that FDI and FPI closely affected economic development. A large part of the economy's growth is due to FDI and FPI's ability to provide employment opportunities, build infrastructure, and gain technological know-how (Roopa, 2020). As shown in Table 7 above, the empirical results revealed that a statistically significant, negative relationship exists between FDI and FPI Africa. The findings in Table 7 reveal that, as FPI increases, Africa's ability to attract FDI declines due to concerns about tax burdens, as government revenue is reliant on taxation to improve repayment of external debt stocks measuring FPI. Our finding is similar to that of Nxumalo and Makoni (2021), who found that, in the case of twelve emerging markets studied over the period 2007-2017, FPI and FDI substituted one another, particularly in the presence of institutional quality. Where FPI serves its purpose, it is withdrawn in exchange for the more permanent FDI option in the host country. In African economies, FDI and FPI are both key sources of funding. Foreign capital (FDI and FPI) invests in infrastructure, production operations, commercial institutes, and other economic opportunities like capital equipment, resulting in economic growth and job creation (Roopa, 2020).

4.5.6 Foreign direct investment (FDI) and population growth (POP)

Table 7 above shows a positive and highly significant relationship between FDI and population growth in Africa. These results confirm the statistical importance of population growth to FDI flows in Africa, in that an increase in the population will command more investment (domestic and foreign). An investor-friendly economy with an extensive market experiences increased demand as enhanced by the population. Hence foreign investors will always be willing to tap into such a market. Theoretically, high population growth increases demand for public goods and services such as education and health care (Mohr, 2015). According to Mohr (2015), substantial population growth can be a substantial cause of unemployment. Furthermore, a rise in population growth generally dampens the possibilities for significant domestic savings since the most output goes toward consumption and the marginal propensity to consume is high (Matchaya, Nhemachena, and Nhlengenthwa, 2018).

4.5.7 Foreign direct investment (FDI) and trade openness (OPEN)

Trade openness has long been of interest to foreign and development economists because of its impact on a country's ability to attract FDI. Hence, Cantah, Brafu-Insaidoo, Wiafe, and Adams (2018) claims that trade openness heavily influences FDI in Africa. In addition, Cantah *et al.* (2018) stressed that selecting the correct trade openness indicator is crucial as FDI and trade openness have a strong correlation. Moreover, the empirical studies on the FDI inflows and trade openness correlation have suffered from lacking a suitable theoretically derived openness measure (Cantah *et al.*, 2018). Trade liberalisation level positively impacts the decision to invest in a foreign country. Because this shows the democratisation of the business environment of an economy, this analogy is portrayed by trade openness as it influences foreign direct investment in Africa.

Table 7 displays that trade openness (OPEN) has a positive and significant impact (at the 1% level) on FDI in Africa. It is clear that trade liberalisation plays a vital role in influencing inward FDI flows in Africa, and this is in congruence with economic theory and earlier empirical studies. Positive trade openness leads to better rates of economic growth. Additionally, positive trade openness raises the aggregate spending function

and the equilibrium income level. Furthermore, trade openness is a critical determinant of economic growth, job creation, and poverty alleviation (Mohr, 2015). Moreover, trade openness generates additional market opportunities for domestic enterprises, higher productivity, and competition-driven innovation (Cantah *et al.*, 2018). According to Cantah *et al.* (2018), trade openness fosters efficient resource allocation, factor accumulation, technological diffusion, and knowledge spillovers.

4.5.8 Foreign direct investment (FDI) and domestic investment (DINV)

According to Szkorupova (2015), attracting FDI benefits the host economy by increasing domestic investment. Furthermore, Szkorupova (2015) found a direct correlation between physical capital stock and economic growth and a positive association between investment and physical capital stock (domestic and foreign). Therefore, gross fixed capital formation measures domestic investment in the current study (DINV).

Table 7 above demonstrates that domestic investment (DINV) has a positive and significant relationship with FDI, providing evidence that both local and foreign investors play a role in providing financial resources to fund productive sectors of the host country's economy. Rising domestic investment contributes to significant production and revenue while public spending is static. Therefore, favourable domestic rates in Africa are conceivable due to lower interest rates and increasing output and income levels (Mohr, 2015). Finally, as interest rates fall, domestic investment rises, as does the level of output and income (Mohr, 2015).

4.5.9 Foreign direct investment (FDI) and human capital development (HCD)

In modern society, access to the internet is vital for a business's smooth and efficient operation. In this current study, human capital development (HCD) is proxied as a percentage of the population using the internet and is a significant determinant of FDI.

The results in Table 7 above indicate that human capital development (HCD) has a positive but insignificant effect on inward FDI flows to Africa. The current study results are likely due to a digital divide in Africa, as the adoption of information and communication technology (ICT) is still low compared to other developing regions such as South America or Asia.

4.5.10 Foreign direct investment (FDI) and consumer price index (CPI)

Price stability is one of the macroeconomic policy objectives because unstable prices can frustrate aggregate demand and investment in an economy.

Table 7 above indicates that CPI has a significantly positive impact on FDI flows to our sampled African countries. Therefore, persistent increases in the general price level will encourage demand and consumption. Thus, investments will increase too, making it profitable for investors as they can produce or manufacture more products while also earning high returns on investments made. Under the 2-step dynamic GMM model, CPI was, however, found to exert a significant and positive influence on FDI flows, at the 5% level of significance.

In other words, rising CPI means more inflation. As a result of our findings in Table 7, Africa had substantial inflation from 1990 to 2018. Thus, excessive inflation threatens economic growth and can affect the pricing of Africa's capital instruments, shares, and commodities. However, according to Mohr (2015), the CPI enables investors to mitigate the above risks by investing in securities that profit from inflation.

4.5.11 Foreign direct investment (FDI) and natural resources (NAT)

Because of the abundance of natural resources in Africa, potential investors seek to invest financial resources to tap into the abundant natural resources in the African continent. Therefore, the current study measured natural resources using the total natural resource rents as a percentage of GDP.

The data in Table 7 above suggest that natural resources negatively influenced FDI in Africa. This result was unexpected, given that natural resource endowment is one of the primary drivers of FDI from other nations. However, as host countries' macroeconomic policies change, many governments are now imposing a cap on extractive industry investments to secure local beneficiation.

According to the OECD (2019), the economic importance of natural resources is contingent on the quantity of two main variables: current income flows and potential future income flows. The foremost is determined mainly by production costs and market

demand, while natural resource endowments and management strategies determine the second. Therefore, it is imperative to consider current, and future income flows to comprehend the value of natural resources. If revenue arises from the depletion of natural capital, current flows may be a misleading estimate of how natural resources will contribute to economic growth over time (OECD, 2019). On the other hand, resource-rich countries can provide the groundwork for long-term development and poverty reduction by managing natural resources responsibly (OECD, 2019). In addition, natural resources also help increase fiscal revenue and employment and reduce poverty.

4.5.12 Foreign direct investment (FDI) and government consumption (GCNS)

Government expenditure is critical in determining aggregate demand that supports FDI, especially in emerging nations like Africa. The empirical results in Table 7 above show that government consumption has a significant negative impact on foreign direct investment in Africa.

The results in Table 7 displayed a negative relationship between government consumption and FDI, suggesting that Africa cannot attract FDI due to higher government consumption. However, increased government consumption is likely to improve aggregate demand, leading to higher economic growth. Furthermore, higher government consumption can crowd out if the economy is nearing capacity. Many developing countries run on budget deficits. The current study finding confirms that, even if the economic and social value of government spending on FDI is so apparent, government spending does not attract FDI, and governments will not stop spending.

From the above discussion results on the key FDI determinants in Africa, the current study computed the diagnostics statistics on the determinants of foreign direct investment (FDI) in Africa from 1990 to 2018. Below is Table 8, which presents the diagnostic statistics on FDI determinants.

Table 8: Diagnostic statistics on the determinants of FDI

	Pooled effects	Fixed effects	Random effects	System GMM	FLGS
Observations	840	840	840	810	840
Groups	30	30	30	30	30
Instruments	28	28	28	28	28
F-stats/Wald chi2	674.12***	46.97***	674.12***	29.82***	683.89***
Prob>F/Prob>Wald chi2	0.0000	0.0000	0.0000	0.0000	0.0000
Hausman Test		69.39***			
Prob>chi2		0.0000			
R-SQUARED	0.4488	0.3306	0.4488		
Rho		0.2877	0.0000		
Arellano-Bond AR(1)				-0.86	
Prob>z				0.391	
Arellano-Bond AR(2)				-0.60	
Prob>z				0.549	
Sargan test of overid				4.85	
Prob>chi2				0.998	
Hansen test of overid				8.35	
Prob>chi2				0.959	
Pesaran's test for CSD		4.062	7.044		
Probability		0.0000	0.0000		
Frees' test of CSD		0.950	0.286		
Critical value @5%		0.1204	0.1204		

Standard errors in parentheses * $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$
Source: Author's own computations

F statistic/Wald chi square test

The overall significance of the regressors [past values of foreign direct investment (FDI), official development assistance (ODA), economic growth (GR), foreign portfolio investment (FPI), population growth (POP), trade openness (OPEN), domestic investment (DINV), human capital development (HCD), consumer price index (CPI), natural resources (NAT) and government consumption] on the regressand [current

value of FDI] is examined by deploying the F-statistic and Wald chi-square.

Table 8 displays that the past value of FDI, ODA, economic growth, FPI, population growth, trade openness, domestic investment, human capital development, inflation, natural resources, and government consumption are positive and statistically significant to the current value of FDI. The current study findings suggested that the regressors are mutually significant in determining the current value of the foreign direct investment in our sampled African countries.

Hausman test

As a result of the Hausman test, it is possible to determine which model is most appropriate to estimate the effects of foreign direct investment in Africa. As seen in the results provided in Table 8, the chi-square is 69.39, and the probability is 0.000. Therefore, the null hypothesis of random effects fails in the current study. Therefore, the random-effects model is ineffective for estimating foreign direct investment factors in Africa. Fixed effects models are therefore adequate for estimating the static model.

Coefficient of determination test

The R-squared measures the coefficient of determination, reflecting the ratio of causation in the current value of FDI determined by the explanatory variables. For example, the R-squared values in Table 6 above are between 0.33 - 0.45 for African countries. The above implies that 33 - 45 percent of the variations in the current value of FDI are caused by past values of FDI, ODA, economic growth, and all other variables, as earlier mentioned above.

Autocorrelation, Sargan and Hansen tests

Diagnostic tests for foreign direct investment in Africa have been performed and the results can be found in Table 8 above. System-generalised moment of methods (S-GMM) rely heavily on the diagnostic tests of Arellano-Bond test for zero autocorrelation and Sargan and Hansen tests of over-identifying constraints for instrumental variables to determine their validity. No normality is assumed in the dynamic panel model (SGMM), although heteroscedasticity can be managed (Baltagi, 2008).

The current study employed the Arellano-Bond test for zero autocorrelation and the Sargan and Hansen tests for over-identification constraints to validate the models used. According to Arellano and Bond (1991), the dynamic panel model's estimators need a first-order serial correlation in the residuals but no second-order autocorrelation (serial correlation). Therefore, the null hypothesis is no autocorrelation (serial correlation), which does not exclude H0.

The current study did not disprove H0 at the 10 percent significance level in the first difference error (2), based on the Arellano-Bond tests for zero autocorrelation results for the FDI model, as shown in Table 6, which further indicates that the dynamic GMM: z = -0.60 with p-value = 0.549. Therefore the serial correlation is absent from the model. The Arellano-Bond test for zero autocorrelation yields these results, which verify our FDI model in the current study.

The current study employed the Sargan and Hansen tests to evaluate the entire set of over identifiable instruments in the model. The FDI model in the current study is reliable, as the current study findings indicate the chi-square statistic and p-value to be 0.998 and 0.959, respectively. Therefore, the current study does not reject the null hypothesis and concludes that over-identification restrictions are valid. Therefore, the FDI model in Africa is valid and exogenous.

4.6 Official development assistance (ODA) determinants

Another objective of this current study was to evaluate the determinants of official development assistance (ODA), as quantified by net ODA inflow percent of gross national income (GNI). These determinants include past values of net official development assistance (ODA), foreign direct investment FDI), economic growth (GR), foreign portfolio investment (FPI), population growth (POP), trade openness (OPEN), domestic investment (DINV), human capital development (HCD), consumer price index (CPI), natural resources (NAT) and government consumption (GCNS). The actual influences of the ODA determinants appear in table 9 below:

Table 9: Dynamic panel-data estimations on the determinants of ODA

Variables	Pooled Effects ODA	Fixed Effects ODA	Random Effects ODA	2 Step Diff GMM ODA	FGLS ODA
L. ODA	0.714***	0.498***	0.714***	0.112***	0.714***
	(0.0263)	(0.0320)	(0.0263)	(0.0307)	(0.0261)
FDI	0.0165	-0.0871**	0.0165	0.0380*	0.0165
	(0.0394)	(0.0433)	(0.0394)	(0.0202)	(0.0391)
GR	-0.267***	-0.263***	-0.267***	-0.103**	-0.267***
	(0.0402)	(0.0390)	(0.0402)	(0.0404)	(0.0399)
FPI	0.0209***	0.0361***	0.0209***	-0.0717***	0.0209***
	(0.00421)	(0.00494)	(0.00421)	(0.00924)	(0.00418)
POP	0.597**	0.530*	0.597**	11.12***	0.597**
	(0.247)	(0.311)	(0.247)	(2.155)	(0.245)
OPEN	-0.00983	0.0101	-0.00983	-0.0923**	-0.00983
	(0.00833)	(0.0147)	(0.00833)	(0.0340)	(0.00827)
DINV	0.00202	0.0506	0.00202	0.0910***	0.00202
	(0.0264)	(0.0334)	(0.0264)	(0.0313)	(0.0262)
HCD	-0.00906	0.00544	-0.00906	-0.0703***	-0.00906
	(0.0165)	(0.0166)	(0.0165)	(0.0185)	(0.0164)
CPI	0.0300**	0.0203	0.0300**	0.249***	0.0300**
	(0.0142)	(0.0150)	(0.0142)	(0.0228)	(0.0140)
NAT	0.0163	0.122***	0.0163	0.390***	0.0163
	(0.0222)	(0.0388)	(0.0222)	(0.0328)	(0.0221)
GCNS	0.0895**	0.00577	0.0895**	0.704***	0.0895**
	(0.0384)	(0.0603)	(0.0384)	(0.144)	(0.0381)
_cons	-1.028	-1.599	-1.028		-1.028
	(1.015)	(1.286)	(1.015)		(1.007)
N	840	840	840	810	840
R^2		0.506			
Instruments				28	
Groups				30	

Standard errors in parentheses * $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$
Notes: FDI is foreign direct investment, ODA is official development assistance, GR is economic growth, FPI is foreign portfolio investment, POP is population growth, OPEN is trade openness, DINV is domestic investment, HCD is human capital development, CPI is the consumer price index, NAT is natural resources and GCNS is government consumption.

Thus, the study examined the effects of the regressors on the regressand, as shown in section 4.6.1 to section 4.6.11

4.6.1 *Official development assistance (ODA) and lagged official development assistance*

The 2-step difference GMM in Table 9 above displays that the ODA lag had a significant positive impact on the current ODA. These current study results of ODA lag validate the historical self-importance and significance to current and future values of net official development assistance in Africa. Therefore, developing countries that have previously received ODA are likely to continue receiving such flows, making it difficult to shake off the dependency syndrome.

4.6.2 *Official development assistance (ODA) and foreign direct investment (FDI)*

Table 9 shows the results of the 2-step difference GMM; the current study revealed that FDI positively and significantly affected ODA in Africa. The current study findings imply that ODA flow in African countries attracts FDI into the region. According to the current findings of the study, African official development assistance boosts capital's marginal productivity by funding complementary initiatives like human capital investment and public infrastructure, which later boosts economic growth.

4.6.3 *Official development assistance (ODA) and economic growth (GR)*

Based on data from 1970 to 2010 in developing countries, Rahnama, Fawaz, and Gittings (2017) utilised GMM to examine the effects of official development assistance on economic growth. The data used in the Rahnama, Fawaz, and Gittings (2017) study originated from the World Bank database indicator. According to Rahnama *et al.* (2017), ODA boosts economic growth for high-income developing countries, whereas it has the opposite effect for lower-income countries. In addition, in both high and lower-income developing countries, Rahnama *et al.* (2017) concluded that higher corruption, the inflation rate, and higher unemployment rates result in lower economic growth. Therefore, the current study aligns with Rahnama *et al.* (2017), as some African countries qualified as low-income developing countries.

Using a 2-step difference GMM model from 1990 to 2018 in Africa, the current study in Table 9 above displayed that ODA negatively and significantly affected economic

growth in Africa. The current study findings displayed in Table 9 above indicate that Africa has consumed all of its ODA. As a result, ODA replaces rather than supplements native resources, facilitates the import of inadequate innovation, and disrupts local income distribution, which increases the unemployment rate and poverty and later impedes the economic growth in Africa.

4.6.4 *Official development assistance (ODA) and foreign portfolio investment (FPI)*

Table 9 above displayed that FPI negatively and significantly affected ODA in Africa. Since FPI and ODA are both forms of international capital flows, they exhibit a high likelihood of substitutability for one another. Hence, the current findings confirm that FPI and ODA are substitute capital flows, and where developing countries are lacking insofar as attracting FPI is concerned, they will turn to ODA.

4.6.5 *Official development assistance (ODA) and population growth (POP)*

Employed 2-step difference GMM, the current study in Table 9 displayed that population growth positively and significantly affected official development assistance in Africa. The current study result is mainly due to an increased need for ODA when developing countries cannot sustain economic activities for their growing populations, thus needing capital injections that do not require repayment, to see through some of the national projects in place. The current study findings confirm that ODA finance skills development leads to poverty reduction, decreases unemployment level, and promotes economic growth in Africa.

4.6.6 *Official development assistance (ODA) and trade openness (OPEN)*

Table 9 demonstrated that trade openness negatively and non-significantly affected ODA in Africa from 1990 to 2018. As demonstrated in Table 9 above, the current study results imply that countries will continue to depend on aid, where their economic activities are confined, and countries do not engage in the business of imports and exports. A closed economy is much to the detriment of many developing countries, and Africa is no different. Given ODA's detrimental impact on African trade openness, it is only reasonable that its net effect on trade balance will be unfavourable.

4.6.7 *Official development assistance (ODA) and domestic investment (DINV)*

The current study in Table 9 above revealed that domestic investment (DINV) exerts a positive and non-significant impact on ODA. As demonstrated in Table 9 above, the result of the current study implies that the two sources of funding are complementary. When donors of ODA acknowledge the efforts of developing countries to raise capital internally, it is an indicator that the brand of a nation is strengthening enough to exit ODA eventually and attracts other international capital flows, such as FDI and FPI. Considering the consistently improving ODA on domestic investment in Africa, providing the excess funds would have an overall positive effect on the trade deficit.

4.6.8 *Official development assistance (ODA) and human capital development*

Using the 2-step difference GMM model from 1990 to 2018 in Africa, the current study in Table 9 above indicates that human capital development (HCD) negatively and non-significantly affected official development assistance (ODA). The current study measured human capital development (HCD) as a percentage of the population using the internet. Hence, it is not surprising that the internet population has recently increased in Africa. However, Africa continues to report skills shortages in people using the internet. In addition, the current study result indicates that with fewer skills people use the internet, Africans lack technical skills, particularly on the internet, to meet the demand by employers across all economic sectors. Given the negative impact of ODA on Africa's human capital development, it is only natural that the net effect on production and income will be negative.

4.6.9 *Official development assistance (ODA) and natural resources (NAT)*

Using the 2-step difference GMM model, the current study in Table 9 above demonstrates that natural resources (NAT) positively and insignificantly affected official development assistance in Africa from 1990 to 2018. The current study result implies that ODA and natural resources contribute toward fiscal revenue, income, and poverty reduction. In addition to the current study, ODA is proxied by the net ODA inflow percent of gross national income (GNI). According to the current study's findings in Table 9 above, since ODA has a strong influence on abundant natural resources in Africa, the overall outcome on the national account should be favourable.

4.6.10 *Official development assistance (ODA) and government consumption*
Higher government spending exhausts the country's economic reserves, raising interest rates (Njeru, 2003). The above could result in lower additional investment in sectors including domestic infrastructure and economic output, which comprises the basic infrastructure contributing to the economy's output. In addition, Njeru (2003) emphasised that countries with good trade, fiscal and monetary policies registered high positive impacts on ODA.

Employed 2-step difference GMM from 1990 to 2018 in Africa, the current study in Table 9 above displayed that government consumption (GCNS) positively and significantly affected official development assistance (ODA). As presented in Table 9 above, the current study results imply that there are strong indications that government consumption attracts ODA in Africa. Considering the positive of ODA on Africa's government consumption, it is only natural that the net effect on budget deficit should be unfavourable.

4.6.11 *Official development assistance (ODA) and consumer price index (CPI)*
Lastly, using a 2-step difference GMM from 1990 to 2018 in Africa, the current study in Table 9 revealed that the consumer price index (CPI) positively and significantly affected official development assistance (ODA). Therefore, the current study findings imply that Africa can absorb or manage further ODA inflow. The openness of a country's trade determines its balance of trade, which varies by all the factors that influence foreign trade. Therefore, institutional factors and economic output, trade regulations, currency fluctuations, treasury securities, inflation (CPI), and consumption are all examples. From the above, the current study result displayed in Table 9 above confirms that given the fact that ODA positively affects consumer price index, only reasonable that its net effect on trade balance will be favourable

From the above discussion results on the critical ODA determinants in Africa, the current study computed the diagnostics statistics on the determinants of official development assistance (ODA) in Africa from 1990 to 2018. Below is Table 10, which reflects the diagnostic statistics on ODA determinants.

Table 10: Diagnostic statistics on the determinants of ODA

	Pooled effects	Fixed effects	Random effects	System GMM	FLGS
Observations	840	840	840	810	840
Groups	30	30	30	30	30
Instruments	28	28	28	28	28
F-stats/Wald chi2	2198.03***	74.28***	2198.03***	2923.68***	2229.88***
Prob>F/Prob>Wald chi2	0.0000	0.0000	0.0000	0.0000	0.000
Hausman Test Prob>chi2		151.14*** 0.0000			
R-SQUARED	0.7264	0.6756	0.7264		
Rho		0.2960	0.000		
Arellano-Bond AR(1) Prob>z				-2.86 0.018	
Arellano-Bond AR(2) Prob>z				0.17 0.863	
Sargan test of overid Prob>chi2 Hansen test of overid Prob>chi2				4.42 0.999 19.66 0.292	
Pesaran's test for CSD Probability		5.323 0.0000	11.003 0.0000		
Frees' test of CSD Critical value @5%		1.010 0.1204	0.495 0.1204		

Standard errors in parentheses * *p < 10%,* ** *p < 5%,* *** *p < 1%*
Source: Author's own computations

F statistic/Wald chi square test

The overall significance of the regressors [past values of official development assistance (ODA), foreign direct investment (FDI), economic growth (GR), foreign portfolio investment (FPI), population growth (POP), trade openness (OPEN), domestic investment (DINV), human capital development (HCD), consumer price index (CPI), natural resources (NAT) and government consumption] on the regressand [current value of FDI] is examined by deploying the F-statistic and Wald chi-square.

Table 10 displays that the past value of ODA, economic growth, FPI, population growth, trade openness, domestic investment, human capital development, inflation, natural resources, and government consumption are positive and statistically significant to the current value of ODA. The current study findings suggested that the regressors are mutually significant in determining the current value of the official development assistance in our sampled African countries.

Hausman test

The fundamental goal of the Hausman test is to find the model that most accurately captures the impact of net official development assistance (ODA) determinants in Africa. Table 10 shows a chi-square of 151.14 with a probability of 0.000. The findings of the current study reject the null hypothesis of random effects. This finding demonstrates that the random-effects model is ineffective for estimating net official development assistance (ODA) drivers in Africa, as demonstrated in Table 10. Thus, the fixed effects model is appropriate for estimating the static model for net official development assistance (ODA) in Africa.

Coefficient of determination test

The R-squared measures the coefficient of determination, which determines the ratio of causation in the current value of net ODA, as determined by the explanatory variables. The R-squared values for the current study are between 0.6756 and 0.7264 in Africa. The above implies that 68 - 73 percent of the variations in the current value of ODA are caused by past values of ODA, FDI, economic growth, and all other variables, as earlier mentioned above.

Autocorrelation, Sargan and Hansen tests

Table 10 provides the findings from the diagnostic tests of the dynamic models of official development assistance in Africa. The Arellano-Bond test for zero autocorrelation and the Sargan and Hansen tests of over-identifying limitations for instrumental variables are essential for using the system-generalised method of moment (SGMM). Heteroscedasticity is accounted for by the SGMM, which does not presume normality (Baltagi, 2008). The findings of this study utilised the Arellano-Bond test for zero autocorrelation and the Sargan and Hansen test to examine the instrumentation of the models.

When estimating dynamic panel models, Arellano and Bond (1991) state that there must be a first-order serial correlation but no second-order autocorrelation (serial correlation). The null hypothesis states no autocorrelation (serial correlation), which does not exclude H0. The current study does not reject H0 at the 10 percent significance level in the first-differenced error (2) based on Arellano-Bond tests for zero autocorrelation outcomes for the official development assistance model shown in table 8, which indicate that dynamic GMM: $z = -0.17$ with p-value = 0.863. From the above, there is no evidence of serial correlation. These findings are consistent with the Arellano-Bond test assumptions of zero autocorrelation and prove the model's efficacy for official development assistance in Africa.

The current study further validates the official development assistance model with the Sargan and Hansen tests. As a result, the current study employed the Sargan and Hansen test to evaluate all model over-identification instruments. Based on the chi-squares statistic and P-value for the ODA model, dynamic GMM: Sargan, $chi2 = 4.42$, p-value = 0,999, and Hansen, $chi2 = 19.66$, p-value = 0.292, we do not reject the null hypothesis, and support over-identifying restrictions as genuine. Therefore, the ODA model in Africa is valid and exogenous.

4.7 Cointegration and error correction

We further sought to investigate the cointegration between foreign direct investment, official development assistance, and economic growth in the African context. For the

current cointegrating links, foreign direct investment and official development assistance have served as proxies and economic growth.

Two variables are cointegrated if they exhibit a long-run equilibrium correlation (Moloi, 2019). There was cointegration between the variables, so the current study employed vector error correction (VEC) between FDI, ODA, and economic growth. Determinants of ODA and FDI are discussed and tested in the current study.

The current study correctly selected the pooled mean group (PMG) estimator in a panel ARDL approach given that the Hausman test results indicated slope homogeneity in the cointegrating vector. The variables should not be of a higher order than first-order integration I(1) to ensure the accuracy of the estimates when using the ARDL approach. In addition to the error correction term (ECT), the panel ARDL estimation exists to assess short-run aspects of the correlation between FDI, ODA, and economic growth in Africa.

On the other hand, ARDL panels for short- and long-term coefficients and their error correction coefficients show the cointegration relationship between FDI, ODA, and overall economic growth. Since panel ARDL can determine short-term and long-term associations, it can also function as an error correction model (Kalai and Zghidi, 2019).

4.7.1 *Cointegration and error correction model for FDI, ODA and economic growth*

Table 11 below indicates if there is a long and short-run relationship between FDI, ODA, and economic growth using the Pooled mean group (PMG), Mean group (MG), and Dynamic fixed effects (DFE). The current study focused on the results of the PMG while those of other techniques were for robustness checks. Table 11 below indicate estimated long-run and short-run results in the ARDL Model when FDI regressed using the PMG, MG, and DFE on the cointegrating relationship between FDI, ODA, and economic growth in Africa.

Table 11: Estimated Long Run and Short Run Results in the ARDL Model

	PMG D.FDI	MG D.FDI	DFE D.FDI
Long Run			
ODA	-0.0332*	-0.231	-0.170***
	(-2.04)	(-1.82)	(-3.47)
GR	0.201***	0.186	0.0705
	(5.60)	(1.33)	(0.75)
ECT	-0.506***	-0.589***	-0.465***
	(-10.48)	(-11.25)	(-14.51)
Short Run			
D.ODA	0.0702*	0.180**	0.0564*
	(1.98)	(2.75)	(2.06)
D.GR	-0.0331	-0.0293	0.00142
	(-0.98)	(-1.04)	(0.05)
_cons	1.579***	2.609***	2.204***
	(4.81)	(5.39)	(7.30)
N	840	840	840

*t statistics in parentheses * $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$*
Source: Author's own computations

Table 11 above presents the estimated long-run and short-run results using the ARDL estimation approach. When FDI regressed, long-run estimates show that foreign direct investment negatively affected official development assistance over the study period. The above is statistically significant at 10% and 1% in PMG and DFE, respectively, while MG is non-significant. The above means that an increase in foreign capital flows will result in 0.03, 0.23, and 0.17 (PMG, MG, and DFE, respectively) units decline in the economic growth in Africa.

In the long-run FDI inflows were found to be negative contributors to economic growth in Africa over the study period. This long-run negative impact of FDI on economic growth existed to the fact that FDI income is not diverted into valuable purposes in the region, resulting in native enterprises losing market share, weak absorption capacity, and inefficient economic rivalry (Iamsiraroj, 2016). This finding is consistent with the findings

of Saqib, Masnoon and Rafique (2013), and Rahman (2015), who concluded that FDI inflows harmed economic growth but differed from Gui-Diby (2014), and Adam and Opoku (2014).

Results on the economic growth indicate that foreign direct investment positively affected economic growth in the long run over the study space, recording a statistical significance of 1% in PMG while MG and DFE are non-significance. The above means that a rise in foreign capital flows will result in 0.20, 0.19, and 0.07 (PMG, MG, and DFE, respectively) units increase in the Africa's economic growth.

On the other hand, when FDI regressed, short-run estimates indicate that foreign direct investment positively affected official development assistance over the study period. The above is statistically significant at 10% in PMG and DFE while statistically significant at 5% in MG. The above means that an increase in foreign capital flows will result in 0.07, 0.18, and 0.07 (PMG, MG, and DFE, respectively) units increasing Africa's economic growth.

Results on the economic growth in the short run indicate that foreign direct investment negatively and insignificantly affected economic growth in PMG and MG. While foreign direct investment positively and insignificantly affected economic growth in the DFE model over the study space. The above means that an increase in foreign capital flows will result in 0.03 and 0.03 (PMG, and MG, respectively) units decline in the economic growth in Africa. In addition, an increase in foreign capital flows will result in 0.001 (DFE) units increase in the economic growth in Africa.

The estimation of the ECT equivalent parameter varies from -1 to 0, with 0 implying no convergence toward equilibrium and -1 implying complete convergence. Any shock this time is appropriately corrected for the next period. Table 11 displays that the error correction component reflects a highly significant and negative effect on FDI, with a probability of 1%. The above means that from 1990 to 2018, there was convergence in Africa regarding receiving FDI. The transition from short to long-run equilibrium takes roughly 50 percent in PMG model.

It is evident from these results that ODA and economic growth portray mixed relationships with FDI in the short and long-run equilibrium. While ODA is consistent in its influence on FDI at the 10 percent level of significance level, economic growth is inconsistent. It can be inferred from these findings that timing is vital to the kind of influence that ODA and economic growth have on FDI flows since there are mixed relationships at different periods. The mean group and dynamic fixed-effects model confirmed the above results. Furthermore, the long-term inverse relationship between FDI and ODA exist from the three estimated outcomes; PMG, MG, and DFE. On the other hand, FDI positively affected economic growth in the long run. Finally, ODA and economic growth exert direct and indirect influence on FDI over the short-term period.

4.7.2 *Cointegration and error correction model for economic growth, FDI and ODA*

Table 12 below display estimated long-run and short-run results in the ARDL model when economic growth regressed using the PMG, MG, and DFE on the cointegrating relationship between economic growth, FDI, and ODA.

Table 12: Estimated Long Run and Short Run Results in the ARDL Model

	PMG D.GR	MG D.GR	DFE D.GR
Long Run			
FDI	0.103*	0.206	0.120**
	(2.53)	(1.52)	(3.11)
ODA	-0.0393	-0.377	-0.00347
	(-1.58)	(-1.07)	(-0.14)
ECT	-0.930***	-1.007***	-1.047***
	(-15.12)	(-19.29)	(-31.45)
Short Run			
D.FDI	0.0951*	0.0273	-0.0822*
	(1.97)	(0.18)	(-1.96)
D.ODA	-0.0294***	0.0878	-0.250***
	(-4.23)	(0.67)	(-8.36)
_cons	1.503***	1.154	1.202***
	(5.47)	(1.95)	(3.43)
N	840	840	840

*t statistics in parentheses * $p < 10\%$, ** $p < 5\%$, *** $p < 1\%$*

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The estimated long-run and short-run outcomes utilising the ARDL estimation approach appear in Table 12 above. Long-run estimations reveal that economic growth had a favourable impact on foreign direct investment across the study period when economic growth regressed. The above is statistically significant at 10% and 5% in PMG and DFE, respectively, while MG is non-significant. As a result, an increase in foreign capital flows of 0.10, 0.21, and 0.12 (PMG, MG, and DFE, respectively) units increase the economic growth in Africa.

Results on official development assistance indicate that economic growth negatively and non-significantly affected official development assistance in all three models in the long run over the study space. The above means that a rise in foreign capital flows will result in 0.04, 0.38, and 0.003 (PMG, MG, and DFE, respectively) units decline in the economic growth of Africa's region. In the long-run economic growth was a negative contributor to ODA inflows in Africa over the study period.

On the other hand, when economic growth regressed, short-run estimates indicate that economic growth positively affected foreign direct investment in two models (PMG and MG) over the study period. At the same time, the short-run shows that economic growth negatively affected foreign direct investment in the DFE model in Africa. The above is statistically significant at 10% in PMG and DFE while non-significant in MG. The above means that an increase in foreign capital flows will result in a 0.10 and 0.03 (PMG and MG) unit increase in the economic growth in Africa. In contrast, an increase in foreign capital flows will result in a 0.08 (DFE) unit decline in the economic growth in Africa.

Regarding official development assistance results in the short run, Table 12 indicates that economic growth negatively affected official development assistance in PMG and DFE. While economic growth positively and insignificantly affected official development in the MG model over the study space. The above is statistically significant at 1% in PMG and DFE. The above means that an increase in foreign capital flows will result in a 0.03 and 0.25 (PMG and DFE) units decline in the economic growth in Africa. In

addition, an increase in foreign capital flows will result in a 0.09 (DFE) unit increase in the economic growth in Africa.

The error correction component reflects a highly significant and negative effect on economic growth, with a probability of 1%. The transition from short to long-run equilibrium takes roughly 93 percent.

It is evident from these results that ODA and FDI portray mixed relationships with economic growth in the short and long-run equilibrium. While FDI is consistent in its influence on economic growth at the 10 percent significance level, ODA is inconsistent. It can be inferred from these findings that timing is vital to the kind of influence that ODA and FDI have on economic growth since there are mixed relationships during different periods. Furthermore, the long-term positive relationship between economic growth and FDI exists from the three estimated outcomes; PMG, MG, and DFE. On the other hand, economic growth negatively affected FDI in the long run. Finally, ODA and FDI exert direct and indirect influence on economic growth over the short-term period.

4.7.3 *Cointegration and error correction model for ODA, FDI and economic growth*

Table 13 below display the estimated long-run and short-run results in the ARDL model when ODA regressed using the PMG, MG, and DFE on the cointegrating relationship between economic growth, FDI, and ODA.

Table 13: Estimated Long Run and Short Run Results in the ARDL Model

	PMG D.ODA	MG D.ODA	DFE D.ODA
Long Run			
FDI	-0.0360	-0.547	-0.360**
	(-0.87)	(-1.32)	(-2.86)
GR	-0.0396*	-0.820*	-1.099***
	(-1.99)	(-2.37)	(-6.26)
ECT	-0.336***	-0.389***	-0.362***
	(-9.79)	(-10.74)	(-12.91)
Short Run			
D.FDI	-0.0808	0.0421	0.0916
	(-0.90)	(0.53)	(1.89)
D.GR	-0.0466	0.0499	0.0597
	(-1.26)	(1.15)	(1.55)
_cons	2.439***	4.181***	4.040***
	(5.33)	(5.06)	(10.58)
N	840	840	840

t statistics in parentheses * *p* < 10%, ** *p* < 5%, *** *p* < 1%
Source: Author's own computations

The estimated long-run and short-run outcomes utilising the ARDL estimation approach appear in Table 13 above. Long-run estimations reveal that official development assistance had an inverse impact on foreign direct investment in all three models across the study period when official development assistance regressed. The above is statistically significant at 5% in DFE, while non-significant in PMG and DFE. As a result, an increase in foreign capital flows of 0.04, 0.55, and 0.36 (PMG, MG, and DFE, respectively) units decline in the economic growth in Africa.

Results on economic growth indicate that official development assistance negatively affected economic growth in all three models in the long run over the study space. The above means that a rise in foreign capital flows will result in a 0.04, 0.82, and 1.10 (PMG, MG, and DFE, respectively) units decline in the economic growth of Africa's

region. In the long run, ODA was a negative contributor to economic growth in Africa over the study period. This long-run negative impact of ODA on the economic growth existed because ODA is not diverted to practical purposes in the region, resulting in the misuse of ODA funds by government officials and weak governance (Hien, 2008). This finding is consistent with the findings of Hossain *et al.* (2018) and Adam and Atsu (2014), who concluded that FDI inflows harmed economic growth; but differed from Arndt et al. (2015) and Momita *et al.* (2019).

On the other hand, when ODA regressed, short-run estimates indicate that official development assistance negatively affected foreign direct investment in the PMG model over the study period. In contrast, Table 13 above indicates that official development assistance positively affected foreign direct investment in the short run. The above means that an increase in foreign capital flows will result in a 0.08 (PMG) unit increase in Africa's economic growth. In contrast, an increase in foreign capital flows will result in 0.04, and 0.09 (MG and DFE) units increase in the economic growth in Africa.

Results on the economic growth in the short run indicate that official development assistance negatively affected economic growth in the PMG model. While the official development assistance positively affected economic growth in the MG and DFE models over the study space. The above means that an increase in foreign capital flows will result in a 0.05 (PMG) unit decline in the economic growth in Africa. In contrast, an increase in foreign capital flows will result in a 0.05 and 0.06 (MG and DFE) unit increase in the economic growth in Africa.

The ECT equivalent parameter is estimated from -1 to 0, with -1 implying complete convergence and 0 implying no convergence toward equilibrium. Any shock during this period adjusts for the following period. Table 13 shows that, with a probability of 1%, the error correction component has a highly significant and negative effect on ODA. As a result, between 1990 and 2018, there was convergence across Africa to gain ODA. The transition from short to long-run equilibrium takes roughly 34 percent in the PMG model.

It is evident from these results that FDI and economic growth portray mixed relationships with ODA in the short and long-run equilibrium. While FDI is consistent in

its influence on ODA and non-significance, economic growth is inconsistent. It can be inferred from these findings that timing is vital to the kind of influence that FDI and economic growth have on ODA flows since there are mixed relationships at different periods. Furthermore, the long-term inverse relationship between ODA and FDI can exist from the three estimated outcomes; PMG, MG, and DFE. On the other hand, ODA negatively affected economic growth in the long run. Finally, the long-term detrimental impact of ODA and FDI existed, although ODA and economic growth exert direct and indirect influence on FDI over the short-term period.

4.8   Granger Causality Testing (Dumistrescu-Hurlin)

The current study employed the PMG/ARDL paradigm to explore the cointegration relationship between official development assistance, foreign direct investment, and economic growth. However, PMG does not reveal the causal direction within the parameters. In addition, understanding the causal direction between official development assistance, foreign direct investment, and economic growth provides authorities insight into the role and interrelationship of these components on the African continent. For the above reason, the current study employed Dumitrescu-Hurlin Granger causality tests to investigate the causal relationship between the variables. However, in the case of cointegration, the Engle and Granger (1987) causality test in the first difference variable using a VAR (Vector Autoregressive) model will produce deceptive findings. Therefore the above requires adding an Error-Correction Term (ECT) to the VAR model. The panel Dumitrescu-Hurlin Granger causality tests of long-run cointegration determine the causality direction, as shown in Table 14 below.

Table 14: Pairwise Dumitrescu Hurlin Granger Panel Causality Tests

Variables	W-Stat Δlnoda	Zbar-Stat Δlnoda	W-Stat Δlnfdi	Zbar-Stat Δlnfdi	Zbar-Stat Δlngr	Zbar-Stat Δlngr
Δlnoda			2.713 [0.2480]	1.155 [0.2480]	3.757*** [0.0005]	3.506*** [0.0005]
Δlnfdi	2.374 [0.695]	0.392 [0.695]			2.259 [0.8950]	0.132 [0.8950]
Δlngr	3.470*** [0.0042]	2.860*** [0.0042]	2.912 [0.1087]	1.604 [0.1087]		

The causality test results reveal that when FDI acts as the dependent variable, no unilateral or associated causation runs from FDI to economic growth and vice versa. The preceding could refer to Africa's inadequate financial operations. The current study findings contrast those of Abbes, Mostefa, Seghir, and Zakarya (2014), Adali and Yuksel (2017), and Sothan (2017) for Cambodia, which records the existence of a causal association between FDI and economic growth.

Table 14 results, on the other hand, reveal that there is a bidirectional correlation between official development assistance and economic growth in Africa and vice versa. Additionally, Table 14 illustrates that there is no unilateral or bilateral causation going from ODA to FDI and vice versa. In all panels, the current study result in Table 14 concludes that causality running from ODA and economic growth (vice versa) is more robust than causality derived from FDI and economic development (vice versa) and ODA and FDI (vice versa).

4.9 Cross-Country Dependency

According to Yoon and Moon (2014), the adjusted R-Squared or R-squared measures the strength and conditioning of the cross-country dependency. The cross-country dependence model is valid if R-squared or adjusted R-squared becomes stronger (Yoon and Moon, 2014). In addition, the cross-country dependency model is unsuitable if R-squared or adjusted R-squared percentage is low (Tang and Bundhoo, 2017). Furthermore, positive autocorrelation exists when the Durbin W-Stat is less than 2. However, if the Durbin W-Stat is more than 2, there is negative autocorrelation. There is no autocorrelation if the Durbin W-Stat is 2 (Tang and Bundhoo, 2017). Therefore, the Durbin W-Stat must be just two for a successful regression model. The Durbin W-Stat was used in this study to identify whether or not the dataset used had autocorrelation.

Table 15: Results of Cross-country dependency tests

Variable	Coefficient	Std. Error	t-Statistic	Prob
ODA	-0.0741***	0.0240***	-3.0880***	0.0021
GR	-0.0081	0.0300	-0.2697	0.7875
FPI	-0.0128***	0.0038***	-3.3995***	0.0007
POP	0.3025	0.2390	1.2657	0.2060
OPEN	0.0687***	0.0113***	6.0782***	0.0000
DINV	0.2311***	0.0248***	9.3233***	0.0000
HCD	0.0275**	0.0132**	2.0841**	0.0375
CPI	-0.0254**	0.0117**	-2.1613**	0.0310
NAT	-0.0778**	0.0309**	-2.5164**	0.0120
GCNS	-0.1521***	0.0476***	-3.1937***	0.0015
R-squared	0.4302			
Adjusted R^2	0.4035			
Durbin W-Stat	1.2044			
Obs	870	870	870	870
Instruments	28	28	28	28
Groups	30	30	30	30

*, ** and *** indicate the significance at the 10%, 5% and 1% significance levels, respectively
Source: Author's own computations

From 1990 to 2018, Table 15 above indicates that official development assistance, foreign portfolio investment, trade openness, domestic investment, human capital development, consumer price index, natural resources, and government consumption constituted significant variables in determining FDI in Africa. In contrast, Table 15 illustrates that economic and population growth proved non-significant factors that determined FDI in Africa from 1990 to 2018.

Table 15 reveals that R-squared is 43.02 percent, and the adjusted R-squared is 40.35 percent, indicating that the model proved unsuitable in Africa from 1990 to 2018.

Finally, the data set demonstrated in the current study Table 15 above proves favourable autocorrelation mostly because the Durbin-Watson is less than two, even though this framework is unfit as per the values of R-squared and adjusted R-squared. Still, somehow the Durbin-Watson statistic indicates that this approach does not have multicollinearity problems.

4.10 Threshold analysis

The last objective of the current study was to determine what threshold level of official development assistance is required to trigger significant FDI inflows into the selected African countries. Therefore, the current section discusses the threshold analysis.

Compatible with Tsaurai (2017), the current study logged all of the study's collected data used to eliminate panel threshold regression deviation due to extreme observations. In addition to the current study, all the panel regression threshold data migrated to the Microsoft Excel spreadsheets, where all the data analysis occurred. Table 16 presents the results of the threshold regression strategy.

4.8.1 Summary of the FDI threshold levels

Table 16: Threshold estimator in single threshold model; FDI Threshold estimator (Level = 95)

Model	Threshold	Lower	Upper
Th-1	0.0002	0.0000	0.0055

Source: Author's own computation

In the threshold estimator Table 16 above, Th-1 denotes the estimator in single-threshold models. First, the current study fits the single threshold model, with the null hypothesis H_o: $\beta_1 = \beta_2$ (no threshold effect) and the alternative H1:$\beta_1 \neq \beta_2$ (Threshold effect does exist). The results show that the estimator of the single model is 0.0002 with a 95% confidence interval [0.0000, 0.0055].

To find a single threshold effect, we perform 300 bootstrap replications. For example, at a 1% significance level, F statistics is 90.38, which is higher than the critical value (26.3873). With a bootstrap p-value of 0.0000, it is highly significant. Because this leads

to the rejection of the null hypothesis of the linear model, in other aspects, FDI and economic growth have a non-linear correlation, and a threshold impact also exists.

Table 17: Results of threshold effect in single threshold model: FDI Threshold effect test (bootstrap = 300 300 300):

Threshold	RSS	MSE	Fstat	Prob	Crit10	Crit5	Crit1
Single	1.6004	19.0686	90.38	0.0000	15.1283	19.0432	26.3873

Source: Author's own computation

The current study determines the thresholds by estimating the model with one, two, or three thresholds and recording the results. Each of the three bootstrap tests uses the same bootstrap number. Table 18 below displays the F statistic and its bootstrap p-value.

Table 18: Results of the threshold effects in different threshold models: FDI

Model	Threshold	Lower	Upper
Th-1	0.0002	0.0000	0.0055
Th-21	0.0002	0.0000	0.0055
Th-22	-0.9707	-1.3412	-0.8405
Th-3	0.8309	0.7597	0.8408

Threshold effect test (bootstrap = 300 300 300):

Threshold	RSS	MSE	Fstat	Prob	Crit10	Crit5	Crit1
Single	1.6004	19.0686	90.38	0.0000	15.1283	19.0432	26.3873
Double	1.5704	18.7066	16.28	0.0400	10.7358	14.2171	28.9497
Triple	1.5504	18.4356	12.36	0.1000	11.9063	14.1589	21.0965

Source: Author's own computation

The results demonstrate that F1 statistics have values above the critical value of 1% at a significance level of 26.3873 when a single threshold (with H0: linear model; H1: single threshold model) exists. With a bootstrap p-value of 0.0000, the F1 statistic is exceptionally significant. When using the test for a double threshold (with H0: single threshold model; H1: double threshold model), the F2 statistic (F2 value of 16.28 > Crit5 value of 14.22) is likewise significant with a bootstrap p-value of 0.0400. The threshold

effect test holds that F3 = 12.36, greater than the critical number of 10 percent significant level of 11.9063. For the test of a triple threshold, the bootstrap p-value of the F statistic is not significant (0.1000). The data presented above indicate that the model has two thresholds.

The current study re-estimates the triple threshold model to find the triple threshold value. The data may deduce that the estimates of the three thresholds are at 0.0002% and -0.9707%.

Table 19: Double threshold model estimation: FDI

Model	Threshold	Lower	Upper
Th-1	0.0002	0.0000	0.0055
Th-21	0.0002	0.0000	0.0055
Th-22	-0.9707	-1.3412	-0.8405

Threshold effect test (bootstrap = 300 300 300):

Threshold	RSS	MSE	Fstat	Prob	Crit10	Crit5	Crit1
Single	1.6004	19.0686	90.38	0.0000	15.1283	19.0432	26.3873
Double	1.5704	18.7066	16.28	0.0400	10.7358	14.2171	28.9497

Source: Author's own computation

The results of fixed effects regression is reported in Table 20. Regression estimates can be presented as follows:

$$growth_{it} = 2.0872 + 0.0620 FDI_{it} d(FDI_{it} \leq 0.0002)[0.37]^{**}$$
$$- 0.3987 FDI_{it} d(0.0002 < FDI_{it} \leq -0.9707)$$
$$+ 0.0587 FDI_{it} d(FDI_{it} > -0.9707)[-9.91]^{**}[1.95]^{***} - 0.1730 FPI_{it}$$
$$- 0.1169 POP + 0.0125 OPEN + 0.0614 DINV - 0.0086 HCD - 0.0009 CPI$$
$$+ 0.0611 NAT - 0.1294 GCNS$$

(** and *** denotes level of statistical significance at 5% and 1%, respectively)

Table 20: Regression Estimates: Double threshold model

Fixed-effects (within) regression			Number of obs =			870
Group variable: Name			Number of groups =			30
R-sq: within = 0.1855			Obs per group: Min =			29
between = 0.0014			Avg =			29.0
overall = 0.1333			Max =			29
			F (12,828)		=	15.71
corr (u_i, xb) = -0.2888			Prob > F		=	0.0000

| GR	Coef.	Std. Err.	T	P>ltl	[95% Conf.	Interval]
FPI	-0.1730	0.0041	-4.24	0.000	-0.0093	-0.0093
POP	-0.1169	0.2604	-0.45	0.653	-0.6280	0.3942
OPEN	0.0125	0.0125	1.00	0.317	-0.0120	0.0369
DINV	0.0614	0.2715	2.26	0.024	0.0081	0.1147
HCD	-0.0086	0.0143	-0.60	0.548	-0.0368	0.0195
CPI	-0.0009	0.0128	-0.07	0.944	-0.0260	0.0242
NAT	0.0611	0.0336	1.82	0.069	-0.0048	0.1271
GCNS	-0.1294	0.0517	-2.50	0.012	-0.2309	-0.0280
_cat#c.FDI						
0	0.0620	0.1694	0.37	0.714	-0.2704	0.3944
1	-0.3987	0.0402	-9.91	0.000	-0.4777	-0.3197
2	0.0587	0.0302	1.95	0.052	-0.0004	0.1180
3	-0.0099	0.0311	-0.32	0.749	-0.0709	0.0511
_cons	2.0872	1.0716	1.95	0.052	-0.0161	4.1906
sigma_u	1.7212					
sigma_e	4.3381					
rho	0.1360					
f test that all u_i=0:	F(29,828)=	2.52			Prob>F =	0000

Source: Author's own computation

At a 5% significance level, the F statistic of 2.52, together with the null hypothesis of all *ui=0*, proves that the fixed-effect model is suitable. P-values computed using bootstrap procedures give us statistical evidence to believe that thresholds exist at the 10% level.

In the threshold analysis regression model, the slope estimate in the regression line shows the impact of FDI under three rules:

- When FDI $\leq$ 0.0002%, the positive coefficient of 0.0620 implies a positive relationship between FDI and economic growth.
- When 0.0002% < FDI $\leq$ -0.9707: the negative coefficient of -0.3987 suggests that economic growth is negatively related to FDI.
- When FDI > -0.9707, a positive effect of FDI on economic growth exists. However, it is not as strong as it was in the first regime, with a coefficient of only 0.0587.

When FDI exceeds the second threshold, the smaller coefficient also suggests a looser link between these two variables. The above means that based on the existing absorption capacity of host countries, the optimal level of FDI is 0.0002 percent of GDP. As a result, FDI's contribution to economic growth decreases beyond this threshold level.
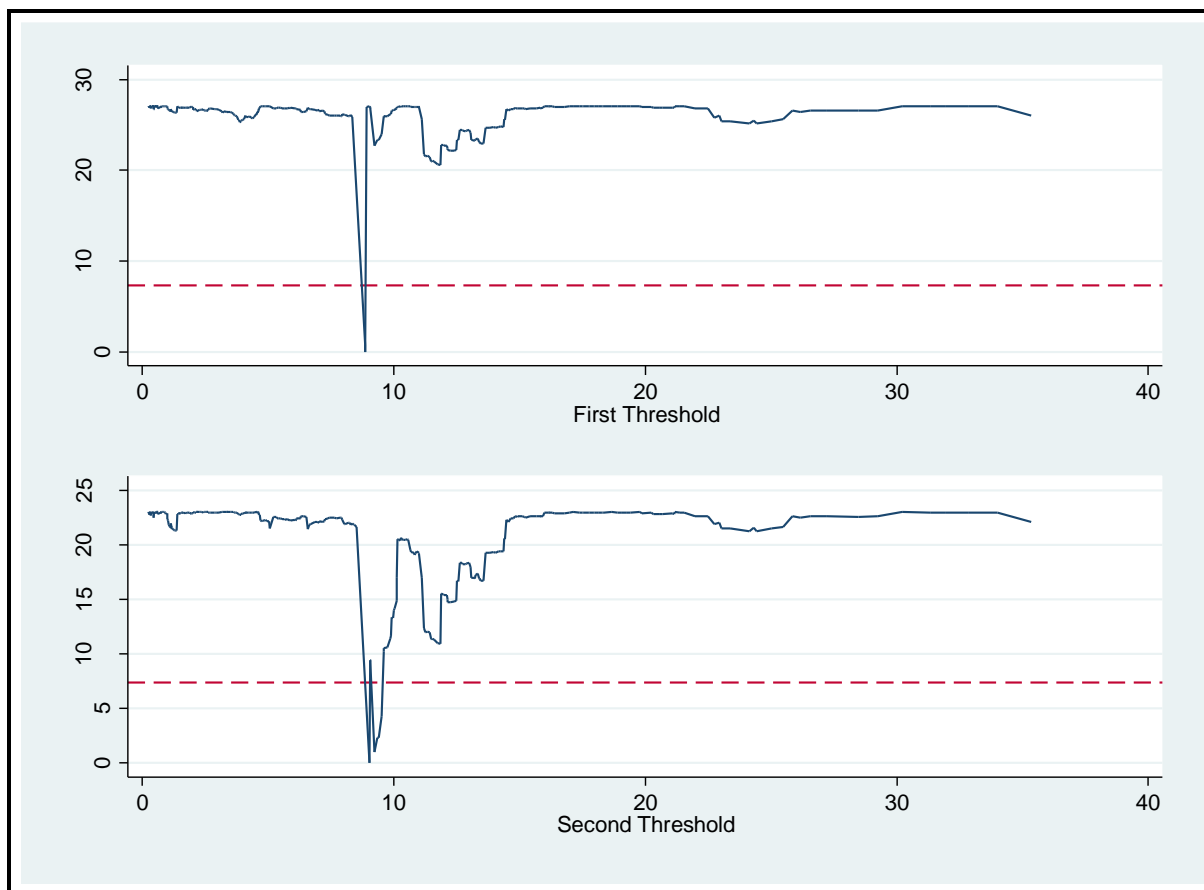
Figure 6: FDI First and Second sample split: Confidence interval construction for threshold

Figure 6 shows the split between the first and second samples. When estimating a single threshold model, the first step likelihood ratio function generates and used to estimate the likelihood ratio. For example, at 0.0002 and -0.9707, the likelihood ratio equals zero, which is the first step threshold estimate.

4.8.2 Summary of the ODA threshold levels

Table 21: Threshold estimator in single threshold model: ODA

Threshold estimator (Level = 95):

Model	Threshold	Lower	Upper
Th-1	8.8161	8.7609	8.8543

Source: Author's own computation

In the threshold estimator in Table 21 above, Th-1 denotes the estimator in a single-threshold models. First, the current study fits the single threshold model, with the null hypothesis H_0: $\beta_1 = \beta_2$ (no threshold effect) and the alternative H1:$\beta_1 \neq \beta_2$ (Threshold effect does exist). The results show that the estimator of the single model is 8.8161 with a 95% confidence interval [8.7609, 8.8543].

The current study found that 300 bootstrap replications could detect a single threshold effect. In this case, the F statistic is 5.33, which is below the threshold value at a 1% significance level of significance (11.8671). On the other hand, a p-value of 0.2033 on the bootstrap test indicates that the result is highly significant. Because of this, the linear model null hypothesis must fail. Thus, the relationship between ODA and economic growth is nonlinear, with a threshold impact.

Table 22: Results of threshold effect in single threshold model: ODA

Threshold effect test (bootstrap = 300 300 300):

Threshold	RSS	MSE	Fstat	Prob	Crit10	Crit5	Crit1
Single	1.7804	21.1774	5.33	0.2033	7.4943	8.7932	11.8671

Source: Author's own computation

A model with one, two, and three thresholds was successively estimated in the study to identify the number of thresholds. All three bootstrap tests rely on the same bootstrap number to generate results. Table 23 shows the F statistic and its bootstrap p-value.

Table 23: Results of the threshold effects in different threshold models: ODA

Threshold estimator (Level = 95):

Model	Threshold	Lower	Upper
Th-1	8.8161	8.7609	8.8543
Th-21	8.8679	8.6018	8.9258
Th-22	9.0389	8.5120	9.1460
Th-3	11.8552	11.1682	11.8913

Threshold effect test (bootstrap = 300 300 300):

Threshold	RSS	MSE	Fstat	Prob	Crit10	Crit5	Crit1
Single	1.78004	21.1774	5.33	0.2033	7.4943	8.7932	11.8671
Double	1.73004	20.5839	24.25	0.0433	12.5385	22.0744	52.1904
Tripe	1.72004	20.4019	7.50	0.4900	24.8145	31.6564	43.1682

Source: Author's own computation

F1 statistic of 5.33 is smaller than its critical value at a 1 percent significance level of 11.8671 in the test for a single threshold (with H0: linear model and H1: single threshold model). Thus, the F1 statistic has a significant p-value of 0.2033 when using bootstrap sampling. Thus, the bootstrap p-value of 0.0433 (F2 = 24.25 Crit2 = 22.0744) is significant in the double threshold test (H0: single threshold model, H1: double threshold model). Even still, the critical value of F3 is 7.50< this score is at 10% of the significant level of 24.8145. For the test of a triple threshold, the bootstrap p-value of the F statistic is not significant (0.4900). According to the data shown above, the model has two thresholds.

The study re-estimated the triple threshold model in order to arrive at the value for the threshold. The study findings revealed the estimated thresholds at 8.8679% and 9.0389%.

Table 24: Double threshold model estimation: ODA

Threshold estimator (Level = 95):

Model	Threshold	Lower	Upper
Th-1	8.8161	8.7609	8.8543
Th-21	8.8679	8.6018	8.9258
Th-22	9.0389	8.5120	9.1460

Threshold effect test (bootstrap = 300 300 300):

Threshold	RSS	MSE	Fstat	Prob	Crit10	Crit5	Crit1

Single	1.78004	21.1774	5.33	0.2033	7.4943	8.7932	11.8671
Double	1.73004	20.5839	24.25	0.0433	12.5385	22.0744	52.1904

Source: Author's own computation

The results of fixed effects regression is reported in Table 25. Regression estimates can be presented as follows:

$$growth_{it} = 3.1833 - 0.0683ODA_{it}d(ODA_{it} \leq 8.8679)[-1.36]^{***}$$
$$+ 2.1506ODA_{it}d(8.8679 < ODA_{it} \leq 9.0389)$$
$$+ 0.2621ODA_{it}d(ODA_{it} > 9.0389)[5.36]^{**}[2.88]^{**} - 0.0197FPI_{it}$$
$$- 0.2756POP - 0.0045OPEN + 0.0834DINV - 0.0074HCD + 0.0008CPI$$
$$+ 0.0462NAT - 0.1161GCNS$$

(** and *** denotes level of statistical significance at 5% and 1%)

Table 25: Regression Estimates: Double threshold model

Fixed-effects (within) regression			Number of obs	=		870
Group variable: name			Number of groups	=		30
R-sq: within = 0.1055			Obs per group: Min =			29
between = 0.0082			Avg=			29.0
overall = 0.0743			Max=			29
			F (12,828)	=		8.14
corr (u_i, xb) = -0.3233			Prob > F	=		0.0000

GR	Coef.	Std. Err.	T	P>ltl	[95% Conf.	Interval]
FPI	-0.0197	0.0038	-5.19	0.000	-0.0272	-0.0123
POP	-0.2756	0.2718	-1.01	0.311	-0.8091	0.2578
OPEN	-0.0045	0.1319	-0.34	0.732	-0.0304	0.0214
DINV	0.0834	0.0200	2.78	0.006	0.0246	0.1423
HCD	-0.0074	0.1511	-0.49	0.623	-0.0371	0.0222
CPI	0.0008	0.1329	-0.06	0.950	-0.0252	0.0269
NAT	0.0462	0.0352	1.31	0.190	-0.0230	0.1153
GCNS	-0.1161	0.0546	-2.12	0.034	-0.2233	-0.0088
_cat#c.ODA						
0	-0.0683	0.0502	-1.36	0.174	-0.1668	0.0319
1	2.1506	0.4010	5.36	0.000	1.3637	2.9378
2	0.2621	0.0909	2.88	0.004	0.0836	0.4406
3	0.0044	0.0532	0.08	0.934	-0.0999	0.1088
_cons	3.1833	1.1409	2.79	0.005	0.9439	5.4228
sigma_u	1.6177					
sigma_e	4.5461					
rho	0.1124					

f test that all u_i=0: F(29,828) = 2.32 Prob>F = 0.0001

Source: Author's own computation

If all of *ui = 0*, the fixed-effect model is suitable. Therefore, the F statistic is 2.32 at the significance level of 5%. As a result of the bootstrap p-values of thresholds, there is a threshold impact at the 10% level of significance.

The slope of the regression line found in the threshold analysis in the regression model suggests the influence of ODA in three different regions:

- When ODA < 8.8161%, the negative coefficient of 0.0683 implies a negative relationship between ODA and economic growth.
- When 8.8161% < ODA < 9.0389%: the positive coefficient of 2.1506 suggests that economic growth is positively related to ODA.
- When ODA > 9.0389%, a positive effect of ODA on economic growth is back; however, it is not as strong as it was in the first regime, with a coefficient of only 0.2621.

When ODA is above the second threshold, the smaller coefficient indicates a weaker link between these two variables. Thus, the current research shows that present absorptive capacity should be set at 9.0389% of GDP, as higher levels of ODA lead to lower economic growth benefits.
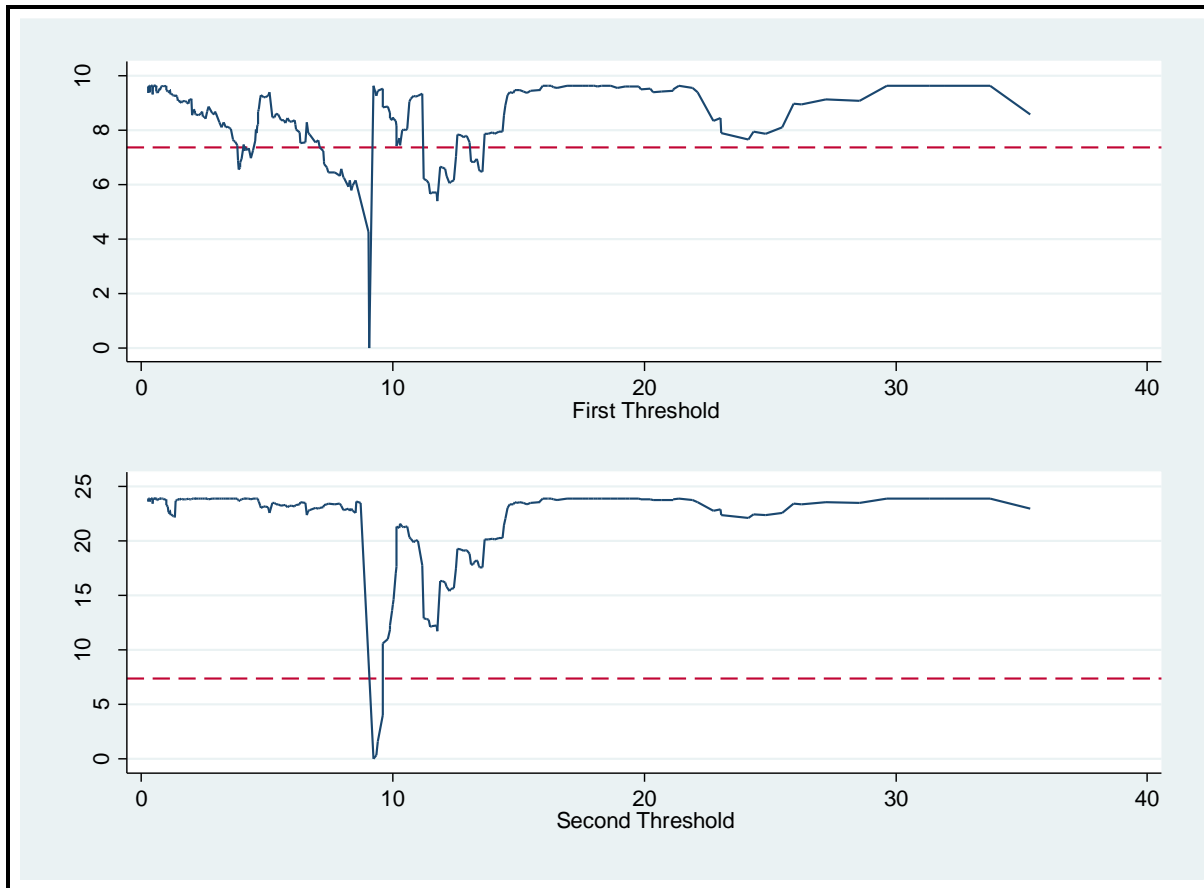
Figure 7: First and Second sample split: Confidence interval construction for threshold

As shown in Figure 7 above, the first and second sample splits coincide. Therefore, the first step likelihood ratio function existed in single threshold model estimation. As a result, the first step threshold estimate is at 8.8679 percent and 9.0389 percent, and the likelihood ratio equals zero.

4.11 Chapter summary and conclusion

This chapter used various econometric techniques to test the variables to evaluate if the research aims outlined in Chapter 1 were viable. First, as a pre-diagnostic test, simple descriptive statistical and correlational analyses of our variables of interest were performed on the panel data.

Before econometric modeling, the current study conducted diagnostic tests such as the unit root test. The two-stage GMM is adopted in the current study to assess the correlation between the FDI-ODA predictor variables and the interest variables. In order

to identify whether to examine a panel of random or fixed effects using the GMM method, the current study applied the Hausman test. The Hausman findings indicated that fixed effects were the most suitable test for this panel data. Furthermore, the findings demonstrated that the relationship between the selected independent variables and foreign direct investment and official development proxies has no common consensus. The variables were linked to the FDI and ODA measures in different methods, indicating that the definitions and measurements of foreign direct investment and official development assistance are essential.

The ARDL was used to explore the cointegrating relationships between official development assistance and foreign direct investment components, namely (economic growth, consumer price index, human capital development, government consumption expenditure, trade openness, foreign direct investment, official development assistance, foreign portfolio investment, natural resources, and population) as well as economic growth. Therefore, the parameters should not be of higher-order integration than the first-order integration, although the ARDL panel does not require unit root testing.

According to this current study, the PMG, MG, and DFE were the most accurate estimators for the panel ARDL. Furthermore, the PMG was the most accurate estimator when adopting the Hausman technique for cointegration analysis between variables. As a result of cointegration, the current study employed panel ECM to measure the short-term connection between the variables in this current study.

As a result of the PMG results, the study found that both FDI and GR have unfavourable correlations with ODA in Africa. The negative and significant error correction term for all of the variables existed for all examined variables. After the short-term shocks, the variables will converge to the long-term equilibrium. The current study employed the Dumitrescu Hurlin Granger Panel Causality Tests to determine the causal relationship between the variables.

After summarising the main findings of the study in the next chapter, we emphasise its contribution to knowledge, and present some recommendations for review by key stakeholders.

CHAPTER FIVE

CONCLUSION

5.1 Introduction

The concluding remarks for this current study appear in this chapter. This chapter aims to present an overall summary of the main study findings and place primary emphasis on the scholarly contributions made to knowledge. Additionally, the chapter explores the policy implications of the empirical evidence drawn from the econometric analysis of secondary data and offers some recommendations for consideration by the relevant stakeholders. Finally, the chapter ends by proposing avenues for possible future research.

In order to present the key findings, it is necessary to recap the research aim and objectives thereof.

The study's main aim was to assess the relationships between official development assistance, foreign direct investment, and economic growth in selected African countries from the period 1990 to 2018 by analysing the co-integrating and causal interactions that arise among these variables.

Specifically, the study's objectives were:

- To identify the key determinants of ODA and FDI into selected African countries;
- To examine ODA, FDI and economic growth long-term relationships in selected African countries;
- To investigate the direction and robustness of causality between ODA, FDI and economic growth in selected African countries; and
- To determine the ODA threshold level required to trigger significant FDI inflows in selected African countries.

The current study was necessary because recent reductions in official development assistance, notably in Africa, have necessitated a shift in economic policies. The continent must restructure its economies and better its economic perceptions to attract

long-term foreign direct investment. Even though the study advocated for an ODA-based funding policy and FDI-based long-term investments, it turns out that the level of economic growth is crucial to encouraging and maintaining foreign investment. This study was motivated by the perceived negative perception of ODA flows in Africa. Although ODA flows are temporary, they help bridge funding gaps in a country's balance of payments (BOP).

5.2   Summary of key findings

Based on the data analysis, the critical findings on FDI and ODA determinants, cointegrating relationships between ODA, FDI, and economic growth, causality between ODA, FDI, and economic growth, and the threshold levels in selected African countries exist in this section.

In order to answer the very first research questions of the study, we looked at the primary drivers of ODA and FDI inflows to our sampled African countries.

5.2.1   Key ODA determinants in selected African countries

Foreign direct investment, foreign portfolio investment, economic growth, domestic investment, trade openness, human capital development, population growth, consumer price index, natural resources, and government consumption were the critical determinants of official development (ODA) in Africa.

The current study employed the dynamic 2-step GMM model for the period ranging from 1990 to 2018. We found that FDI, population growth, domestic investment, inflation, natural resources, and government consumption positively affected ODA. On the other hand, economic growth, FPI, trade openness, and human capital development significantly impacted ODA in our selected African countries.

5.2.2   Key FDI determinants in selected African countries

Official development assistance, foreign portfolio investment, economic growth rate, domestic investment, trade openness, human capital development, population growth, inflation, natural resources, and government consumption were the key factors giving

rise to official development (ODA) in Africa. The inability of developing countries to tap into their internalised resources resulted in increased dependence on ODA.

Employing the 2-step difference GMM estimator for the period 1990 to 2018, the current study found that economic growth rate, foreign portfolio investment, natural resources, and government spending had adverse effects on FDI inflows into the selected African countries under study. Therefore, we concluded that the critical determinants of inward FDI flows were official development assistance, population growth, trade openness, domestic investment, and consumer price index, which all yielded a positive and significant effect on FDI. Human capital development returned a positive but insignificant effect on FDI.

Table 26: Summary of the key FDI and ODA determinants and their effects in selected African countries

Dependent Variable	Independent Variable	Coefficient	Effect and significance
FDI	Lag of previous period's FDI (FDI$_{t-1}$)	-0.131	Negative
	Official development assistance (ODA)	0.529**	Positive**
	Economic growth(GR)	-0.495***	Negative***
	Foreign portfolio investment (FPI)	-0.196***	Negative***
	Population (POP)	21.97***	Positive***
	Trade openness (OPEN)	0.314***	Positive***
	Domestic investment (DINV)	0.444***	Positive***
	Human capital development (HCD)	0.077	Positive
	Inflation (CPI)	0.122**	Positive**
	Natural resources (NAT)	-0.430***	Negative***

	Government consumption (GCNS)	-2.321***	Negative***
ODA	Lag of previous period's ODA (ODA_{t-1})	0.112***	Positive***
	Foreign direct investment (FDI)	0.038*	Positive*
	Economic growth (GR)	-0.103**	Negative**
	Foreign portfolio investment (FPI)	-0.072***	Negative***
	Population (POP)	11.12***	Positive***
	Trade openness (OPEN)	-0.092**	Negative**
	Domestic investment (DINV)	0.091**	Positive**
	Human capital development (HCD)	-0.0703***	Negative***
	Inflation (CPI)	0.249***	Positive***
	Natural resources (NAT)	0.390***	Positive***
	Government consumption (GCNS)	0.704***	Positive***

*Significant at 10%; ** Significant at 5%; *** Significant at 1%*

5.2.3 Relationship between ODA, FDI and economic growth in selected African countries

Following identifying the main ODA and FDI drivers for selected African economies from 1990 to 2018, the current study sought to assess the relationships between official development assistance (ODA), foreign direct investment (FDI), and economic growth using panel data analysis.

ARDL bound test exists to determine whether short and long-run cointegrating correlations between ODA, FDI, and economic growth variables in the study. When FDI regressed as a dependent variable, there was evidence of the negative and significant relationship between foreign direct investment and official development assistance

using PMG and DFE. However, while using MG, the study revealed a negative and insignificant relationship between ODA and FDI. Although the economic growth reveals a positive and significant relationship with foreign direct investment, in the long run, using PMG, while using MG and DFE, we found positive and insignificant relationships between FDI and economic growth. According to this current study, ODA and FDI inflows have a favourable and causal correlation in the short term. On the other hand, PMG and MG show a negative and insignificant association between growth rate and FDI. The positive but non-significant short-term relationship between economic growth and FDI exists by employing DFE in the short run.

When official development assistance regressed as a dependent variable, PMG and MG, in the long run, showed a negative and non-significant relationship between ODA and FDI. In contrast, DFE showed a substantial negative relationship between ODA and FDI. A negative long-term correlation between ODA and the economic growth rate exists. PMG returned a negative and insignificant association between ODA and FDI in the short term. At the same time, MG and DFE showed a positive but insignificant correlation between the two variables of ODA and FDI. In the short run, we further observed that ODA and economic growth have a negative and insignificant correlation when assessed using PMG.

When economic growth regressed as a dependent variable, in the long run, there was a positive and substantial relationship between the economic growth rate and FDI when applying PMG and DFE, but only a positive and insignificant relationship when using MG. The long-term economic growth rate and ODA yielded a negative and insignificant relationship. PMG showed a significant positive link between the economic growth rate and FDI in the short run. The study concluded a negative and significant correlation between growth rate and FDI when using DFE but a positive and insignificant relationship using MG in the short run. PMG and DFE indicated a negative and significant relationship between economic growth rate and ODA in the short run; however, the results showed a favourable relationship when using MG.

The FDI interaction with ODA and economic growth resulted in an ECT of -0.506 (PMG), -0.589 (MG), and -0.465 (DFE), all significant at 1 percent. In order to achieve a steady-state, the system rectified its prior period disequilibrium at 50.6% using PMG, 58.9% using MG, and 46.5% using DFE, respectively. When ODA interacts with FDI and the economic growth rate, the error correction term (ECT) came out to be -0.336, significant at 1% using PMG; -0.389, significant at 1% using MG; while using DFE, -0.362, significant at 1%. The above illustrated that the system corrected its previous period disequilibrium at approximately 33.6% on PMG, 38.9% on MG, and 36.2% using DFE annually to reach the steady-state.

When the economic growth rate interacted with FDI and ODA, the error correction term (ECT) was respectively found to be -0.930, significant at 1% using PMG, -1.007, significant at 1% using MG, and -1.047, significant at 1% when applying DFE. The above demonstrated that the system corrected its previous period disequilibrium at approximately 93.00% on PMG, 100.7 on MG, and 104.7 on DFE annually to reach a steady state.

5.2.4 Cointegration and Causality between ODA, FDI and economic growth in selected African countries

It would be a fallacy to assume that cointegrating correlations prove causality between ODA, FDI, and economic growth. However, the above necessitated more research to ascertain causality.

In the long term, the PMG/ARDL technique found that ODA has a negative and significant impact on FDI, at least at a 10% significance level. In contrast, economic growth has a positive and 1% significant impact on FDI and the error correction component is significant at a 1% significance level and adversely associated with FDI. ODA has a positive and 10% significant impact on FDI in the short run, but economic growth has a negative and insignificant impact. The short-to-long-run equilibrium adjustment speed is roughly 50%. The study concludes that ODA and economic growth have a mixed relationship with FDI in the short and long-run equilibrium. ODA is consistent in its influence on FDI at the 10% level of significance, but economic growth is inconsistent.

The PMG displays the economic growth, FDI, and ODA relationships when economic growth is the regressor. The study concludes that in the PMG results of long-run estimates, FDI is directly related to economic growth, while ODA is inversely related. FDI is statistically significant to economic growth at 10%, while ODA is statistically insignificant at 10%. While FDI is directly related to economic growth, ODA is indirectly related to economic growth in the short run. FDI and ODA are statistically significant to economic growth at 10% and 1%, respectively. The speed of adjustment from short to long-run equilibrium is 93%. The study concludes that the results show that the link between economic growth, FDI, and ODA is stable in both the short and long run; however, the impact of FDI on economic growth is consistent, but that of ODA is inconsistent.

When ODA regressed, the PMG model indicates that ODA had negative short- and long-term correlations with FDI and economic growth in Africa. The results also showed that only economic growth is statistically significant at 10% to ODA in the long run. In contrast, FDI and economic growth are inconsequential to ODA in the short run in Africa. The ECT demonstrated a 34% adjustment rate from short to long-run equilibrium.

The current study concludes that, there is no causal relationship between FDI and economic growth (vice versa) and ODA and FDI (vice versa). In addition, the current study reveals the bidirectional correlation between ODA and economic growth (vice versa) in Africa.

5.2.5 Official development assistance threshold level required to trigger significant FDI inflows in selected African countries

The current study found that the FDI single model estimator is 0.0002 with a 95% confidence interval. The F statistic is 90.38, exceeding the critical value of 1% significance level (26.3873). In addition, the bootstrap p-value is 0.0000, making it highly significant.

The following FDI three rules exist using the threshold regression models in the current study: (1) When FDI < 0.0002%, the positive coefficient of 0.0620 implies a positive

relationship between FDI and economic growth, (2) When 0.0002% < FDI < -0.9707: the negative coefficient of -0.3987 suggests that economic growth is negatively related to FDI and (3) When FDI > -0.9707 a positive effect of FDI on growth is back, however, it is not as strong as it was in the first regime with the coefficient of only 0.0587. Therefore, the current study concludes that the first step threshold value equals zero, occurring between 0.0002 and -0.9707.

On the other hand, the current study concludes that using the ODA dynamic panel threshold, the single model estimator is 8.8161 with a 95% confidence interval. Furthermore, the current study concludes that the F statistics is 5.33, below the 1% significance level (11.8671) at the bootstrap of 0.2033.

The following ODA three rules exist when using the threshold regression models in the current study: (1) When ODA < 8.8679%, the negative coefficient of 0.0683 implies a negative relationship between ODA and economic growth, (2) When 8.8679% < ODA < 9.0389%: the positive coefficient of 2.1506 suggests that economic growth is positively related to ODA and (3) When ODA > 9.0389% a positive effect of ODA on growth is back, however, it is not as strong as it was in the first regime with the coefficient of only 0.2621. Therefore, the current study concludes that the first step threshold estimate is when the likelihood ratio equals zero, which happens between 8.8679 and 9.0389 percent.

5.3 Contribution to new knowledge

This current study has three dimensions of importance and contributions to the body of knowledge: empirical, theoretical, and methodological. These contributions, as well as policy implications, are examined in the following four subsections.

5.4 Empirical contribution

The critical empirical contribution of this study is the empirical investigation and subsequent analysis of the link between the selected ODA, FDI variables, and economic growth. This contribution has three components:

- Despite a growing number of investigations in this focus area, the outcomes are uneven and mixed (Ndambendia and Njoupouognigni, 2010; Kossele 2017; Dike, 2018; and Ali and Mingque, 2018).

- The chosen variables of interest are rarely investigated in a single study, contributing to the fragmentation of the literature in this area.

- The majority of the studies in which these variables (ODA, FDI and economic growth) were investigated primarily focused on two variables (FDI and economic growth) while the current study contributes to empirical literature by jointly examining the three variables (ODA, FDI and economic growth).

Most studies in this field exist in developed countries, with only a few focusing on underdeveloped countries, particularly Africa. Zekarias (2016), Ali and Malik (2017), and Ali and Mingque (2018) are prominent studies that adopted the FDI and economic growth nexus but did not focus on Africa. Bhandari, Pradhan, Dhakal, and Upadhyaya (2007) and Alemu (2017) confess the developing and growing nature of ODA, FDI, and economic growth exploration and state that more research is needed in other contexts, with Alemu (2017) precisely revealing the shortage of investigation within the African context.

As a result, the current study adds to empirical knowledge and scholarly understanding of the relationships between ODA, FDI, and economic growth in Africa. Most importantly, the current study highlights the fact that critical FDI and ODA determinants such as foreign portfolio investment, government consumption, natural resources, consumer price index, trade openness, economic growth, domestic investment, population growth, and human capital development are understudied variables when it comes to their relationship with ODA, FDI, and economic growth, particularly in the context of African countries.

5.5 Theoretical contribution

Theories are considered vital analysis instruments since they lead and propel the study process. In addition, theories create a stimulant for knowledge advancement within the selected topic of interest by providing a framework for action and comprehension (Inglis

and Maclean, 2005). As a result, in any research, the relevance of a chosen theory is critical (Babbie and Mouton, 2001).

To explain the hypothesised relationships between the variables (ODA, FDI, and economic growth), the current study used different complementary hypotheses. This current study emphasises the necessity of a multi-theory approach to understanding ODA, FDI, and economic growth integration research. A complementary approach was therefore followed in integrating the principles of the mainstream ODA, FDI, and economic growth theories (the big push theory, the public interest theory, the dual gap theory, theory of international trade, the eclectic paradigm theory, currency areas theory, the theory of internalisation, the imperfect market theory, the neoclassical growth theory, mercantilists theory, the classical theory, and the Keynesian theory). In chapter two of this study, the application of theoretical perspective to current research is argued.

Cairney (2013) argues that a single theory cannot adequately explain study observations and account for all speculated variable correlations. Hence many theories were used in this study. However, no other study in the African context has adopted this technique to the best of the researcher's knowledge. Other research, on the other hand, has relied heavily on prominent individual hypotheses (e.g., Upadhyaya, Pradhal, Dhakal and Bhandari, 2007; Blaise, 2007; Hien, 2008; Ndambendia and Njoupouognigni, 2010; Ellahi and Ahmad, 2011; Nwaogu and Ryan, 2015; Donaubauer, Meyer, and Nunnenkamp, 2016; Alemu, 2017; Ozekhome, 2017). Rao, Sethi, Dash, and Bhujabal, 2020 are one of the few investigations that used this complementary technique. Nevertheless, the research was not undertaken in Africa; instead of focusing on developed countries.

5.6 Methodological contribution

The similarity of the empirical work that investigated official development assistance, foreign direct investment, and economic growth was done by Sabra and Eltalla (2016), Iamsiraroj (2016), and Nwaogu and Ryan (2015). Those studies evaluated the significant relationship between ODA, FDI, and economic growth using methodological

approaches that did not cater to possible endogeneity and wholly ignored the threshold regression. Prior empirical studies employed the Ordinary least squares (OLS) estimation technique, known for its inability to address the endogeneity problem. This current study contributes to new knowledge methodologically by assessing the threshold constraints endogenously using a dynamic panel threshold regression, which is a technique that uses a GMM estimator to deal with the endogeneity issue.

Furthermore, in the limited studies such as those of Ndambendia and Njoupouognigni (2010), Alemu (2017), and Ozekhome (2017), that employed panel data estimation methods to examine the relationships between ODA, FDI, and economic growth in Africa, an endogenous problem triggered by a bi-directional cause-and-effect relationship between the dependent and independent variables were ignored in the estimation approaches. In addition, as indicated by Walsh and Yu (2010), the dynamic nature of FDI data was also neglected in these earlier studies. However, the current study considered the complex nature of FDI data and employed the dynamic GMM approach as one of the estimation approaches to address the endogeneity issue.

The study contributes to new knowledge by complementing existing studies on the relationship between ODA, FDI, and economic growth but giving insights from an African perspective. Methodologically, we also extend on the previous studies by considering the official development assistance *threshold level* reached to trigger significant inflows of FDI into selected African countries. With the current drive by governments to break the ODA curse in Africa, this study proposes policies that will augment the efforts of many sitting governments in their quest to boost economic development by channeling increased inward FDI flows and receiving less ODA.

5.7 Policy implications

The current findings and outcomes may be valuable to policymakers, practitioners, and academics. The policymakers in African countries are encouraged to adopt policies to boost economic growth, trade openness, human capital development, and population growth to attract significant inward FDI flows. As a result of a consolidated

legislative framework and governance principles, policymakers are encouraged to implement good governance practices into official development assistance (ODA) to improve the oversight role.

This study thus contributes to the literature, practice, and policy by developing a disclosure compliance framework based on the weaknesses of a fragmented legislative framework and the absence of defined guidelines. Figure 8 below is the disclosure and transparency compliance framework for official development assistance (ODA).

Figure 8: ODA Disclosure and transparency compliance framework
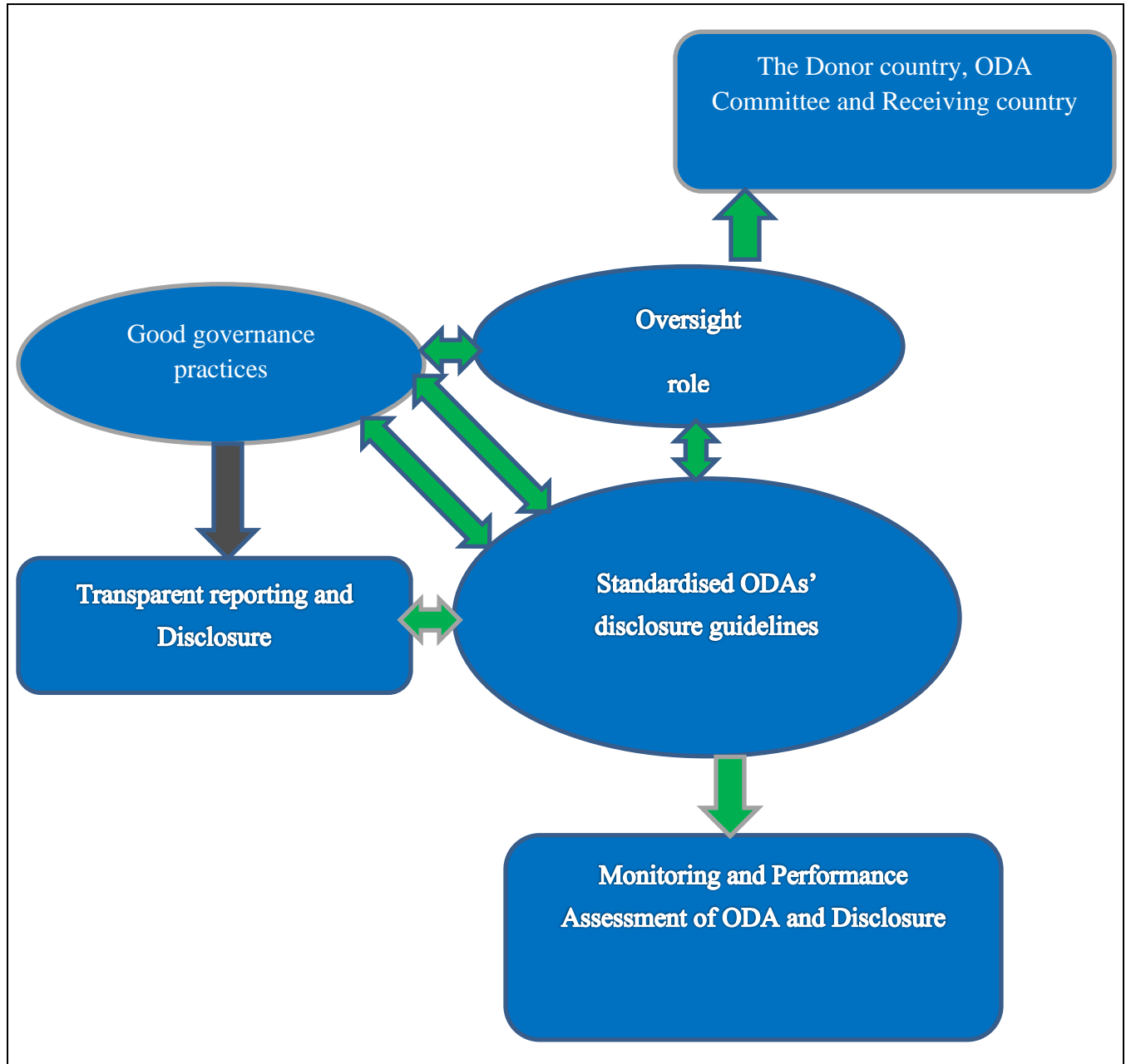
Source: Researcher's own conceptualisation

The oversight function could improve by establishing a consistent and coordinated strategy for enforcing compliance and investing in continual human capital development through training and mentoring. In addition, the donor country and the standing committee on ODA must strengthen the oversight function in monitoring ODA

disclosure performance. They must also give necessary assistance to the receiving state to carry out its functions autonomously and without excessive interference.

In order to achieve the standardised reporting behaviour, the ODAs' reporting and disclosure guidelines must be centrally controlled. The above will contribute to assuring the conformity to good governance concepts such as transparent reporting and disclosure and sustaining high ethical standards.

Ensuring that qualitative disclosures in reporting correspond with prescriptions in regulatory, governance, and monitoring frameworks would benefit state agents and authorities of ODAs. According to King III and IV, as well as the OECD's structure on principles of good governance, transparency and disclosure are among the essential governance pillars, alongside accountability, fairness, and responsibility. As a result, state agents and ODA authorities must ensure that procedures and resources are in place to implement the disclosure guidelines.

5.8 Recommendations for future research

The recommendations for future research are an attempt to steer future ODA, FDI, and economic growth research in light of the inadequacies and findings that resulted from this study, as mentioned in the previous section.

This study concentrated on the relationships between official development assistance, foreign direct investment, and economic growth in selected African countries. Future studies could consider a comparative study employing the same variables but extending the number of countries and economic blocs. For instance, researchers could consider comparing MENA and BRICS or the EAC and the SADC to determine if there are differences in the patterns of ODA, FDI inflows, and economic growth based on level of development, economic bloc membership, or any factors that may impact on aid dependence or FDI attraction. Comparative studies are gaining popularity as they highlight those aspects that the defective units can work on improving in order to elevate their respective statuses.

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APPENDIX A: TURNITIN REPORT

Thesis_VMM

APPENDIX B: ETHICAL APPROVAL

UNISA | university of south africa

UNISA DEPARTMENT OF FINANCE, RISK MANAGEMENT AND BANKING ETHICS REVIEW COMMITTEE

Date: 17 MARCH 2020

Dear Mr VMM Moloi

> ERC Ref #2020/CEMS/FRMB/003
> Name : Mr VMM Moloi
> Student #: 33860866
> Staff #:

Decision: Ethics Approval from 17 March 2020 to 30 April 2026

Researcher(s): Name Mr VMM Moloi

E-mail address moloivmm@gmail.com, telephone 076 408 5749

Supervisor (s): Name Prof PLR Makoni
E-mail address makonpl@unisa.ac.za, telephone 012 429 3029

Working title of research:

The nexus between official development assistance, foreign direct investment and economic growth in selected African countries

Qualification: Doctor of Philosophy (Financial Management)

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 17 March 2020 to 30 April 2026

The **Negligible risk application** was **reviewed** by the DFRB Ethics Review Committee on 17 March 2020 in compliance with the Unisa Policy on Research Ethics and the Standard Operating Procedure on Research Ethics Risk Assessment

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APPENDIX C: TEMPLATES OF RESPONSES TO EXAMINERS' COMMENTS