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FOREIGN CAPITAL INFLOWS AND TRADE OPENNESS NEXUS:

THE CASE OF SELECTED SUB-SAHARAN AFRICA COUNTRIES

By

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DECLARATION

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DEDICATION

I dedicate this thesis to my family, especially Mr and Mrs Damson Mdewa Nthangu, who have been part of my academic excellence.

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ABSTRACT

The focus of the study was to investigate the relationship between foreign capital inflows and trade openness in sub-Saharan Africa (SSA) countries. The research involved 31 countries of the SSA region. The study used unbalanced panel data from 1985 to 2018 from the International Monetary Fund, balance of payments yearbook and world development indicators. The first objective was to examine the relationship between foreign capital inflows and trade openness using a panel smooth transition regression model. The findings revealed the existence of a positive and significant bi-directional causality between foreign capital inflows and trade openness. This implies that the two flows are connected and therefore can exert a positive multiplier effect on each other. The second objective was to examine the socioeconomic determinants of foreign capital inflows. The study applied the random effect model (RE) and the dynamic model of generalised method of moment (SYSGMM). The findings showed that, real interest rate, real exchange rate, inflation, GDP growth rate and food security significantly impact on foreign capital inflows.

The third objective was to investigate the impact of foreign capital inflows and trade openness on output performance. The researcher adopted the RE and the SYSGMM. The findings showed that FDI and FPI are statistically significant whereas, trade openness is not statistically significant to impact output performance.

The study recommends that more steps should be taken to deepen interregional and regional economic integration in Africa, including the implementation of free trade agreements so as to promote trade and foreign capital inflows. Again, the governments of SSA countries that wish to attract more foreign capital inflows should improve on health facilities so as to increase life expectancy; ensure that there is food security; and improve the education system so as to increase the number of literates in the region.

Lastly, an ideal bank for regional capital flow should be established subsequent to other banks, such as agricultural banks and banks of industries. This bank should be saddled with the responsibility of managing these investible funds and capital flow and channelling them to the appropriate sector for output performance monitoring.

Keywords: Foreign capital inflows, trade openness, output performance, panel smooth transition regression, random effects (RE), system GMM

LIST OF ABBREVIATIONS

ABBREVIATIONS	DEFINITION OF TERMS
SSA	Sub-Saharan Africa
IMF	International Monetary Fund
WDI	World Development Indicators
UNCTAD	United Nations Conference on Trade and Development
WB	World Bank
UNDP	United Nations Development Programme
OECD	Organization for Economic Co-operation and Development
PSTR	Panel smooth transition regression
P-ARDL	Panel autoregressive distributive lag
GDP	Gross domestic product
FTAs	Free trade agreements
FDI	Foreign direct investment
FCI	Foreign capital inflows
EDF	Equity and debt flow
FPI	Foreign portfolio investment
FA	Foreign aid
REM	Remittances
ODA	Official development assistance
USD	United States dollars
GFCI	Gross foreign capital inflows
TO	Trade openness
NIPA	Namibia Investment Promotion Act
NEPAD	New Partnership for Africa’s Development
AUDA	African Union Development Agency
AfDB	African Development Bank
UN	United Nations
MDGs	Millennium Development Goals
SDGs	Sustainable Development Goals

FE	Fixed effect
RE	Random effect
BOP	Balance of payments
X	Exports of goods and services
LEX	Life expectancy
CAPP	Capital productivity
M	Imports of goods and services
HE	Health of the population
EL	Education levels
SET	School enrolment, tertiary
Foodsec	Food security
FAO	Food and Agriculture Organization
INF	Inflation
Y	Output
LabF	Labour force participation
RIR	Real interest rate
REXC	Real Exchange rate
IPS	Im, Pesaran and Shin
ADF	Augmented Dickey-Fuller
CD	Cross-dependence
AIC	Akaike information criterion
SIC	Schwarz information criterion
HQ	Hannan-Quinn information criterion
HOM	Heckscher-Ohlin-Mundell
UN Comtrade	United Nations Commodity Trade Statistics
VAR	Vector autoregressive
OLS	Ordinary least square
PSTRVEC	Panel smooth transition regression vector error correction
SSR0	The sum of squared residuals under the null hypothesis
SSR1	The sum of squared residuals under the null hypothesis

GLS	Generalised least squares
ML	Maximum likelihood
H0	Null hypothesis
H1	Alternative hypothesis
PVEC	Panel vector error correction model
ECT	Error correction terms
EAP	East Asia and Pacific
K	Capital
L	Labour
TFP	Total factor productivity
MNEs	Multinational enterprises
ECOWAS	Economic Community of West African Countries
SADC	Southern African Development Community
EAC	East African Countries
IV2SLS	Instrumental two-stage least square regression
ZM	Zhang-Markusen theory
VECM	Vector error correction model
ECM	Error correction model
LDCs	Less developed countries
3SLS	Three-stage least square
IFS	International financial statistics
LLC	Levin, Lin, Chu
PCA	Principal Component Analysis
SEM	Structural equation modelling
WAMZ	West Africa Monetary Zone
LSDV	Least square dummy variable
Sq. Km	Square kilometre
NSE	Nairobi Stock Exchange
EU	European Union
SYSGMM	System generalised method of moments

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CHAPTER 1

INTRODUCTION AND OVERVIEW

1.1 Background of the Study

In the era of globalisation and economic integration, foreign capital inflows have been essential in accelerating economic development, especially in developing countries (Sahoo & Sethi, 2017). The idea is that foreign capital inflows (FCI) provide capital for productive sectors to attain economic development, particularly in capital-deficient economies. Foreign capital comes in various forms, chief among them include foreign direct investment (FDI), foreign portfolio investment (FPI), equity and debt flow (EDF), foreign aid (FA) and remittances (REM) (Todaro & Smith, 2012). Out of these different forms of foreign capital, this study deals with only FDI and FPI because these two forms have been proven to increase output and stimulate economic growth by many previous studies (Agbloyor & Yawson, 2014; Bilal, Anwar & Shawnawaz, 2015; Nyauncho & Kabiru, 2015; Onyinye & Emmanuel, 2018; Cantah, Brafu-Insaidoo, Wiafe & Adams, 2018). However, which of the FDI or FPI impact more on output performance remain inconclusive by many previous studies (Ekeocha 2008; Nwosa & Adeleke 2017; DinhSu & Nguyen 2020). Again, the threshold effect of the relationship between foreign capital inflows and trade openness[1] in the SSA region appeared new in literature. All these form the novelty of this study.

Literature argues that the increase in the level of foreign capital inflows that has been sometimes observed in Sub-Saharan Africa[2] (SSA) has been driven mainly by FDI and FPI (Sy & Rakotondrazaka, 2015; Outlook, 2018; World Bank, 2020). Furthermore, the recent major composition of capital inflows in the region has been direct investment and portfolio investment (Fernandez-Arias & Montiel, 1996; Sy & Rakotondrazaka, 2015).

[1] The study uses TO and TR interchangeably to proxy Trade openness

[2] Sub-Saharan African Countries and Sub-Saharan Africa Countries have been used interchangeably

Generally, FDI and FPI are the main forms of foreign capital inflows and major ways by which investments are made in other countries (Akinlo, 2003; Mcmillan, Rodrik & Verduzco-Gallo, 2014; Bah & Giritli, 2020). Most developing countries have been over-reliant on external financial sources because domestic resources are insufficient to finance long-term development (Akinlo, 2003; Ahmed & Mmolainyane, 2014; Akobeng, 2016; Batu, 2017; Cantah *et al.*, 2018; Chorn & Siek, 2017; Varela, 2018). Moreover, researchers are advocating foreign capital as a preferred source of capital, particularly in Africa, because most African countries have low domestic savings and, besides that, Africa is generally poor (Adams & Klobodu, 2017; Carp, 2014; Karadam & Ocal, 2014; Adams & Klobodu, 2018; Beegle & Gaddis, 2016; Loungani & Razin, 2001). The low domestic savings and low incomes of most African countries imply that it is hard to raise domestic capital to finance investment (Boyce & Ndikumana, 2012). As a result, most of these countries have to look up for foreign capital to fill the saving-investment gap to promote growth and development (Khan, 2007).

Similarly, other researchers argue that foreign capital inflow encourages the process of economic growth by transferring advanced technology (Balasubramanyam & Sapsford, 1996; Mowlaei, 2018); increasing productivity (Ozturk, 2007); and new entrepreneurship (Khan, 2007). Additionally, according to the neoclassical theory, foreign capital is supposed to augment domestic capital, which ultimately promotes output growth or performance and stimulates economic development. In recognition of the importance of foreign capital in filling the resource gap, most developing countries, including SSA countries, have liberalised their financial account to encourage foreign capital inflows. As a result, the region (SSA) sometimes observes increasing foreign capital inflows. For example, on average, FDI as a percentage of GDP increased from 2.906% in 2007 to 3.945% in 2017, respectively, whereas FPI increased from 0.878% in 2007 to 1.694% in 2017 (Chuhan-Pole, Calderon, Kambou, Blimpo, & Korman, 2018).

Nevertheless, the composition and structure of capital inflows in the region have partly been influenced by external shocks, comprising the global financial crisis in 2008/2009, the 2011/2012 European sovereign debt crisis, and the extreme decline in the prices of oil in 2014/2015. For instance, as a result of the global financial crisis in 2008 and 2009, foreign capital inflows to SSA countries dropped from 7.5% of GDP in 2007 to 5.5% of GDP in 2008 (Chuhan-Pole *et al.*, 2018). The total output growth also slowed down from an average of 5% before 2008 to less than 3.5% in 2009 (IMF, 2009). The European sovereign debt crisis hit the SSA region harder than the global financial crisis did. This is evidenced by the decrease in gross capital inflows in the region from 10.12% of GDP in 2011 to 5.5% in 2013, respectively, indicating a 4.6% decline (Baek & Kim, 2020).

Conversely, the global financial crisis led to a decrease in the gross capital inflows in the region by only 2% (Calderon, Chuhan-Pole & Kubota, 2019). Besides, there has been an increase in economic integration and globalisation of economies over recent decades, where trade and capital flows have been the main forces that shape the process; even the transmission of the global crisis to the SSA region has been through trade channels (Belke & Domnick, 2018). However, trade itself is advantageous in the economy because it contributes to output performance and improves access to global markets, consequently subjecting countries to increasing international competition, thereby enjoying the exploitation of their comparative advantages on a larger scale (Sally, 2015). Moreover, the 2030 development agenda and Addis Ababa Agenda for action have recognised trade as the crucial means for implementing sustainable development goals (Brun & Gnangnon, 2017). This is because trade increases production output, thereby generating employment opportunities and increasing wage levels, which eventually help improve people's standard of living and consequently reduce poverty. Likewise, the World Bank reported that productivity (output) and GDP per capita growth

increased more rapidly in developing countries that removed trade barriers and restrictions to trade than in other developing countries that did not (Druppers, 2017).

According to the report of World Development Indicators (WDI, 2019), exports of goods and services in the SSA economy declined from USD214.063 million in 2013 to USD187.050 million in 2014; the economy witnessed a further decline in GDP from USD137.307 million in 2015 to USD125.021 million in 2016, respectively. The value of imports of goods and services increased from USD518.581 million in 2013 to USD533.074 million in 2014, while it decreased from USD462.853 million in 2015 to USD399.962 million in 2016. In general, the exports and imports of goods and services in SSA countries have been moving parallel, although imports are more volatile than exports (World Bank, 2018). Globally, there has been a dramatic increase in trade and investment flows, although Africa has not benefited much from that increase. This is evidenced by a decline in the share of Africa's imports to world imports from 4.5% in 1970 to 2.9% in 2010, while, during the same period, Africa's share of exports to world export declined from over 3.5% to 3.3% (Bagwell & Staiger, 2011).

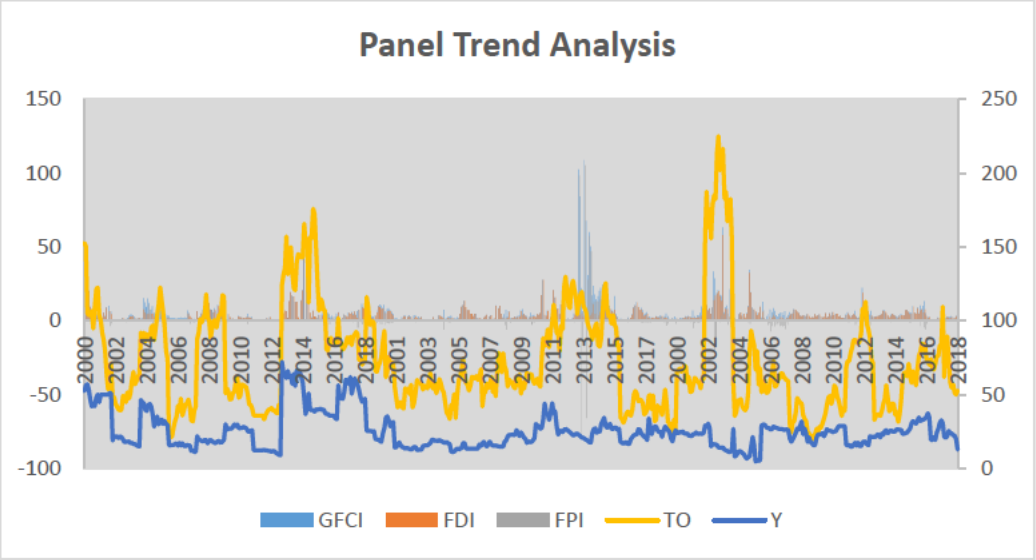


Figure 1.1: Foreign capital, trade flow and output performance trends in SSA

The graph above shows the trends of gross foreign capital inflows (GFCI), foreign direct investment (FDI), foreign portfolio investment (FPI), trade openness (TO) and output performance(Y). From the figure above, trade moves around the mean with a greater moving average than the rest; this indicates that many of the SSA countries are open for them to attract capital flows. Nonetheless, the TO variable dropped sharply at the initial stage, which is below the average, but suddenly rose again in 2006 and later slid to negative returns. However, in 2008, the TO rose quickly to over 150 units of output and later moved below the expected average; moreover, TO experienced a slight increase between 2010 and 2014 but fell to around -50 units in 2018 and later skyrocketed to over 200 units of output performance, which indicates the highest returns among the series. FDI and FPI portrayed stability in their initial movements before trending towards different directions and remaining unstable. Both GFCI and Y trended either upward or downward during the years selected. The upward and downward movements of Y confirm the unstable growth in SSA countries. The GFCI, on its

own, maintained negative trends from the initial year to the final year and proved to be the worst in terms of moving averages for all the periods.

Generally, trade and capital flows are theoretically regarded as complements if they exhibit a positive relationship or substitutes if they are negatively correlated. Mundell (1957) considered trade and capital flows as substitutes, implying that when trade integration increases, capital inflows decrease. However, the new theoretical models have challenged this view by incorporating financial frictions, thereby suggesting trade and capital flows to be complements, meaning that when trade integration increases, capital inflows also increase (Kraay, Aart, Norman Loayza, Luis Serve´n, & Jaume Ventura, 2005; Caballero, Farhi, & Gourinchas, 2008; Antras & Caballero, 2009). This complementary relationship helps to boost output performance or growth. Besides, previous empirical literature has shown that the trade and capital flows nexus ranges from a positive relationship (Portes & Rey, 2005; Chaisrisawatsuk & Chaisrisawatsuk, 2007; Aizenman & Noy, 2008; Sedik & Sun, 2012; Belke & Domnick, 2018; Sazali, Bakar, Huey, & Ghazali, 2018; Donghui, Yasin, Zaman, & Imran, 2018; Singhania & Saini 2018; Olayiwola, Adedokun, & Oloruntuyi, 2019) to negative relationship (Ali, Farooq, Sardar, & Bhutta, 2019; Tahmad & Adow 2018; Mehar & Hasan 2018; Koojaroenprasit 2013; Caudros *et al.*, 2004; Bende-Nabende, 2002; Grünfeld & Svindal, 2000). Conversely, other studies found no significant association between trade and capital flows (e.g., Ahearne *et al.*, 2004; Rahman, 2011; Yang *et al.*, 2013; Tsaurai, 2015; Caudros *et al.*, 2004; Klasra, 2011; Sazali *et al.*, 2018). Conflicting results in the previous literature are due to the use of different sample sizes, time periods, measurement problems, functional forms, and econometric methods. Therefore, given the mixed results from previous studies and the limited empirical evidence, particularly for the case of SSA, there is a pressing need to examine the relationship between trade openness and foreign capital inflows in SSA countries. This is undertaken in the current study using a large sample size, longer time periods and application

of the econometric method that is a non-linear approach called the panel smooth transition regression (PSTR) model. Adopting a non-linear approach in the study's model helps to determine the asymmetric and threshold relationship in the study. It better provides for effective parsimony, predictability and interpretability required in the model, which a linear model may not sufficiently supply.

Moreover, the SSA region has been receiving a comparatively smaller share of the increased global flows; for instance, between 2000 and 2014, the FPI and FDI inflows in the region were only 1% of global FPI inflows and 2% of the global FDI inflows, respectively (Chuhan-Pole *et al.*, 2018). Likewise, the region is experiencing a high saving-investment gap (Kabadayi *et al.*, 2012). SSA has the lowest average gross savings rate compared to other developing countries. For instance, from 2000 to 2017, the average savings rate in SSA was only 22%, while in East Asia and the Pacific, it was 27% and 34% in South Asia (World Bank, 2019). Therefore, the need to examine factors that attract foreign capital inflows to rescue the situation in the region cannot be overemphasised. Previous empirical literature has suggested several socioeconomic factors that influence foreign capital inflows in the economy. Such factors include domestic economic growth, inflation rate, exchange rate, foreign economic growth, infrastructure development, human capital investment, level of corruption, food security, poverty, level of economic freedom, health and well-being of the population and so forth (Blonigen, 2005; Rodríguez-Pose & Cols, 2017; Chuhan-Pole *et al.*, 2018; Calderon *et al.*, 2019; Zlatković 2016; Erdogan & Unver 2015; Asiedu *et al.*, 2015; Hecock & Jepsen, 2013; Rodriguez & Pallas, 2008; Kahai, 2004; Dunning 1988). This study emphasises some of these human-based (people category) socioeconomic determinants targeted at goal-oriented sustainable development, such as health and well-being of the population, human capital investment and food security as main variables because it appeared not much study has adequately addressed these concepts in the production economy.

Finally, the impact of foreign capital inflows and trade openness on the output performance of the SSA countries also needs to be investigated. The investigation will show whether foreign capital inflows and trade openness affect output performance in the SSA region. Some studies have revealed that some open economies experience higher growth rates than less open ones. For example, (IMF, 2015), Shaheen *et al.,* (2013), Mazhikeyev *et al.,* (2015) and Siyakiya (2017) all revealed that open countries attract foreign capital inflows and boost output performance more than isolated ones because they are more connected to the external world. Nonetheless, as cited by Gwartney *et al.,* (2009) and Murinde (2019), some countries in the SSA region are open but struggling to attract foreign capital inflows and therefore have slow growth rates. In view of this puzzling finding, this study seeks to examine the impact of foreign capital inflows and trade openness on output performance in SSA countries.

1.2 Problem statement

Over the years, it has been believed in research works that high trade openness is important in attracting foreign capital inflows and boost output growth or performance (Baldwin, 1997; García-Herrero & Wooldridge, 2007; Wakeman-Linn & Wagh, 2008). Many SSA countries have tried to open their economies to increase trade flows and foreign capital inflows to achieve output growth. Such countries include the Democratic Republic of the Congo (DRC), Djibouti, Ethiopia, Guinea, Kenya, Madagascar, Mali, Mozambique, Niger and Nigeria, Rwanda, Uganda and Tanzania. However, there are records of countries in the region with opened economies, yet still struggling to attract foreign capital, for example, Mauritius, Rwanda, Botswana, Cape Verde, Ivory Coast, Tanzania, Uganda, Burkina Faso, Malawi, Seychelles, Botswana and Zambia, etc (Gwartney *et al.,* 2009; Kandiero & Chitiga, 2006; Murinde, 2019). The trend of foreign capital inflows in those SSA countries evidences this. Although sometimes capital flows seem to be increasing in absolute terms, they are still very low and at times,

declining. For example, between 2000 and 2017, on average, FDI as a share of GDP was only 3.95%, while FPI recorded only 1.69% within the same period (Calderon et al., 2019). Even as a global share, the foreign capital inflow has been minimal and declining; for example, between 2000 and 2014, FPI and FDI inflows in SSA were only 1% and 2% of the global FPI and FDI flows, respectively (Chuhan-Pole et al., 2018).

In the same vein, even trade flows as a percentage of global share were only 3.3% of exports and 2.9% of imports in the same period (Bagwell & Staiger, 2015). Even compared to other regions, capital and trade flows in the SSA region have also been very low (Battachrya *et al.*, 1997; Insaidoo & Biekepe, 2013). Therefore, it is observed that despite the belief that high trade openness is crucial in attracting foreign capital inflows, there are countries in SSA with high trade openness, however, their levels of trade and capital flows are still very low. This begs the question of whether foreign capital inflows and trade openness have a relationship in SSA countries. The empirical evidence on this concept remains missing because the matter has not been fully explored. Moreover, many efforts have been made at country and sub-regional levels to improve foreign capital inflows in SSA. For example, East African governments decided to adopt the economic liberalisation policies such as privatisation with the aim of using the private sector to manage foreign investment attraction. The government of Tanzania, in particular, initiated and implemented various reforms to attract foreign capital inflows, for example, reforms in the financial institutions, civil service, public sector service, trade regime reforms, reforms in the exchange rate and interest rate. Reforms were also initiated and implemented in the political systems, thereby changing systems of the economy from a command-based economy into a market economy, as well as the establishment of the Tanzania Investment Centre (Ngowi, 2006). Furthermore, Nigeria made several efforts to improve foreign capital inflows; for example, the development of public-private risk-mitigating instruments, the establishment of transparent rules to ensure that due process in the award of

contracts will be respected, strengthening of the local capital market as well as liberalisation of the economy (Asiedu, 2004). In the same vein, Namibia also developed the Foreign Investments Act of 1990 and later on, the Namibia Investment Promotion Act (NIPA) in 2016 to replace the former Act, but both Acts were aimed at influencing the flow of foreign investment in the country (Klazen, 2017).

Furthermore, the New Partnership for Africa's Development (NEPAD), currently referred to as the African Union Development Agency (AUDA-NEPAD), is another effort developed by statesmen to increase capital in the sub-region through a combination of various reforms and the establishment of an enabling environment for investment (Nsouli & Funke, 2003). The African Development Bank (AfDB) has also made various efforts to attract foreign capital to the continent; for example, AfDB has tried to remove barriers that hinder the flow of investment finance in the region. Additionally, the AfDB has attempted to bring together multilateral financial institutions, private funds, pension funds and sovereign wealth funds to create a mechanism to reduce political and financial risks, which, in the process, will improve the business environment. Furthermore, AfDB has been engaging with policymakers in every country to improve the legal and regulatory environment and create a more predictable business climate (Adarkwah, 2016).

Despite these efforts, most African countries continue to face a shortage of resources to finance private and public investments (UN, 2010). This implies that external financial resources are greatly needed to finance investment in the SSA region, more so than for many other regions, because income levels in SSA are too low to generate enough domestic resources to finance its investment (Chorn & Siek, 2017). The poor design of the macroeconomic policies and distorted investment and trade policies is among the factors that have led to the ineffectiveness of the efforts made so far (Rodrik, 1998). Another reason for the SSA to still have low capital inflows despite all the efforts that have been undertaken may be the inability to identify relevant factors

that determine capital flows into the region. This is because most of the factors that have been examined by the previous empirical studies are quantitative and therefore are easy to measure, although their results are still inconclusive. Relatively little is known about the socioeconomic factors that influence capital inflows in the region, while these factors are very important as they affect productivity and consequently capital inflows (Blanton & Blanton, 2015; Naanwaab & Diarrassouba, 2016). Specifically, there is a lack of empirical studies in SSA on the combination of the following human based socioeconomic factors; health and well-being of the population, human capital investment (education level) and food security. Therefore, this study contributes to the literature by examining the effect of these socioeconomic factors on foreign capital inflows in the region. In addition, despite all efforts to boost output performance, the growth rate in SSA is still very low relative to the growth rate of other regions in the world. For example, the region recorded its slowest growth rate in 2015, the first time since 1998. The IMF Regional Economic Outlook for Africa (2016) reported that the growth rate in the SSA decreased in 2014 from 5.1% to 4.4% in 2015, whereas the IMF prediction for GDP growth rate in 2016 for the region dropped from 2.9% to 1.4% in the same year. The most significant shock in SSA was experienced among the oil exporting countries as their GDP growth forecast was negative. The economies of countries such as Nigeria, Equatorial Guinea and South Sudan contracted by 1.7%, 9.9% and 13.1%, respectively. In a related development, Frankema and Austin (2016) revealed that Sub-Saharan Africa has the lowest manufacturing output per capita on the planet.

Furthermore, according to IMF World Economic Outlook (2021), the recovery in sub-Saharan Africa is expected to lag behind the rest of the world with a cumulative per capita GDP growth over the 2020-25 period projected at 3.6%, substantially lower than in the rest of the world, which is put at 14%. Within the period, the income gap based on real GDP per capita between the SSA region and the rest of the world is projected to grow wider. This situation is

unacceptable and from there the need for an empirical investigation on the impact of foreign capital inflows and trade openness on output performance and national productivity in the SSA region.

1.3 Research objectives

The broad objective of this study is to examine the relationship between foreign capital inflows and trade openness in Sub-Saharan African countries.

Specifically, the study aims at examining the following:

1. To examine the relationship between foreign capital inflows and trade openness in SSA countries.
2. To investigate the socio-economic determinants of foreign capital inflows in SSA countries.
3. To establish the impact of foreign capital inflows and trade openness on output performance in SSA countries.

1.4 Research questions

The following research questions were addressed in relation to each of the three objectives:

1. Is there a relationship between foreign capital inflows and trade openness in SSA countries?

2. Do socio-economic factors determine foreign capital inflows in SSA countries?

3. Do foreign capital inflows and trade openness impact output performance in SSA countries?

1.5 Research Hypotheses

The following hypotheses shall guide in the estimation section:

1. **H_0:** There is no relationship between foreign capital inflows and trade openness in SSA countries.

H_A: There is a relationship between foreign capital inflows and trade openness in SSA Countries.

2. **H_0:** Socio-economic factors do not determine foreign capital inflows in SSA countries.

   H_A: Socio-economic factors do determine foreign capital inflows in SSA countries.

3. **H_0:** Foreign capital inflows and trade openness do not impact output performance in SSA countries.

   H_A: Foreign capital inflows and trade openness do impact output performance in SSA countries.

1.6 Significance and justification of the study

The main aim of the study is to establish an evidence-based research capable of guiding policymakers on the possible relationship between FCI and trade openness in the SSA region. This manuscript highlights which factors influence the flow of FCI in SSA countries. Again, the study investigates the impact foreign capital inflows and trade openness have on output performance in the region. Academically, the study will help to widen the stock of the extant literature relating to the trade-capital flow relationship, determinants of FCI and their impacts on output performance in SSA. It is significant to know the trade-capital flows nexus to understand the interaction of the main forces that shape the globalisation process. Furthermore, the trade-capital flows nexus helps to contribute to the currently ongoing international debates among policymakers that focus prominently on trade and leave aside the role of financial integration. In addition, the relationship between the two flows is central to the planning strategies of the nations and development.

Moreover, understanding the trade and capital flows linkages is crucial during currency and financial crisis analysis (Goldberg & Klein, 1999). In addition, knowing the relationship between the two flows will help to identify whether or not the change in one flow is influenced

by the change in the other flow; therefore, countries that desire to attract foreign capital inflows should pursue open and export- or import-oriented trade policies. Furthermore, knowing the relationship between the two flows helps the study to recommend whether the current move towards boosting the intra-Africa continental free trade area is the right direction. In addition, it will help in deciding whether it will significantly impact fostering not only trade but also foreign capital inflows and output performance in the region. Therefore, the empirical findings of this study have important implications for policymakers in SSA because it will assist and guide them through designing suitable trade and investment strategies as well as boosting the economy (output performance). Moreover, the relationship analysis between the two flows in the case of SSA would help to investigate their links for countries at the early stage of their development, where they are considered as factor-driven economies by Porter (1990) and Ozawa (1992).

Furthermore, the study can inform the sustainable development agenda at UNCTAD with robust evidence because the socio-economic factors examined are part of indicators of progress towards people/human based category SDGs. Moreover, trade, health, food security and education have been mentioned as areas that need global partnership enhancement to achieve the Millennium Development Goals (MDGs). The study is topical, well-timed and policy-relevant due to the increasing role occupied by foreign capital as a source of investment and a stepping stone toward filling the resource gap for economic growth in SSA countries.

Furthermore, knowing the impact of foreign capital inflows and trade openness on output performance in the SSA region is essential for policymakers in their quest and strategy to attract foreign investment, boost output productivity, create employment, eradicate poverty as well as achieve economic development. These missions are among the core United Nations' SDGs to be attained by 2030. Consequently, they are formulated as the vision in the SSA region to be achieved over the next decade.

In a nutshell, the findings of this study will assist researchers who might conduct further/similar studies. They might use the work as reference material as the study attempts to add to the debate on the conflicting empirical findings on the nexus between FCI and trade openness by contributing to literature in Africa, which has been found to be scarce. Generally, the findings of this research, which investigates the relationship between FCI and trade openness, have theoretical, methodological and practical relevance.

1.7 Research gap

In relating foreign capital inflows with some macroeconomic variables, several studies exist at a country-specific level but studies pooling sub-Saharan countries together are seldom in literature. The implication of conducting a country-specific study over a panel study on the concept of foreign capital inflows is that interaction among member countries is lost. Panel data contains more variability, information, and more efficiency than pure cross-sectional or time series data. However, some reasons why researchers avoid panel studies on the concepts relating to FCI and trade openness could not be unconnected with the difficulties encountered during panel-wide studies. Taking panel studies on the SSA region helps to discover gaps in literature that could have been lost during country-specific studies. There are country-specific studies that have assessed the relationship between FCI and trade openness using linear modelling approaches. Some of such studies and the location of the studies include Lee, Hsiao, Bui and Nguyen (2021) conducted in Vietnam; Bese and Kalaycı (2021) conducted in Turkey; Alam, Raza, Shahbaz and Abbas 2016 conducted in Pakistan; Makoni (2018) conducted in Emerging African Economies. Zaman *et al.,* (2018) conducted in Asia, found a positive relationship between trade openness and FCI inflows; Khan and Hye (2014) conducted in Pakistan; Adow and Tahmad (2018) conducted in Sudan; Cantah *et al.,* (2018) partly conducted in Sub-Saharan Africa and Rathnayaka and Mudiyanselage *et al.,* (2021) conducted in Romania

found a negative relationship; while Ho *et al.,* (2013) conducted in Malaysia and Wickramarachchi (2019) conducted in Sri Lanka found that trade openness had no significant impact on FCI inflows.

However, this study differs from existing studies in the following ways:

(i) In chapter two: this study has successfully classified the data from countries in Sub-Saharan Africa to establish trend relationship. This was done by categorising countries of similar economic and political features to understand the flow of relationships. Variables series involved in the tested trend analysis are trade openness and foreign capital inflows (foreign direct investment and foreign portfolio investment). The economic blocs with similar features, according to this study, are the Economic Community of West African States (ECOWAS), the Southern African Development Community (SADC) and East African Countries (EAC). The outcome from the analysis showed that trade openness continued to nosedive in recent years, but performed significantly better than foreign portfolio investment, gross foreign capital inflow and foreign direct investment all through the period. Notably, most countries under EAC blocks performed less when compared with ECOWAS, with SADC standing between them in FDI performance. Overall, countries across the three economic blocks performed poorly in terms of portfolio and gross capital inflow investment throughout the period under review. Efforts to access more economic blocs proved abortive due to the scarcity of data.

(ii) Modelling of capital inflow augmented from the Cobb-Douglas production function was missing in literature, particularly when the study was constrained to migrate from a static to a dynamic model. The dynamic model became necessary when results suggested that most macroeconomic variables adopted for the study were not behaving well to determine output performance in the SSA region with the static

model. It indicates that the static model has failed to determine output performance going by the interactions among the observed variables in the SSA countries under investigation. However, since past studies such as Yaoxing (2010); Awad (2011); Orji *et al.,* (2014); Sakyi *et al.,* (2015); Ayodele *et al.,* (2019); Asamoah *et al.,* (2019) all found a significant relationship between output performance and these macroeconomic variables under investigation at either country level or in other regions, the study is constrained to seek for further justification from a dynamic model. No economy is static in the world. The assumption that a model will behave well for any given economy in the static world may be misleading. Consequently, the study opted for a dynamic model of system GMM.

(iii) Policy Perspective: The study provides evidence that in identifying the dynamic relationship between the foreign capital inflow and the series of factors that determine it in the SSA countries, some variables in the model, especially human capital investment and inflation, failed to impact foreign capital inflow significantly. This strongly indicates that foreign capital inflows in these SSA countries could not compare favourably with regional economies in other parts of the world where significant results were found. Again, trade openness and capital productivity have negative effects on output performance. The study shows that output performance could decline in the region with increasing trade openness and capital productivity activities. The implication is that no adequate policies are in place to engage these macroeconomic variables to stimulate productive activities of output performance. Lack of effective policy measure causes these variables to end up in unproductive activities, thus inhibiting output performance in the region. For policy application, an ideal bank for regional capital flow must be established in the region subsequent to other banks, such as the agricultural bank and the bank of

industries. This bank should, by white paper policy, be allowed in countries of SSA, saddled with the responsibility of managing these investible funds and capital flow and channelling same to appropriate sectors for output performance monitoring. Moreover, SSA countries must consider the relevance of Trade openness (Top), capital productivity (CAPP) and real interest rate (RIR) since they all inversely impact output performance. Increasing trade openness would decrease output performance by at least 4.8 units; capital productivity increasing by 1 unit would cause output performance to decrease up to 3.2 units. A 1% increase in real interest rate would cause output performance to decrease by 21.2%. Consequently, policy measures are required among the SSA countries to urgently moderate the macroeconomic variables that impact trade openness (TO). There is an urgent need to establish a policy that will enhance export promotion and import substitution. This policy should be aimed at strengthening home industries. Various taxes types could be levied to change people's taste in imported goods but must be moderated on imported raw materials for local production. Most industries in SSA are at the infant stage and mostly lack the basic technical skills to produce goods of international quality.

Further, as mentioned before, this study contributes to the body of knowledge from the path of modelling methodology of the non-linear model. Most of the previous studies used linear models in analysing the relationship between foreign capital inflows and trade openness, although they also arrived at different conclusions (Belke & Domnick, 2018; Sazali, Bakar, Huey, & Ghazali, 2018; Donghui, Yasin, Zaman, Imran, 2018; Singhania & Saini 2018; Olayiwola, Adedokun, & Oloruntuyi, 2019; Ali, Farooq, Sardar, & Bhutta, 2019; Tahmad & Adow 2018; Mehar & Hasan 2018). Adopting linear approaches in their study's models make their studies fail to determine the asymmetric and threshold relationship. Also, their studies

could not sufficiently provide effective parsimony, predictability and interpretability required in the model. Therefore, this study uses a non-linear model called panel smooth transition regression (PSTR). This model is important because it permits a smooth change between regimes and allows for various types of nonlinearities and asymmetric dynamics based on the types of transition function. The PSTR model also tolerates the estimation of nonlinearities that may occur between variables. The model also permits the choice of the suitable switching variable and the type of transition function. Again, the previous studies focused on FDI as a proxy for capital flows in analysing the nexus between foreign capital inflows and trade openness and ignored other forms of capital flows such as foreign portfolio investment, which is included in the current study. Examples of such studies include Cantah *et al.,* (2018); Nyauncho and Kabiru (2015); Liargovas and Skandalis (2012); Seyoum *et al.,* (2014); Miao *et al.,* (2020) and Tahmad and Adow (2018).

Again, this study differs from other studies on the factors influencing foreign capital inflows with a focus on human-based socioeconomic factors (health and wellbeing of the population, human capital investment (education level) and food security). This is because human-based socioeconomic factors affect the business environment and their impacts on economic development are indisputable (Kahai, 2004; Naanwaab & Diarrassouba, 2016). The few studies that attempted to investigate the socioeconomic factors focused on one form of foreign capital inflows, and their results are still conflicting. Such studies include Matea Zlatković (2016)**;** Alsan *et al.,* (2006); Asiedu *et al.,* (2012); Bryant C and Javalgi R. (2014) and Talukdar and Parvez (2017). This study contributes to the empirical literature by extending the effect of socioeconomic factors on FDI and FPI. Furthermore, many papers which assess the socioeconomic factors did not use any framework (Cleeve *et al.,* 2015; Busse & Nunnenkamp, 2009; Noorbakhsh *et al.,* 2001). The run of analysis without using any framework could mean that researchers did not find a robust theoretical framework to apply in their papers. This study

provides a solution by arguing that national competitive framework is a comprehensive theoretical framework that researchers can apply to assess various socioeconomic influences of FCI flows to developing countries, particularly SSA.

In conclusion, after an extensive review of the literature on the impact of foreign capital inflows and trade openness on output performance, it was discovered that the majority of similar studies that have been conducted focused on individual and developed countries (see Adenutsi, 2007; Ayodele Folorunso *et al.,* 2019; Ali *et al.,* 2020). In Africa, Siyakiya (2017) and Sikandar et al., (2021) attempted to examine the impact of foreign capital inflows and trade openness on the economy. For instance, while Siyakiya (2017) assessed the impact of trade openness on output performance in selected African countries, he failed to include foreign capital inflows in the study. Other studies in Africa that failed to include FCI, trade openness or focused on individual African countries are Asamoah *et al.,* (2019) who failed to include trade openness and Adu-Gyamfi *et al.,* (2019) who did not include FCI in their study. While, Ayodele *et al.,* (2019) and Nketiah *et al.,* (2019) focused on individual African countries. Again, Sikandar *et al.,* (2021) studied the impact of foreign capital inflows on agriculture development and poverty reduction in developing countries. The study did not include trade openness and the focus area was not output performance. From the foregoing, it is clear that none of these studies covered the focus area (industrial sector) and the scope (trade openness, foreign capital inflows and output performance) currently being investigated. Therefore, this study is set to fill this gap and contribute to the body of knowledge, especially on the scarce existing literature on the impact of foreign capital inflows and trade openness on output performance in SSA countries.

1.8 Overview of the research methodology

This study has adopted appropriate research methodologies to address each objective. Firstly, the study uses a nonlinear panel approach called panel smooth transition regression (PSTR) to

examine the relationship between foreign capital inflows and trade openness in Sub-Saharan Africa (SSA). Secondly, the research adapts the panel model of static and dynamic model of System GMM to investigate the socio-economic determinants of foreign capital inflows in SSA. Thirdly, the thesis utilises the fixed effect (FE), random effects and dynamic system GMM model to analyse whether foreign capital inflows and trade openness impact output performance in the SSA region.

1.9 Structure of the Thesis.

The study is organised into seven chapters as follows:

Chapter 2: Presents a brief overview of the SSA economies and their aggregate economic performance. The chapter discusses the trends of international capital flows and global shocks in SSA countries. The chapter concludes by discussing the theories underpinning the study and critical empirical literature review.

Chapter 3: Discusses study's research methodology that is integral to the reliability of the findings and validity of the study. Specifically, this chapter includes the introduction, research design, variables and their measurements, sample and data sources, the justification for choosing the panel data analysis, the hypotheses as well as methods employed to analyse the data.

Chapter 4: Covers the first objective of the thesis, which includes the introduction of the chapter, the study's specific objective, hypothesis and a brief review of empirical literature. The chapter also includes the econometric framework, data presentation, analysis, and discussion of the results, as well as the summary of the chapter about the relationship between foreign capital inflows and trade openness.

Chapter 5: Addresses the second study objective. The chapter investigates the socioeconomic determinants of foreign capital inflows in SSA. The chapter also includes a brief introduction,

research-specific objective, hypothesis as well as the brief empirical literature review. The research methodology is also discussed, and the data analysis, interpretation, presentation, discussion and conclusion of the chapter are provided.

Chapter 6: Provides an analysis of the third objective of the study, which includes an introduction, specific objective of the study, hypothesis, literature review (both theoretical and empirical (data analysis, interpretation and discussion of the results)). The last section is the conclusion of the chapter.

Chapter 7: This is the last chapter of this study and presents a summary of findings, policy implications, recommendations of the study, areas for further research, limitations of the study and delimitation of the study.

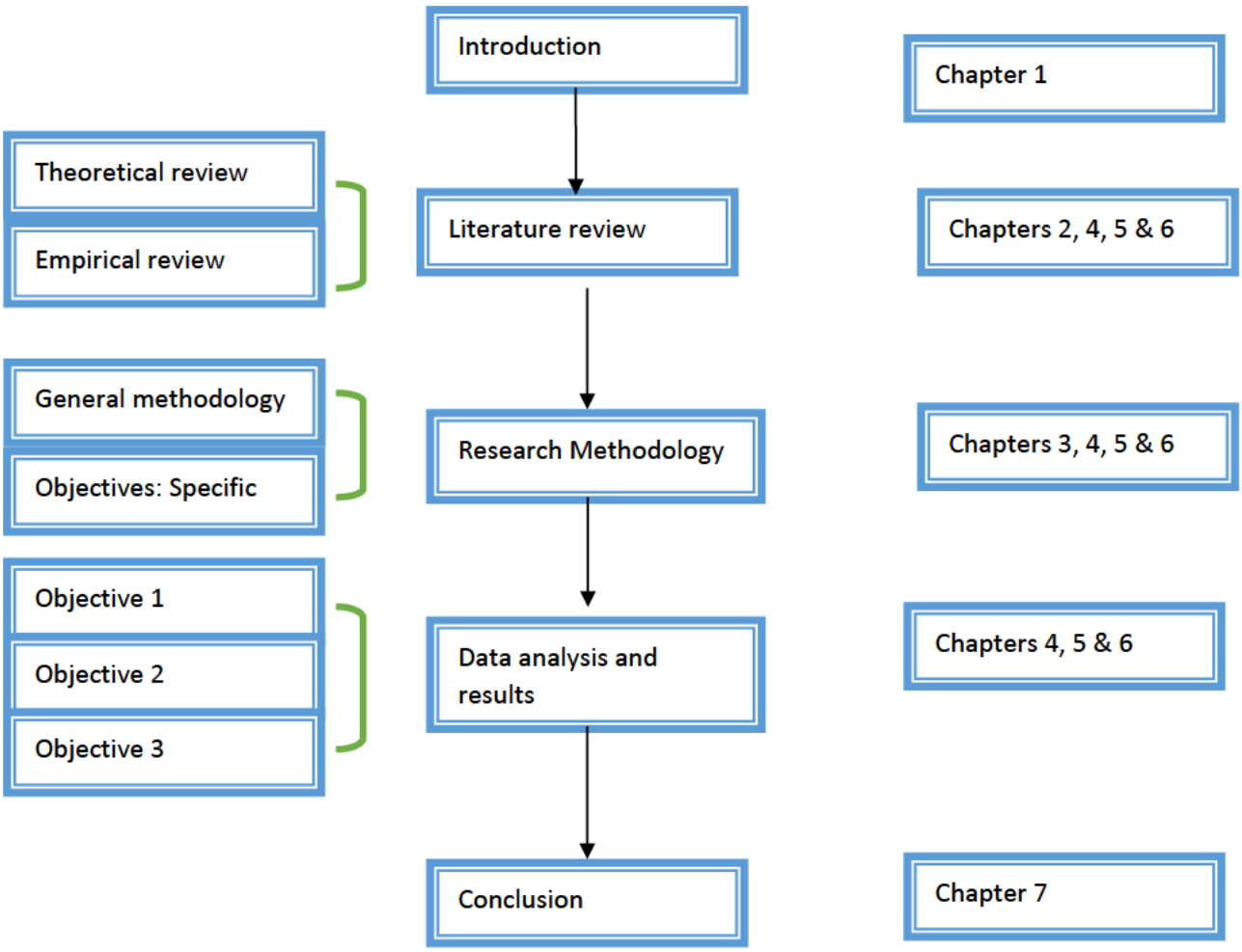


Figure 1.2 presents the structure of the thesis

2.0 Summary

The background of the study was presented in this chapter. SSA countries could be placed at par with the world's developed countries because of their natural endowments. However, the opposite is the case, as the region generally exhibits low levels of trade, foreign capital inflows, as well as output performance or productivity. The variables of the study are linked in the background, and research objectives were highlighted. This is followed by research questions to be addressed, the statement of the problem, significance and justification of the study, as well as contributions of the study or research gap. The scope of the study was also discussed, and the overview of the research methodology, the thesis structure and the summary of the chapter were presented. The next chapter discusses conceptual issues (overview of the SSA economies and trends of capital flows), theoretical and empirical literature reviews.

CHAPTER 2

LITERATURE REVIEW

2.0 Introduction

This chapter presents an extensive review of literature. The section has been sub-divided into three. Section one addressed the review of broad-wide conceptual literature; under it is the subsection that addresses various concepts and demographic issues relating to capital inflows and trade openness in the SSA. Conceptual issues as they relate to variables of interest under investigation in this study are reviewed in this section. Section two addresses theoretical arguments underpinning the topic under consideration. This subsection aims to outline the theoretical framework upon which the empirical analysis of the study will be based. Section three addresses the review of empirical literature. Section three reviews the verification and the application of extant (existing) theories through the use of data. The section on empirical review is meant to synthesise previous work and identify gaps, key findings, relevant variables and empirical caveats.

2.1 Conceptual Literature

This section reviews the Sub- Saharan African Demographic Structure, the trend analysis for various economic blocs in the SSA region, Economic Performance of Sub-Saharan, among others.

2.1.1 The Review of Sub-Saharan Demographic Structure

Comparatively, the sub-Saharan African region, which consists of 22 million sq. km, is relatively wider than that of China (9.3 million sq. km), India (2.97 million sq. km) and the United States (9.1 million sq. km) in total (Akinola & Bokana, 2017). The region is also five times bigger than the European Union region. According to recent data released by World Bank, the region is home to more than 1 billion people. The SSA region comprises countries

in the low, lower-middle, upper-middle and high-income bands. Among these countries, 20 are affected by conflicts, which have significantly thwarted their economic growth (Breet *et al.*, 2018). Such countries include Angola, Burkina Faso, Burundi, Cameroon, the Central African Republic (CAR), Chad, Côte d'Ivoire, the Democratic Republic of the Congo (DRC), Djibouti, Ethiopia, Guinea, Kenya, Madagascar, Mali, Mozambique, Niger, Nigeria, Rwanda, Uganda, and Tanzania (CIA, 2020). The overview of the demographic structure of the SSA region as affected by conflict will assist in understanding the possible factors behind the region's economic performance.

The succeeding sections study the relationship trend among gross foreign capital inflow (FCI), foreign direct investment (FDI), foreign portfolio investment (FPI) and trade openness (TR). These are key variables of interest in this study. The trend analysis was carried out based on the classification of the economic blocs in the SSA region. The sub-regions that could not be analysed were due to limitation in data availability. However, the Economic Community of West African States (ECOWAS), Southern African Development Community (SADC) and East African Countries (EAC) were among the economic blocs that were analysed.

Figure 2.1 (A-L): Trend analysis for the Economic Community of West African States (ECOWAS)

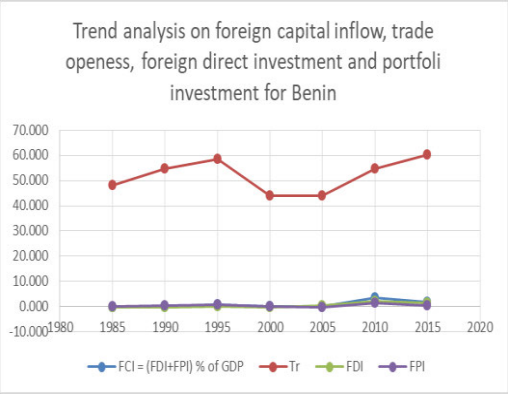


Figure 2.1A: **Trend analysis on Benin Republic**

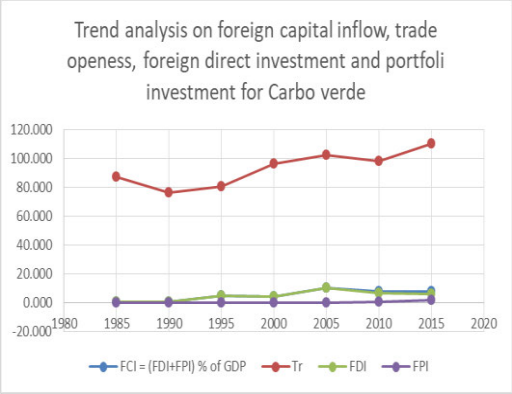


Figure 2.1B: **Trend analysis on Cabo Verde**

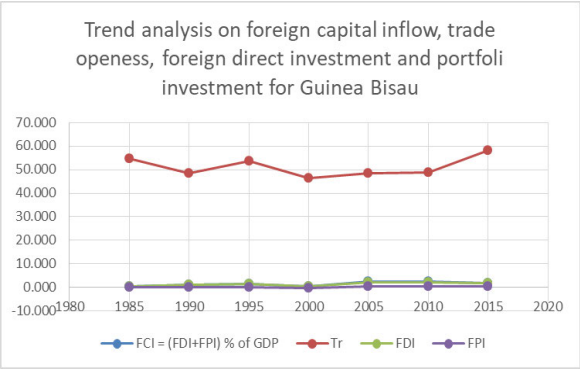


Figure 2.1C: **Trend analysis on Guinea Bissau**

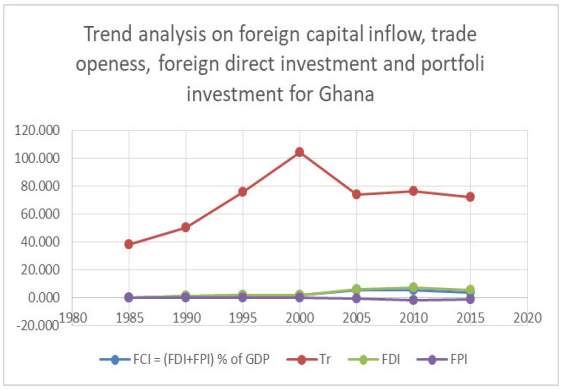


Figure 2.1D: **Trend analysis on Ghana**

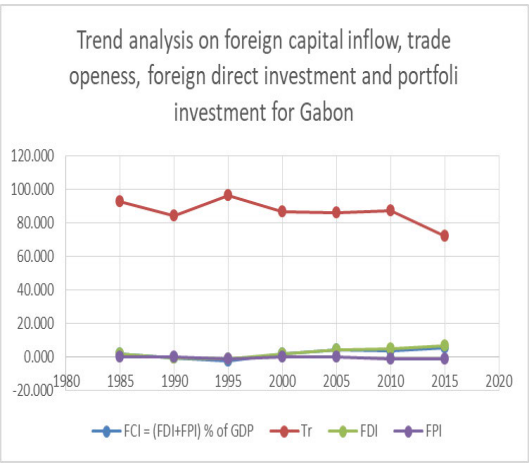


Figure 2.1E: **Trend analysis on Gabon**

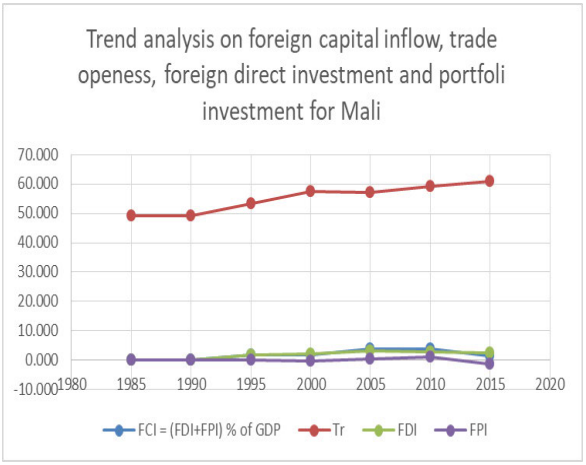


Figure 2.1F: **Trend analysis on Mali**

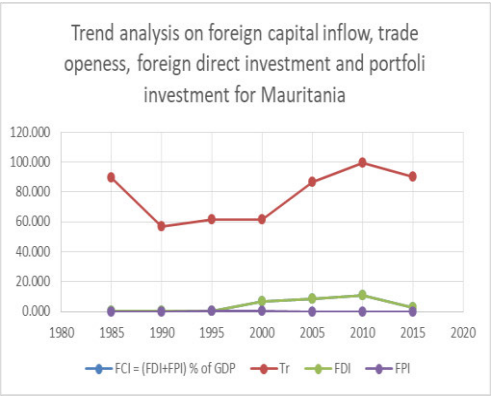


Figure 2.1G: **Trend analysis on Mauritania**

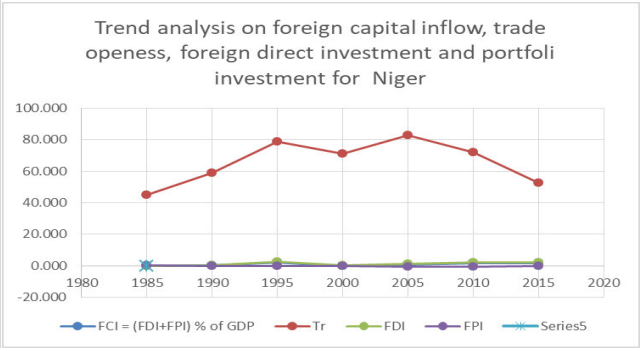


Figure 2.1H: **Trend analysis on Niger**

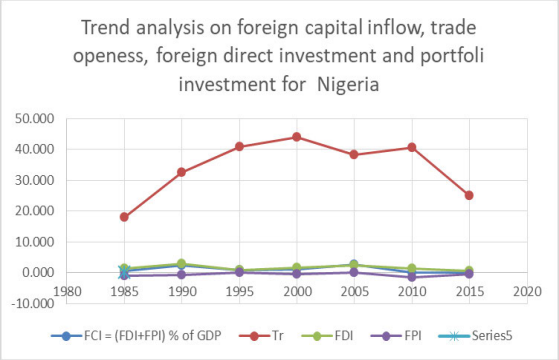


Figure 2.1I: **Trend analysis on Nigeria**

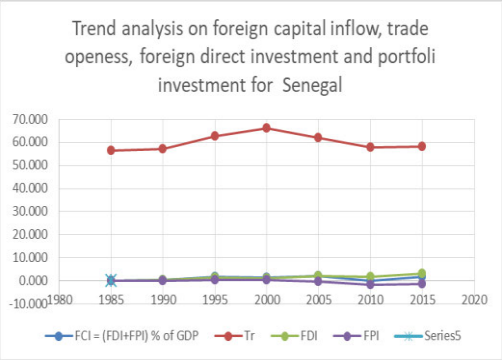


Figure 2.1J: **Trend analysis on Senegal**

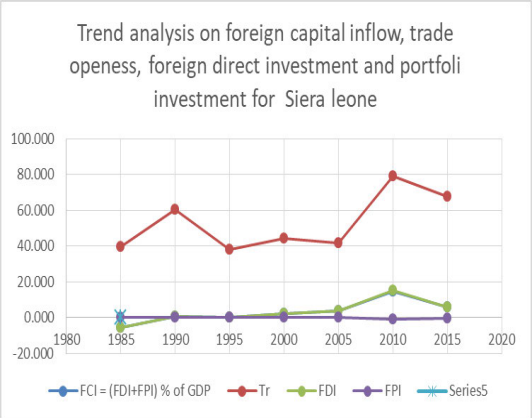


Figure 2.1K: **Trend analysis on Sierra Leone**

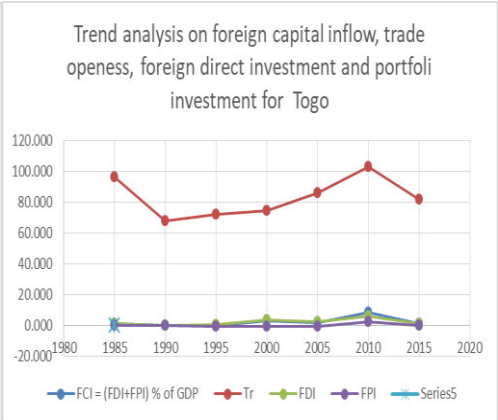


Figure 2.1L: **Trend analysis on Togo**

Data on gross Foreign Capital inflow (FCI), Trade Openness (TR), Foreign Direct Investment (FDI) and Portfolio Investment (FPI) obtained for each member country under the Economic Community of West African States (ECOWAS) are to be analysed with respect to individual country-specific performance as well as the overall economic block performance. Evidence from Benin republic revealed that TR rose sharply between 1985 and 1995 but gradually dropped afterwards. As for FCI, FDI and FPI, the evidence showed a steady flow of the variables between 1985 and 2015, apart from FDI in the year 2000, which slightly rose and later dropped towards 2015. Cabo Verde's TR continued to rise significantly till 2015 after a sharp drop in 1990. While data for FCI and FPI steadily move along the horizontal axis without any sign of improvement, FDI on its part, started slowly but later rose between 1990 and 2005 before it declined afterwards through 2015. The emerging evidence from Guinea Bissau disclosed different performances. For example, the Guinean trade openness abruptly dropped

in 1985 towards 1990 and later rose quickly in 1995, after which it continued to fall until 2010 before it rose again to an average of 60.00 in 2015. The variables for FCI, FDI and FPI continued to move without any significant improvement between 1985 and 2015, except for FDI, which marginally rose between 2005 and 2010 but fell later on. Meanwhile, Ghana's trade openness significantly increased from 40.000 in 1985 to its highest in 2000 but dropped sharply afterwards till 2015. FCI and FPI revolved around 0.000, while FDI slightly rose between the years 2000 and 2010 after a slow start but marginally dropped in 2015.

Gabonese's Trade Openness (TR) nosedived from 1985 to 1990 and quickly improved after then. In 1995, it continued to decline until 2015, whereas FDI continued to rise from the year 2000 towards 2015 after a slow start. FCI and FPI moved below 0.000 on the horizontal axis until 2015. Meanwhile, Malian trade openness data proved otherwise from that of Gabonese; apart from its steady state between 1985 and 1990, it significantly moved upward from 1990 to 2015. Whereas Mali's FDI, FCI and FPI revolved around 0.000 between 1985 and 2015, FDI slightly moved upward in the year 2000 and later fell towards 2015. Mauritania's case is a bit different from the previous experience. For example, her trade openness started on a negative note through 1985, 1990 and year 2000, but later moved upward till 2010 with a slight drop towards 2015. Apart from the FDI estimate that marginally rose from 1995 till 2000 with a slight dip towards 2015, the data for FPI and FCI continued to wallow at the bottom axis throughout the period under review. Niger republic's trade openness began from its lowest record of 41.000 in 1985 and rose towards 1995 through 1990 before it slid in 2000 and later moved to its highest record of 80.000 in 2005, with a further sharp drop till 2015. FDI, FCI and FPI data from Niger possess similar attributes, as they all oscillate around zero value.

Nigerian Trade Openness (TR) rose from 1985 through 1990 until 2000 and quickly declined all through till 2015, whereas FDI started to rise in 1985, but it was short-lived till it dropped in 1995 with a slight rise in 2005. Whereas FCI and FPI revolved around near-zero value assets

throughout the period under review. In the case of Senegal, FDI and FPI steadily moved in the same direction. They nosedived between 2005 and 2015, whereas indicators for FCI negatively slid below the minimum level until 2015. Senegalese trade openness showed some resilience throughout the period under consideration, with an average of 60.000. As for Sierra Leonean TR, it recorded an average of 60.00 but in a different version from that of Senegal. The data trended upward in early 1985 and nosedived again between 1990 and 1995. Interestingly, it rose from 2005 till 2010, with another fall in 2015. Data for FDI, FCI and FPI clocked together between 1985 and 2010 but moved in different directions starting from 2010 to 2015, with FDI having the upper hand. Meanwhile, Togo's trade openness sustained an average of 80.000 between 1985 and 2015. While the data for FDI, FPI and FCI clustered around an average of 0.000 from 1985 to 2005, with slide improvement in FDI only.

Figure 2.1 (M-Y): Trend analysis for Southern African Development Community (SADC)

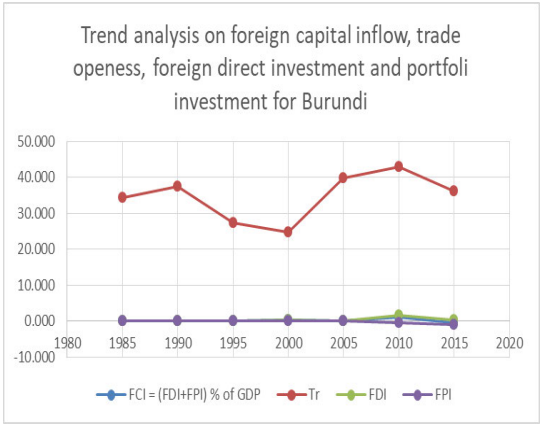


Figure 2.1M: **Trend analysis on Burundi**

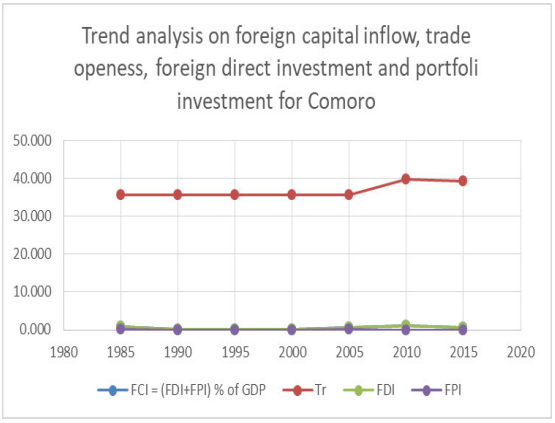


Figure 2.1N: **Trend analysis on Comoros**

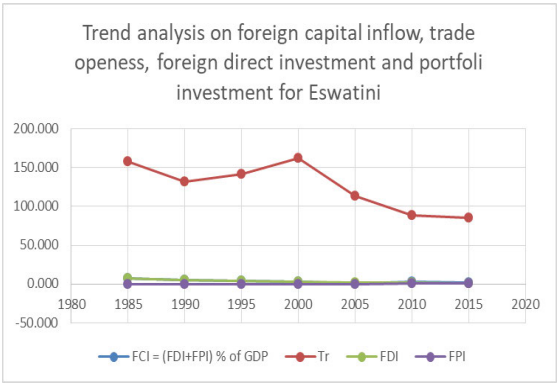


Figure 2.1O: **Trend analysis on Eswatini**

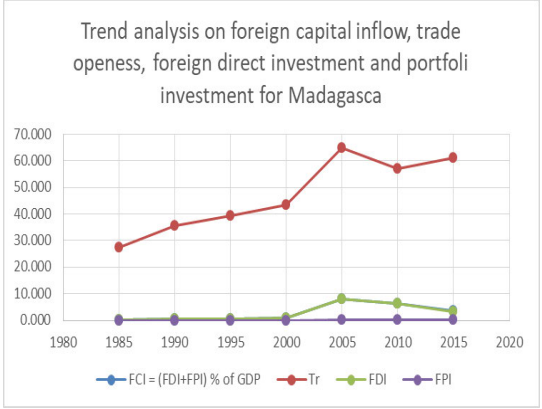


Figure 2.1P: **Trend analysis on Madagascar**

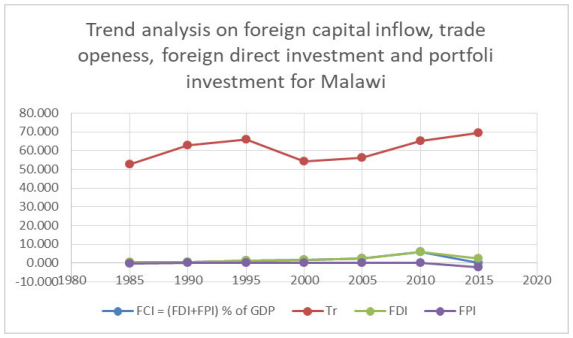


Figure 2.1Q: **Trend analysis on Malawi**

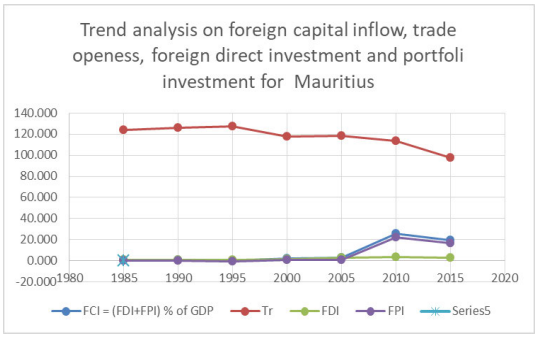


Figure 2.1R: **Trend analysis on Mauritius**

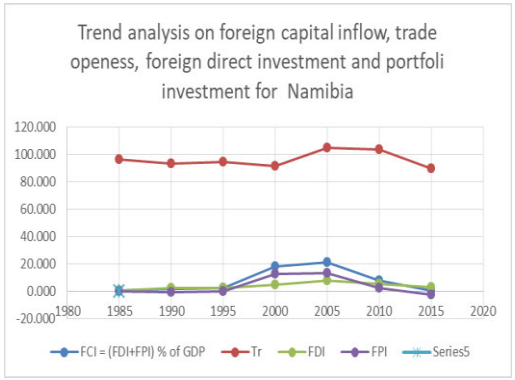


Figure 2.1S: **Trend analysis on Namibia**

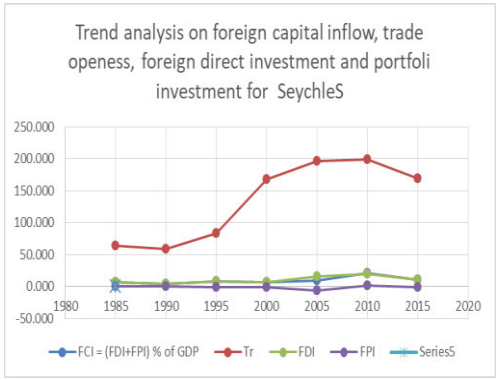


Figure 2.1T: **Trend analysis on Seychelles**

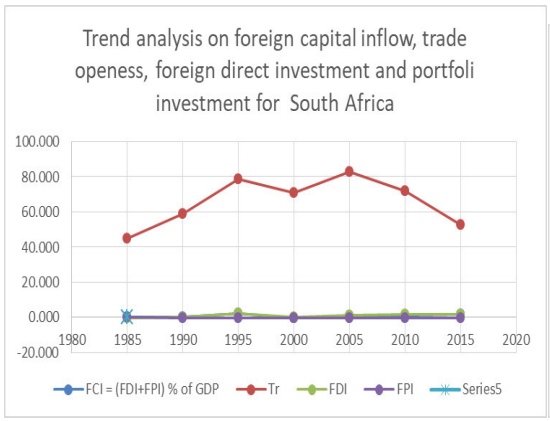


Figure 2.1U: **Trend analysis on South Africa**

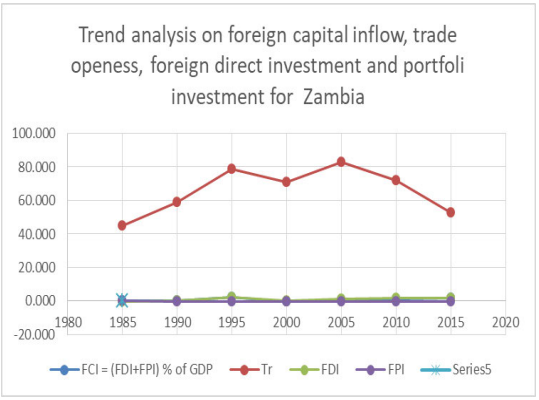


Figure 2.1V: **Trend analysis on Zambia**

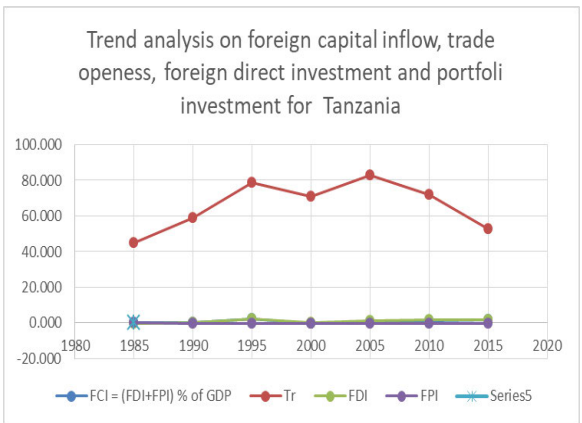


Figure 2.1W: **Trend analysis on Tanzania**

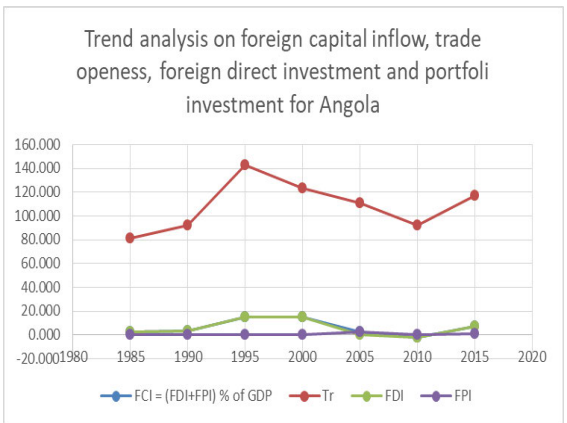


Figure 2.1X: **Trend analysis on Angola**

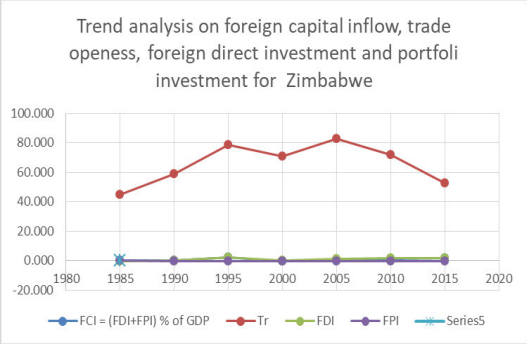


Figure 2.1Y: **Trend analysis on Zimbabwe**

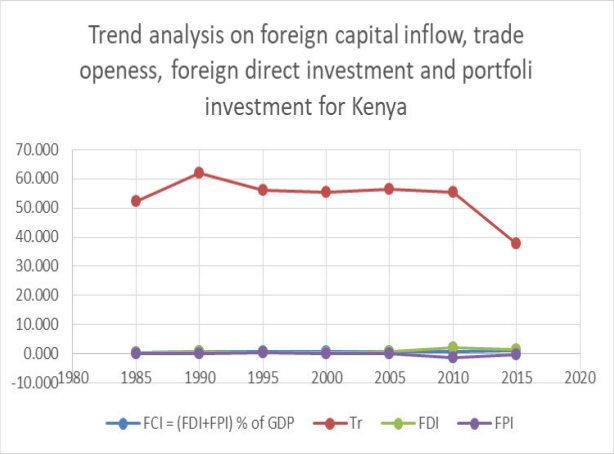
Foreign Direct Investment (FDI), gross foreign capital inflow (FCI), trade openness (TR), and Foreign Portfolio Investment (FPI) that were obtained for each member country under the Southern African Development Community (SADC) are to be analysed with respect to individual country-specific performance alongside an overview performance across the economic block. Burundi's trade openness oscillated around 39.000 throughout the years under review, while Comoro's trade openness constantly moved from 1985 to 2005 and slightly rose from 2010 up to 2015. FDI, FCI and FPI across the two countries possessed similar attributes by clustering near zero value. Trade openness data from Eswatini and Madagascar behaved differently by moving in two different directions. Eswatini's trade openness keeps nose-diving as the years go by, contrary to the emerging evidence from Madagascar, with a constant rise till 2015. Other indicators were closely related in terms of performance, especially between 1985 and 2000, in which Burundian FDI rose and quickly dropped towards 2015.

In Malawi, trade openness performed averagely well with consistent rise and fall throughout the period under consideration, unlike that of Mauritius, where trade openness consistently fell up till 2015. Data for FDI, FCI and FPI lie far below TR in the case of Malawi, while other indicators, except FCI and FPI slightly rose in 2005 after a slow start in the case of Mauritius. The evidence from Namibia is somewhat different from that of Malawi with a stable rise in TR, while data for FDI, FCI and FPI skewed far below in the form of a mirror image of TR in terms of performance. Meanwhile, Seychelles' TR moved up quickly after a slight setback in

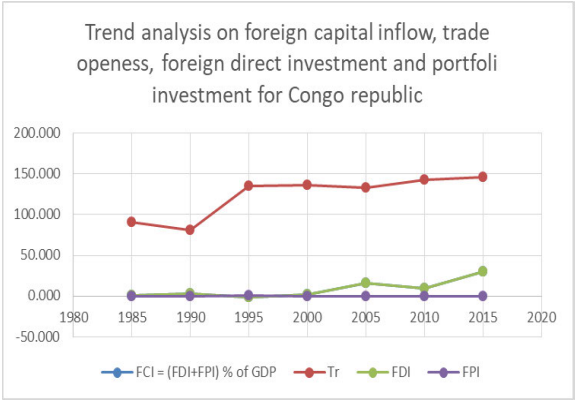
1990 till 2010, with a marginal drop in 2015. FDI steadily increased towards the end of 2015, whereas FCI and FPI wallowed below zero.

Evidence from South Africa and Zambia revealed that trade openness (TR) rose sharply from 1985 to 1995 but gradually dropped afterwards till 2015. As for FCI, FDI and FPI, evidence showed a constant change between 1985 and 2015. In a related case from Tanzania and Zimbabwe, TR continued to rise significantly till 1995 after a sharp drop in 2000 and later moved up again in 2005, but later fell. While data for FDI, FCI and FPI steadily across the two countries moved along the horizontal axis without any improvement. Conversely, Angola's TR began to rise from 1985 to 1995 but nosedived through 2005 and rose again later.

Figure 2.1Z: **East African Countries (EAC)**



Figures 2.1ZA: **Trend analysis on Kenya**



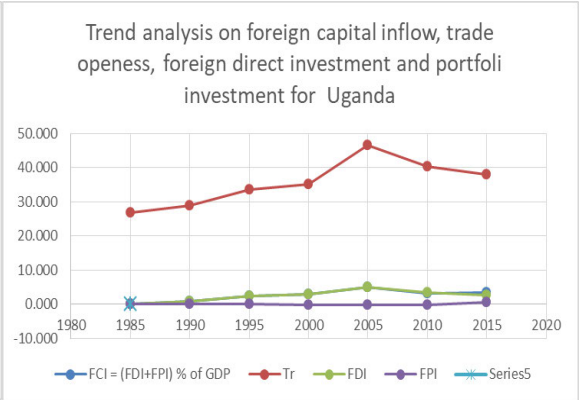


Figure 2.1ZB: **Trend analysis on Congo Republic** Figure 2.1ZC: **Trend analysis on Uganda**

Foreign Direct Investment (FDI), gross foreign capital inflow (FCI), trade openness (TR), and Foreign Portfolio Investment (FPI) that were obtained for each member country across East African Countries (EAC) are to be analysed with respect to individual country-specific performance alongside an overview performance across EAC economic block. Evidence from Kenya exposed that trade openness (TR) rose suddenly between 1985 and 1990 but abruptly dropped afterwards until 2015. As for FCI, FDI and FPI, the evidence exhibited constant variation between 1985 and 2015 without any improvement. As for Congo republic, the trade openness began with a fall, which later moved up in 1990 and moved upwardly afterwards. The variables for FCI, FDI and FPI continued to move in a similar direction without any significant increase from 1985 to 2015, except for FDI which marginally rose between 2005 and 2010 but later fell.

Evidence from Uganda revealed that TR rose sharply from 1985 to 2005 but increasingly dropped afterwards. As for FCI, FDI and FPI, the evidence displayed a steady flow of the variables between 1985 and 2015, apart from FDI in the year 2000, which slightly rose and later dropped towards 2015.

In conclusion, trade openness continued to nosedive in recent years, but it performed significantly better than foreign portfolio, gross foreign capital inflow across and foreign direct investment all through the period. Notably, most of the countries under EAC blocks performed less when compared with ECOWAS, with SADC standing in between them in FDI performance. In the overall assessment, countries across the three economic blocks performed poorly in portfolio and gross capital inflow investment throughout the period under review.

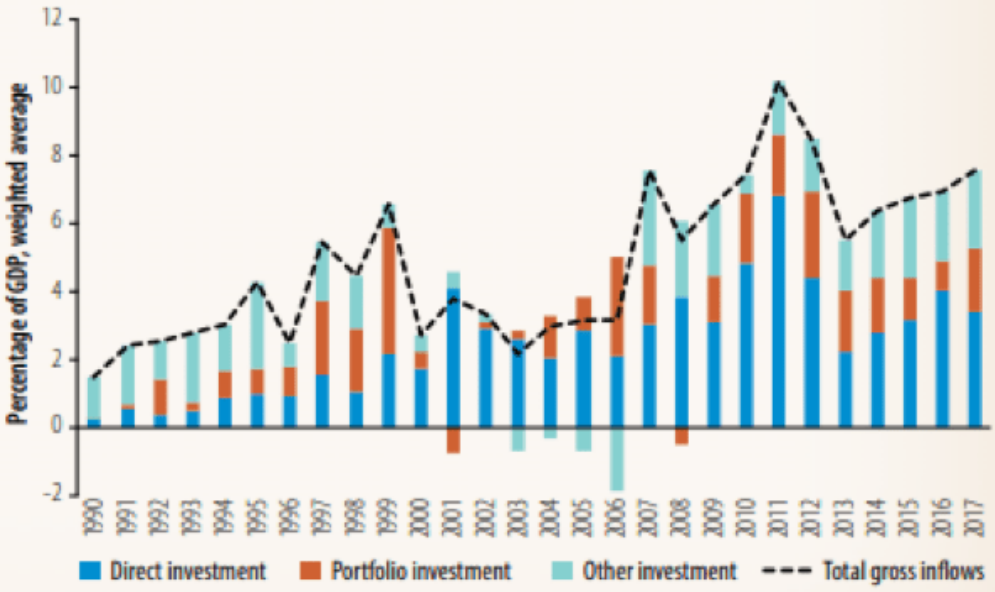
2.1.2 The Review of Economic Performance of Sub-Saharan African countries

The SSA region's economic performance has dwindled over the past decades; the fluctuating nature of the economic performance could not be unconnected with various macro-economic

imbalances that have bedevilled the region after independence. Some of these imbalances could be traceable to a mismatch between foreign capital inflows and the degree of trade openness among most SSA countries. For instance, between 1980 and 2000, the IMF and World Bank data observed that the average growth rate in GDP per capita of the region was -0.6%, while other regions such as South Asia contributed 3.6%, Latin America contributed 0.5%, East Asia also added an average of 4.9% and the Middle East contributed an average of 1.2% (Akinola & Bokana, 2017). The comparable figures of capital inflows and corresponding trade openness around this period are found in Figure 2.2 for the region of SSA. Figure 2.2 below explains the current trend of movement of capital inflows in the SSA region. It also revealed that the flow is generally low except for the slight rise in 2010.

Compared with the global financial crisis, the European sovereign debt crisis hit Sub-Saharan Africa harder

FIGURE 2.2: Evolution of Gross Capital Inflows to Sub-Saharan Africa



Source: International Monetary Fund Balance of Payments BPM 6.0.

Note: Aggregate figures represent GDP-weighted averages of the ratio of gross capital inflows to GDP across countries in Sub-Saharan Africa. GDP = gross domestic product.

Past studies, such as Bende-Nabende, (2002); Kinda (2012); Boyce and Ndikumana, (2012) and Alley (2015), argued that low foreign portfolio investment, foreign direct investment and other international capital flows to be some of the major reasons why the SSA region is

suffering such an oddly low economic growth. Although further evidence revealed that the outlook of economic performance for the region turned relatively favourable between 2001 and 2006 as average GDP per capita growth increased from the previous decade of -0.6% to 1.88% (Arbache & Page, 2010). Notwithstanding, prospects were still sensitive to downside risks from lower commodity prices and a sharp slowdown in capital flows (Alley, 2015). This paradox is evidenced as the growth trajectory in SSA demonstrates substantial differences across countries, where resource-rich countries experienced faster growth rates than those countries bereft of rich resources. For instance, while oil-exporting countries and other resource-rich economies such as Angola, Cameroon, Chad, Republic of Congo, Equatorial Guinea, Gabon, and Nigeria grew at an average of 4.5% per annum, the less-rich economies such as Benin, Burkina Faso, Burundi, Cabo Verde, Cameroon, Central African Republic, Comoros and Cote d'Ivoire grew only at an average of 1.4% per year (Arbache & Page, 2010; Boyce & Ndikumana, 2012). Arbache and Page (2010) argued further that resource-poor landlocked and coastal economies for example, Botswana, Burkina Faso, Burundi, Central African Republic, Chad, Ethiopia, Lesotho, Malawi, Mali, Rwanda and Swaziland also grew at approximately the same rate. While landlocked countries without natural resources grew by 1.2% per year, the non-resource-rich coastal countries grew at 1.3%.

The period between 2008 and 2015 was also marked by global shocks that further retarded growth in the SSA countries. Growth remains weak due to global instability, low investment, insufficient funds and a decline in commodity prices (Allen & Giovannetti, 2011). Many SSA countries were hit by several shocks, including the steep decline in commodity prices and severely stricter financing conditions (Outlook, 2017). The period was marked by major global or external shocks that lowered the growth rate of the entire region (Seck & Gaye, 2014). Policy buffers were low in several countries during this period, and many SSA countries entered a tight borrowing with China to stimulate their economy (Brambila & Massa, 2010). A few of

such countries include Nigeria, South Africa, Kenya, Mauritius and Côte d'Ivoire (Brambila & Massa, 2010).

Given the aftermath of the three major global shocks that adversely affected the SSA economy and many policy responses, initial estimates indicated that the real GDP aggregate of SSA countries increased by 1.1% in the first quarter of 2016, and the region's output only expanded by 1.4% in the entire year (Outlook, 2017). As further revealed by the OECD (2021) national account data files and World Bank national account data files between 2017 and 2020, the real GDP growth (annual %) of the region went down to 1.2% in the first quarter of 2017 (UNDP, 2020). Nonetheless, the economy witnessed a rebound in the second quarter and grew by 2.4% per annum in 2017. In addition, a slight improvement was recorded in 2018 and the economy grew to 2.7% per annum. In contrast, a mere 2.6% growth rate was recorded in 2019 and a 0.1% decline was recorded for that year (UNDP, 2020). The SSA's worst economic performance was witnessed in 2020, when there was a sharp decline in the GDP growth rate to -2.02% (Ferrannini, Barbieri, Biggeri, & Tommaso, 2021). The main reason for the tumbling of the real GDP growth rate can be attributed primarily to low capital inflow into the region due to the COVID-19 pandemic and to the type of primary products and activities, which include the agrarian agriculture and mining operations that involve a large number of citizens in the region, which subjected SSA countries to external shocks (Ferrannini, *et al.,* 2021).

Given the above, it can be deduced from the overview that the growth rate and the aggregate economic performance of the SSA region followed a diverse trajectory over the past decades. There has been a period of high growth and the region maintained growth momentum (1995-1997), with many countries experiencing a sustained and robust growth rate stimulated by domestic demand and increased investment flows (Seck & Gaye, 2014). Conversely, there were also periods (2009; 2012; 2016) when SSA's real GDP growth rate experienced low economic performance due to global shocks (Chuhan-Pole *et al.,* 2018).

2.1.3 Trends of international capital flows and global shocks in SSA countries

Three global or external shocks redefined the structure and composition of gross capital flows in the SSA region. They are the 2008/09 global financial crisis, the 2011/12 European sovereign debt crisis, and the 2014/15 fall in the global oil price. These three major external shocks have significantly affected the degree and level of gross capital flows and the shift of investment inflows in the SSA region (Outlook, 2017).

In the period of the 2008/09 global financial crisis, the SSA countries became vulnerable to trade linkage (Berman & Martin, 2009), and the resulting contraction of remittance flows because unemployed migrants went back to their countries of origin, which negatively affected foreign direct investment (Allen & Giovannetti, 2011). In addition, Allen and Giovannetti (2011) revealed that private sector financing was restricted and the funds devoted to assisting less developed countries were retracted and rolled back to the donor country's economic cycle. For instance, portfolio equity flows slowed down and sometimes reversed in countries such as Nigeria, South Africa, Kenya, Mauritius and Côte d'Ivoire. Additionally, various bond issuance plans were suspended in some SSA countries such as Kenya, Ghana, Uganda and Tanzania (Macias & Massa, 2009). Consistent with sharp falls in stock markets, total foreign claims on international bank lending in Zambia decreased in June 2008 from $2.91 billion to $2.61 billion in September 2008. In addition, Ghana also experienced a similar decline over the same period (Macias & Massa, 2009).

The study carried out by Odhiambo (2017) revealed that the FDI decreased from 9.7% to 4.7% in the SSA region, 5.2% to 3.6% for Botswana, 4.2% to 2.7% for Malawi; and 2.7% to 0.6% in Kenya. Between 2001 and 2006, the bilateral aid to SSA countries stood at US$33.1 billion. However, from 2008 to 2009, there was a substantial decline in the net bilateral aid to the SSA region to about $26.7 billion (Beker, 2014). This had a negative impact on the GDP growth rate in the region, declining from 6.1% to 4.9% in 2007 and 2008, respectively, which further

dropped to 1.6% in 2009 (Seck & Gaye, 2014). As a result, the World Bank in 2012 predicted a financing gap between $270 to $700 billion in developing countries, which was based on the severity of the economic and financial crisis and the timing and strength of policy responses (Beker, 2014).

Seck and Gaye (2014) and Brambila and Massa (2010) revealed that the global financial crisis severely impacted SSA economies as the region experienced a dry-up of financial inflow. They indicated a sharp decline in the private capital inflows from the third quarter of 2008, because of the reduced capacity to invest and reduced likelihood to invest with credit conditions that became much tighter. These situations made it more difficult and expensive to invest in foreign countries, including those in SSA. Lippit (2014) agreed with the view expressed by Brambila and Massa (2010) and revealed that there was a slump in the economy, with growth forecasts reduced by 1.7% in 2016. The Sub-Saharan African countries' bond and equity markets were less attractive to foreign investors, and many bond issuance plans were put on hold. For example, due to the poor global market conditions between 2008 and 2009, Ghana cancelled plans for the issuance of $300 million bonds, whereas Kenya deferred a planned Eurobond debut issue of $500 million (Seck & Gaye, 2014). Similarly, Tanzania suspended its plan to raise a $500 million debut Eurobond, Uganda failed to issue any Eurobond for infrastructural projects, while the expected amount of bond anticipated to be issued by South Africa reduced from $492 billion in 2007 to $337 billion in 2008, representing a reduction of 32% (UNCTAD, 2012). Moreover, the All-Share Index in the Nairobi Stock Exchange reduced by 21.36%, the All-Share Index of the Nigeria Stock Exchange also fell by 30.64% and the BRVM Composite Index of Cote d'Ivoire also fell by similar rates in the same period (Outlook, 2017).

While recovery seemed to be on the way for the world economy in general and most of the developing countries particularly regained or were about to regain full capacity activity levels in 2010, the European sovereign debt crisis in 2011/12 brought back the gloom (UNDP, 20210.

There has since 1998 been a radical increase in the issue of sovereign debt by high-income countries, which has crowded out many developing countries, almost melting away financial intermediation for the Sub-Saharan African countries (Biggeri & Tommaso, 2021). For instance, the IMF's 2010 Coordinated Direct Investment Survey Database revealed that out of approximately $199.5 billion inward direct investment in SSA countries in the year 2008, more than 67% were from the European Union, suggesting that the European financial crisis of 2009-2010 had a direct negative impact on the market capitalisation in SSA. This makes the consequences for developing countries, particularly the SSA region, even more severe. There was a steady decline in foreign direct investment in SSA up until 2011, although it declined at a relatively sluggish rate than those experienced in 2009 and 2010 (UNCTAD, 2012).

The fall in global oil prices (2014) saw the SSA region experiencing a major adverse shock. As revealed by Hou *et al.*, (2015) and based on IMF and World Bank forecasts in 2014 and 2015, a 30% drop in oil prices directly reduced the value of oil exports in Sub-Saharan Africa by $63 billion (major losers include Nigeria, Angola, Equatorial Guinea, Congo, Gabon, Sudan), and reduce imports by an estimated $15 billion (major gainers include South Africa, Tanzania, Kenya, Ethiopia).

Furthermore, a review by the IMF in 2015 shows that the total value of oil exports in SSA to notable regions and developed countries such as the European Union, Japan, US and China declined by $25 billion, representing a decrease of 13% in 2014. In addition, the exports to the US fell by 44% and that of the EU dropped by 10% during the 2014 global oil price drop. The decline in the aggregate value of oil exports in SSA to these countries was, for the most part, because there was a decline of 17% in the year 2012 to the last quarter of 2014. In particular, Nigeria's oil export value declined by 14% in the last quarter of 2014. While, the value of Tanzania's oil imports dropped by 20% in January 2015. Baek and Kim (2020) explored the nexus between the impacts of the 2014 fall on global exchange rate and oil price instability in

SSA countries. According to the study, the 2014 fall in global oil prices had both direct and indirect impacts on exchange rates, which constantly influence foreign direct investment, gross foreign capital inflows, remittance flows and foreign portfolio investment in SSA countries. The fall in oil prices led to instability of the exchange rate and consequently affected the movement of foreign capital to SSA countries. The study conducted by Pershin *et al.,* (2016), which investigated the extent to which oil price influences exchange rates in SSA countries, also established that the price of crude oil is a dominant factor that influences exchange rate movements in SSA countries. Some of these countries include Kenya, Botswana, Tanzania and all the oil-producing countries in the SSA region, which subsequently affects capital flows to developing countries. Masron and Subramaniam (2018) shared a similar view to that of Pershin *et al.,* (2016) and revealed that the exchange rate is the pass-through mechanism through which remittances, foreign aid, net foreign investment, foreign direct investment and other capital flows are spread to SSA countries. Given that crude oil prices are a dominant factor that influences exchange rate movements in SSA countries, instability in the exchange rate simultaneously lowers remittances and capital flows to the SSA region.

Given the above, it can be inferred that the three major global or external shocks. i.e. the 2008/09 global financial crisis, the 2011/12 European sovereign debt crisis and the 2014/15 fall in the global oil price truly redefined the structure and composition of gross capital flows in the SSA region.

2.2.0 Theoretical Literature Review

2.2.1 Classical Heckscher-Ohlin-Mundell (HOM) paradigm

Theoretically, capital and trade flows can behave as either substitutes or complements. The negative linkage between capital and trade flows implies that the two flows behave as

substitutes, while the positive correlation implies that they are complements (Belke & Domnick, 2018).

Basic tenets of the theory: The Heckscher-Ohlin paradigm and the analysis of Mundell (1957) provide the basic framework for studying the interaction between capital mobility and trade integration.

Assumptions of the theory: The classical Heckscher-Ohlin-Mundell (HOM) theory works under the assumptions of the two-factors framework and two goods. It is assumed that free trade leads to factor price equalisation with the rest of the world, making international capital mobility irrelevant. For example, considering two countries with different capital endowments and assuming both countries have the possibility of trading with each other, there would be no need for capital to flow from the capital-abundant to the capital-scarce country because trade alone automatically eliminates the differences in the rate of return to capital. Consequently, capital and international trade flows behave as substitutes, implying that the increase in trade integration reduces the incentive for capital to flow.

The weakness of the theory: There are several studies with more realistic features that came to modify the basic HOM framework; their contributions range from production uncertainty (Helpman & Razin, 1978) to technological differences (Jones, 1967; Kemp, 1966). With these modifications, capital flows and international trade can be complements with causality running from capital flows to trade. For example, Markusen (1983) concluded that capital flows and international trade generally behave as complements and the results of Mundell (1957) are not rules, just exceptions. Markusen reached this conclusion by comparing several modelling assumptions and several models.

The strength of the Heckscher-Ohlin theory

The theory has been found to be more precise, exact, scientific and analytically superior to the earlier approaches to the theory of international trade. Ohlin's theory has been recognised to be less abstract, and in the context of this study, it adequately explains the relationship between capital inflow and trade openness in the SSA.

Criticisms of the theory

The Heckscher-Ohlin theory has certain deficiencies for which many authors have criticised the theory as follows:

Partial Equilibrium Analysis: The Heckscher-Ohlin theory has failed to develop a general equilibrium concept. It is viewed from the part of the partial equilibrium analysis. This is because the theory explains the pattern of trade only on the basis of factor intensities and factor proportions but fails to integrate several other influential factors such as transport costs, external economies and economies of scale.

Oversimplifying Assumptions: The theory over-simplified assumptions of full employment of resources, perfect competition, constant returns to scale, identical production function, absence of product differentiation and absence of transport costs. Consequent upon this set of shortcomings in assumptions, the whole model has been reduced to quite an unrealistic theory.

2.2.2 Financial Friction Theory

Recent theoretical models examine the trade-finance nexus by attempting to incorporate the financial frictions into macroeconomic dynamics.

Basic Tenet of the Theory: Antras and Caballero (2009) argued that, with the current world of heterogeneous financial development, trade and capital mobility behave as complements. This means that the higher the trade integration, the higher the capital flows into the capital-

scarce country. Therefore, trade integration increases the return to capital and therefore acts as an incentive for capital flow into less financially developed countries. Furthermore, causality is from trade to international capital flows as opposed to earlier research. Another modelling approach by Furusawa and Yanagawa (2013) used the degree of maturity of financial institutions to investigate the trade and capital flow nexus. Trade and capital flows behave more as complements as financial institutions become less developed.

Moreover, Rose and Spiegel (2002) presented a financial friction theoretical model based on the fear that when a country defaults on servicing external debts, it might end up decreasing trade flows, and therefore, the closer the financial ties of the countries, the more trade tends to be conducted between them. In addition, Hahm and Shin (2009) claim that information asymmetries and transaction costs, respectively, lead to the complementarity of financial assets and trade in goods. Likewise, the hypothesis by Kojima and Ozawa (1984) differentiates the two situations where foreign investment can work as a substitute or complement to international trade. The first case is that foreign investment and international trade are complements when foreign investment is taken under the principle of complementing comparative advantage patterns or the principle of foreign investment originating in the marginal (including sub-marginal) industry. Simply put, foreign investment should originate from the comparatively disadvantaged (marginal) activity or industry investing countries, which to a host country, is a comparatively advantaged activity or industry. The second situation or case is when foreign investment is assumed from the comparative advantage of the investing country's activity or industry. In this case, foreign investment and international trade become substitutes.

The weakness of the theory:

When testing the trade-finance nexus for different capital flows, the estimated coefficient is mostly pronounced for foreign direct investment, in line with theories stressing informational frictions but other flows, such as portfolio investment, had less friction. However, the disintegration of financial inflow was not specified in the theory of financial friction (Belke & Domnick, 2018).

The strength of the financial friction theory

Theoretical evidence from the financial friction theory confirmed that trade and financial flows might behave either as substitutes or as complements. If they are substitutes, trade and financial flows should exhibit a negative relationship, while everyone would expect a positive correlation if they are complements**.** Many studies have proved this theory to be consistent from the empirical investigation point of view.

Conclusively, as described above, the classical Heckscher-Ohlin-Mundell theory highlights that capital and international trade flows behave as substitutes (inversely related). At the same time, the financial friction theory by Antras and Caballero (2009) and the later theoretical models by Markusen (1983), Hahm and Shin (2009), and Furusawa and Yanagawa (2013) argued that trade-finance nexus is a complement, meaning that the higher the trade openness, the higher the flow of foreign capital, and vice versa.

2.2.3 New Theories of International Trade

It was observed that the Heckscher-Ohlin theory provided good explanations of trade theory until the first half of the 20th century. However, in recent years, many researchers noted that the comparative advantage argument appeared less applicable in our modern world. Economists are of the view that the socioeconomic trade theories of Heckscher-Ohlin have failed to offer a complete explanation of the structure of world trade. The world trade data has

grown to contain several empirical regularities that appear to be inconsistent with socioeconomic theories. Consequently, the assumptions of the Heckscher-Ohlin theory in relation to perfect constant returns to scale, competition, and same technology are less valid in the context of modern world trade. Consequently, economists have improved on the Heckscher-Ohlin theory by relaxing most of the assumptions and developing new or complementary trade theories.

Assumptions of new trade theories

The new theories are based on economies of scale, imperfect competition, and technological differences among nations.

Basic Tenets of New Theories of Trade

The new theories which were developed after the 1970s have the following basic tenets:

(a) The liberation of the trade theory from the previous assumption of perfect competition made in the neo-classical and classical theories of trade.

(b) The new theory was built to incorporate developments in industrial organization theory and an imperfect competitive framework within the trade theory.

(c) Product differentiation has been incorporated alongside economies of scale in the imperfect competitive framework within the Heckscher-Ohlin general equilibrium theory of comparative advantage.

(d) Important determinants of the pattern of international trade that includes increasing returns to scale, product differentiation, technological innovation, and international oligopoly rivalry have been integrated into the new theories. The strategic trade policy models have provided theoretical justification for policy intervention in the form of export subsidies, import protection, etc., in increasing national relative advantage in exports.

(e) The new theories indicate the possible interaction between the inter-industry pattern of trade based on relative factor endowment of intra-industry trade and factors of production based on product differentiation and scale economies.

(f) The theories are quite vital in explaining the patterns of trade between developed nations as well as trade between developing and developed nations at any time in static terms.

Broad Categories of New Theories

The new theories can be broadly categorised into three types. Namely; Neo-technological trade theories, Intra-industry trade models and Strategic trade policy models.

(1) Neo–Technological Trade Theories: The neo-technological trade theories offer detailed information on the relevance of technological gap and innovation across countries and firms as a major source of international trade. The theories include the following:

2.2.3.1 Kravis' Theory of Availability – In the Kravis' (1956) model, technological innovation was viewed as a basis of trade operation through the product availability hypothesis. The availability model explains the pattern of trade in terms of domestic availability and non-availability of the product. Availability influences trade through the forces of supply and demand. According to this theory, a country exports and produces available goods. It simply implies that goods are developed by innovators and entrepreneurs. To be available means access to the elasticity of supply. In summary, according to Kravis' theory of availability, international trade takes place due to variability in the availability of certain products among countries.

2.2.3.2 Linder's Theory of Volume of Trade and Demand Pattern: In Linder (1961)'s theory, preferences were given to the demand side. Factors such as similarity in income levels across nations and income distribution characteristics determine the trade pattern. The theory further argues that international trade takes place between nations with similar demand patterns

and income levels. Consequently, Linder's theory explains the reasons for the large volume of trade among manufacturers in developed nations. The theory highlights the fact that the large share of world trade is among the developed countries with broadly similar per-capita incomes rather than between the developed and underdeveloped countries.

2.2.3.2 Posner's Imitation Gap or Technological Gap Theory: M.V. Posner (1961) analysed the effect of technology on trade. He regards technological changes as a continuous process which influences the pattern of international trade. The model is based on the assumption that trading countries have similar factor endowments and identical production functions for established products. But the technology is different between the trading countries. This difference in technology leads to the introduction of new products and production processes by a firm in a country. As a result, an innovative firm that creates a new product might acquire a temporary comparative advantage in the exports of its products to other countries. This comparative advantage could be called 'technology gap'. To conclude, the technological gap theory is more realistic than the socioeconomic theories because it analyses the effect of technical changes on the pattern of international trade.

2.2.3.3 Intra – Industry Trade Models

Intra- industry trade refers to trade between identical countries which are exporting and importing similar but differentiated products. The intra-industry trade models developed after the 1970s consider firm-level internal economies of scale and product differentiation in explaining trade between identical economies. Economies of scale and imperfect competition can give rise to trade even in the absence of comparative advantage. Grubel and Lloyd (1975) established a study which formed the basis for developing intra-industry trade models. They found that international trade was maximum between identical (capital-abundant) developed countries, and these countries exported and imported similar but differentiated products. The

main intra–industry models as argued by Krugman's model (1979) and Paul Krugman's model, marks a distinctive and realistic departure from the socioeconomic models because it recognises the role of economies of scale and monopolistic competition in international trade. Krugman in his model, points out that trade is possible between two countries having identical tastes, technology, factor endowments and income levels because of product differentiation and internal economies of scale in production. Consequently, the sources of trade between identical economies lie in product differentiation and internal economies of scale in producing manufactured goods under a monopolistic competitive framework.

2.2.3.4 Brander–Krugman Model (1983): The Brander-Krugman model of intra-industry trade is based on oligopolistic competition. This model considers the application of the concept of dumping in international trade. The Brander-Krugman model considers a situation in which two firms or two countries resort to dumping in each other's domestic market. Hence, their model is also known as reciprocal dumping model. Dumping in the context of international trade means a practice in which a firm sells its products in a foreign market at a price much lower than its domestic price. The situation in which dumping leads to a two-way trade in the same product is known as reciprocal dumping. The possibility of dumping in international trade was first noted by Brander (1981) and then extended by Brander and Krugman (1983). The Brander-Krugman model suggests that with the opening up of trade, the monopoly situation turns into a duopolistic market structure, which is a form of oligopolistic competition. Thus, their reciprocal dumping model explains the intra-industry trade in homogenous products under oligopolistic competition.

The Strength of these models are mainly two:

(a) Trade increases the choice of goods available to consumers and thereby improves consumer welfare.

(b) Trade can cause an increase in demand, production and real income, facilitated by economies of scale.

Weakness of the models

The models fail to explain the net effect of such peculiar trade on a nation's economic welfare.

2.2.4 National competitive framework

The national competitiveness framework mostly refers to Porter's diamond theory of national competitive advantage (Porter, 1990). Contrary to standard economic theory, the diamond system emphasises that national prosperity is created and not inherited (Porter, 2011; Porter, 1990). It draws more attention to created factors of production rather than endowed resources such as land and natural resources. In the same line of argument, Esser *et al.,* (2013) postulate that the current world focuses more on knowledge and technology-based competitive advantages while competitive advantages based on inherited endowments continue to lose their significance. The national competitive model avers that a nation gains a competitive advantage when it creates and possesses certain hard-to-imitate factors (Porter, 1990). The model further explains how the government could act as a catalyst to improve a country's position in the global economic, competitive environment (Porter, 2011). These hard-to-imitate factors included in the diamond framework are the firm's strategy, structure and rivalry, related supporting industries, demand conditions and factor conditions (Porter, 1990).

Basic Tenet of National competitive Framework

The concept of competitiveness as a critical concept in the national competitive framework has been evolving throughout the years, resulting in various facets from 'input'-based to 'output'-based competitiveness (Aiginger *et al.,* 2013). It is also a phenomenon that applies to both firms as well as country specific level; nevertheless, this study focuses on the country level because it is in line with its objective. According to Narula and Wakelin (1998), the competitive

advantage of a country (location) is an absolute advantage over other countries (locations). While Dunning and Zhang (2008) view competitiveness as a competitive advantage that is driven by the possession of quality resources, capabilities, and access to markets (RCM) together with quality institutions(I). Conversely, Mitschke (2008) and Delgado *et al.,* (2012) present two dimensions of a country's competitiveness. While Mitschke (2008) contemplated the two dimensions to be the international competitiveness of the domestic firms and the country's attractiveness, Delgado *et al.,* (2012) considered foundational competitiveness and global investment attractiveness as the two dimensions of a country's competitiveness. In practice, some policymakers often relate competitiveness to qualities that help to improve the standard of living (e.g. Sweden flourishes because of its competitiveness) while others relate it to locational attributes that drive growth (e.g. China is competitive because of its low adjusted cost of labour) (Delgado *et al.,* 2012).

Criticisms of the National Competitive Theory

Some authors argue against the competitiveness of countries and view it as a meaningless notion (De Grauwe, 2010; Krugman, 1994), partially due to some policies implemented to promote competitiveness, such as currency devaluation (Delgado *et al.,* 2012). However, from the view of investment or potential investment firms, competitiveness is believed not to be a worthless notion (Dunning, 1996; Dunning, 1995). This is because improving a country's competitiveness would favour the business environment. Consequently, competitiveness could also represent a determinant of foreign investment (Cristina & Cantemir, 2012). Furthermore, multinational companies often consider, assess, and compare the competitiveness of various countries (locations); if a location loses its competitiveness, MNEs shift their operations and capital to a different location with a favourable business environment (Dunning & Zhang, 2008; Mudambi & Navarra, 2002). In this regard, MNEs assess countries in terms of their

ability to give resources, capabilities and access to markets. Nevertheless, the competitive advantages of the host countries can reflect the attractiveness of the country towards foreign investment (Mitschke, 2008).

Another critique of competitiveness theory could be the different definitions and views of the concept that abound in the literature (Boltho & Glyn, 1995). In this regard, the study adopts the interpretation of competitiveness by Mitschke (2008), Dunning and Zhang (2008) and Delgado, Porter, Ketels and Stern (2012), as presented in the relevance of the framework section below.

A major critique of Porter's national competitive framework (diamond framework) is the double diamond framework (Rugman & D'Cruz, 1993). The double diamond concept challenges the idea of a diamond theory with an almost exclusive focus on the home base (Moon *et al.,* 1998). The home base is perceived by Porter (1990) as a place where the competitive advantages of a country can be derived from. However, Rugman and D'Cruz (1993) found that outside the Triad of the US, EC and Japan, the home base as a source of competitive advantages is not the case. Rugman and D'Cruz (1993) argue that Porter's diamond failed to understand that for small countries and open trading economies where MNEs earn most of their income outside their home country, the diamond of the target market is more relevant than their home diamond. Rugman and Verbeke (1993) proposed that the North-American diamond is more relevant than the Canadian diamond since the signing of the US-Canada free trade agreement (FTA) meant that multinational enterprises (MNEs) from both the US and Canada could go to both countries for resources and highly skilled labour to make up their factor conditions. However, the double diamond concept is not very relevant in this study because the host countries which are the SSA countries are less competitive than developed

countries and most developing countries as foreign investment sources, hence MNEs should rely on their home base for the acquisition of competitive advantages.

The relevance of the national competitive framework on foreign capital locational-based determinant studies

The national competitive framework provides two main routes via which 'people' category or human-based goals such as quality education, health and well-being could influence foreign investment inflows. These two means are found in the national competitive framework (Delgado *et al.,* 2012). The two means are foundational competitiveness or potential productivity and business costs.

According to Delgado *et al.,* (2012), a country's competitiveness can be viewed in two ways. One way is to view it as foundational competitiveness (expected output per potential worker), and the other is to relate it to global investment attractiveness which is the gap between the country's foundational competitiveness and the country's current factor cost (Delgado et al., 2012). The latter view idealizes the concept of country competitiveness to location attractiveness towards global investments, including FDI and FPI. Also, the authors argue that an attractive country for global investment location is one which has lower factor costs than potential productivity or foundational competitiveness (Porter *et al.*, 2007). It implies that a location with high competitiveness will attract more investors, given that factor costs are low. In other words, a country's global investment attractiveness directly relates to foundational competitiveness and is negatively affected by business costs. Therefore, Delgado *et al.,* (2012) perceive a country to be competitive when it has high foundational competitiveness. This foundational competitiveness is a high expected output per individual working age, or when it has excellent location attractiveness towards global investment.

The Strength of the National Competitive Theory or Framework

The national competitiveness framework identifies two main drivers of a country's competitiveness, namely the macroeconomic and the microeconomic environment (Delgado *et al.*, 2012). The microeconomic factors relate to specific factors that shape the business environment. In contrast, macroeconomic factors include monetary and fiscal policy (MFP) and social infrastructure and political institutions (SIPI) (Delgado *et al.*, 2012; Mitschke, 2008). Building on economic development literature, social infrastructure and political institutions include the quality of the political institution, the rule of law, primary education and essential health services (Delgado *et al.*, 2012). Since a country's global investment attractiveness, including foreign investment inbound attractiveness is directly proportional to foundational competitiveness, the macro factors affect the investment attractiveness of the country as well. Also, Yussof and Ismail (2002) and Mortimore (2000) state that while the MNEs have an impact on a country's competitiveness, this competitiveness contributes to the attraction of more quality foreign investment. Mortimore (2000) added that competitive factors such as skills, ability to train and availability of labour influence foreign investment inflows in developing countries. For instance, FDI to electronics in Ireland has flourished because of their ability to create a skilled human resource base, which allows companies to set up excellent plants and target world-leading firms (UNCTAD 2000, p. 20). In this view, it implies that 'people' category or human based factors such as education, health and well-being are included in the framework to determine the global investment attractiveness of a country. Looking at the goals and considering Porter (1990) who argued that national productivity is the best measure of national competitiveness, it communicates that human capital theory could comprehensively provide the theoretical underpinnings of the national competitive framework.

In the same manner, Dunning and Zhang (2008) make a good case by expounding the national competitive approach to accommodate location-based resources, capabilities and markets

(RCM) and institutions (I) as locational competitiveness factors of countries for foreign investment inflows. Barney (1991) argues that resources and capabilities are heterogeneously spread to firms and are imperfectly mobile; this is also true concerning the allocation of resources and capabilities to various countries. These two assumptions together allow for the differences in resources to exist and persist over time among countries allowing for countries' resource-based competitive advantages (Mitschke, 2008). Dunning and Zhang (2008) argue that the ability of a country to attract potential investors depends on its competence to establish a set of difficult-to-imitate and distinctive created assets. They bear in mind that transnational companies tend to be located in areas that provide the most suitable immobile resources, such as infrastructure, services, manufacturers' networks, and institutions, for their mobile assets (Lall, 2000).

In highlighting the two main groups of factors that influence the locational competitiveness of countries towards foreign investment inflows, Dunning and Zhang (2008) argue that on one side, resources, capabilities and markets (RCM) creates a physical environment where firms and other economic entities craft economic well-being. At the same time, institutions (together with beliefs system and values reinforcing them) create the incentive structure to build up the human environment and set the rules of the game for firms and other wealth-creating entities (Dunning & Zhang, 2008; UNDP, 2004; Ndao *et al.*, 2004). Dunning and Zhang (2008) summarise the Resources, Capabilities, Markets, and Institutions (I), which state that firms consider the most when making their international locational choices. The resources include natural resources and created assets, e.g. technological capacity. While the capabilities entail intangible assets, skills, educated/trained labour, health labours, accumulated experience and wisdom, organizational capacity and governance. Conversely, market refers to information/knowledge/availability of both domestic and foreign markets.

Furthermore, Schwab (2010) details the structure of competitiveness to include basic requirements such as institutions, infrastructure, macroeconomic environment, health, and primary education, as well as efficiency enhancers including higher education, training, technological readiness and finally, innovation and sophistication factors. The institution's side of the national competitive model includes both formal and informal institutions. The formal ones are constitutions and laws, while informal institutions include cultural morals, traditions and enforcement mechanisms such as self-regulation, cancellation of contracts and imprisonment. Dunning and Zhang (2008), as well as Schwab (2010), emphasised the significance of both formal and informal institutions in creating a competitive country with regards to being an attractive location for global investment. In addition, Lynch and Jin (2016); Kirkman *et al.*, (2006); and Perlmutter (1969) argue that the institutional theory can conceptualize culture, gender, religion, social structure, and related sociological factors, which have for so long been considered as necessary in international business development. In this regard, institution theory provides significant theoretical underpinnings of how a nation becomes competitive in the national competitive framework. In particular, it provides a theoretical ground on how culture (e.g. gender equality) as part of informal institutions and education, health and well-being as formal institutions influence national competitiveness and foreign capital inflows.

As discussed above, the human capital theory and institutional theory emerge as the two leading theories which provide the theoretical ground of how 'people' category or human based socioeconomic factors contribute to a country's attractiveness and ultimately to global investment attractiveness, including FDI and FPI. Below is the discussion of how human capital theory and institutional theory incorporate the 'people' category/human based socio-economic factors in the national competitive framework and ultimately enhance foreign capital inbound in the country.

Theories, which underpin the links between 'people' category/human based socio-economic factors and foundational competitiveness and foreign capital inflows

The national competitive framework incorporates the 'people' category goals/ human based socioeconomic factors and explains how they affect competitiveness and consequently, a country's attractiveness to foreign investment inflows by linking them to human capital, productivity and transaction cost (Delgado *et al.*, 2012). The theoretical grounds for the link in the framework can be drawn from the human capital theory and institutional theory.

2.2.4.1 Human capital theory: Basic Tenets of the Theory

The human capital theory can be traced to authors such as Mincer (1958) and Becker (1962). In the model by Mincer (1958), it was found that the economic gains foregone when investing in training (education) are compensated with higher lifetime earnings. Furthermore, Becker (2009) proposed that education is a form of capital resulting from deliberate investment. In contrast, Becker (1962, 1993) discovered two ways of investing in training or education. These are 1. general-purpose human capital investment and 2. firm-specific human capital investment. The former increases the marginal productivity of individuals across industries. Conversely, the latter increases the marginal productivity of an individual within a firm and not to other firms in different industries (Becker, 1993; Becker, 1962).

The Strength of the human capital theory

According to Porter (1990), productivity is the only sensible indicator of a country's competitiveness. Thus, an increase in the productivity of a country could be equated to an increase in the competitiveness of the country. The human capital theory is premised on the notion that an increase in a person's stock of knowledge and health raises his or her productivity in both market and non-market activities (Tompa, 2002: 183). Schultz (1997) explores several forms of human capital that contribute to productivity; however, their effects depend on

society's income and technological stage. In this regard, the income or poverty level acts as a moderator in how human capital forms influence the productivity of the country. Human capital forms include knowledge capital, which results from schooling and health capital. Health capital determines the total amount of healthy time available for people, whereas knowledge capital affects the productivity of the time spent on them (Schultz, 1997). In this regard, education, health, and well-being are critical components of human capital (Bleakley, 2010; D. Bloom and Canning, 2003). In the formulation of the human capital theory, Becker (1962) asserts that health plays an equally important role in developing workers' productivity.

A country with an educated population has skilled and highly educated labour. These workers would work with advanced methodologies, execute their duties competently, and have minimum errors in their operations; this could increase efficiency and productivity. Educated workers are easily trainable; consequently, an educated and well-trained worker can handle various tasks, lowering unit costs as opposed to the uneducated worker (Shatz, 2003). When human capital is enhanced, productivity is high; then unit labour cost should decrease. Because the unit labour cost is equal to labour compensation divided by labour productivity, then, if the denominator is increasing, the unit labour cost will decrease, which contributes to lowering the cost of operating business and hence, attract foreign investment inflows (Alsan *et al.*, 2006).

Also, Ishak and Rahmah (2002) state that as far as skilled workers are concerned, the level of education of a country is of critical importance to ensure the supply of the work force required by the economy. To support this view, Shatz (2003) argues that most multinational industries deal with differentiated products or technically advanced industries, which produce more appealing products to educated or high-income earners. Therefore, MNEs also need highly skilled labour to produce these sophisticated products. Then again, highly educated workers could imply high wage costs to MNEs because of their qualifications, but according to Kucera

(2002), MNEs are more concerned with skills than wage costs. Moreover, high education levels are associated with other human and economic development, such as sound economic policies, excellent infrastructures, and health and income level. Thus, the argument for high-educated workers seems stronger than the uneducated and cheap ones (Shatz, 2003).

Health is usually considered an essential component of human capital, particularly in health development literature. It is included in the goods production function either as a determinant of the total factor productivity (e.g. Acemoglu and Johnson, 2007) or as a factor of input (e.g. D. E. Bloom *et al.,* 2004; McDonald and Roberts, 2006). On the side of health and well-being as a form of human capital, a high rate of absenteeism due to high mortality and morbidity rate can reduce the productivity (output per individual) in the country, increase the costs of production; a high rate of infectious diseases can threaten investors' health and the lives of expatriate staffs, hence, could reduce foreign investment (Alsan *et al.,* 2006). In addition, firm profitability might suffer if health-related costs are high. The cost of treating people is high as well if MNEs operate in a country, which has poor health infrastructure and personnel, firms might incur additional costs to develop the health infrastructure or subsidise the costs for their employees (Alsan *et al.,* 2006; Polanyi *et al.,* 2000). For example, Debswana, Anglo-American and Coca-Cola are a few companies now subsidizing HIV medicines (anti-retroviral therapy) in southern African countries (The Economist, 2002). In another way, improved health can increase return on education and work experience because healthier workers with lower rates of absenteeism and with longer life expectancy acquire more experience (Tompa, 2002). Moreover, healthier children have enhanced intellectual function and higher school attendance, allowing them to become better educated adults, increasing productivity and hence, more foreign investment inflows (Bloom, 2005; Bhargava, 2001).

Also, an executive opinion survey by the World Economic Forum argues that the critical

channels through which the health population affects foreign investment are productivity, absenteeism, as well as through death, disability, funeral expenses, medical expenses, and recruitment and training expenses (Asiedu *et al.,* 2015). It is very typical in Africa and other developing countries where the impact of health on foreign investment and business, in general, can be seen. For instance, 33% of college students who graduated in 1980 were dead by 2001 (21 years later) because of HIV in Uganda. Likewise, 14.4% of college-graduated students in 1987 and 3.3% of college-graduated students in 1994 were deceased by 2001 (Asiedu *et al.,* 2015).

Regarding health care problems, Sub-Saharan Africa (SSA) could be leading as stated by Bui *et al.,* (2018), "women in South Asia die more in childbirth (500 for every 100,000 live births) than any other part of the world except the region of Sub-Saharan Africa". Moreover, half of the business leaders in low-income countries believe that HIV hinders their country's access to global foreign investment (Asiedu *et al.,* 2015). Because education and health and well-being are identified as twin factors affecting human capital or productivity (Becker, 1962), this necessitates the analysis of how the combination of education and health and well-being impacts productivity and, ultimately, foreign capital inflows.

Other human capital form includes childhood and adult nutritional status (Schultz, 1997). Some authors argue that a person's height at the fourth birthday is a good indicator of how nutritious such a person is; however, there are studies which look at how a malnourished young child can catch up in adult stature when provided with an improved diet (Strauss & Thomas, 1998). Scholars argue that childhood nutritional status contributes to adult productivity and health as well as enhances the performance of children in school and new training tasks, which would in turn, affect the return to other human capital investment activities as well (Behrman & Deolalikar, 1993; Moock & Leslie, 1986). In this regard, food security is important in

encouraging an increase in productivity in the country. In another way, food security could contribute to better factor conditions, which is among the four core factors in a national competitive framework. If the population is starving due to food insecurity, then the human capital will suffer, causing massive chaos in the nation and that could present obstacles to improving productivity and economic production (Cohen & Soto, 2007). In addition, food insecurity could bring competition over control of the food product's factors, which would end up triggering conditions for violence and civil wars. Bora *et al.,* (2011) argued that lack of food has been the source of many past and recent conflicts. Therefore, for higher productivity and better economic condition, food security is vital, promoting foreign capital inflows because of the supportive economic productivity and favourable business environment.

2.2.4.2 Institution theory and its relevance to national competitive framework and foreign capital influences studies

It is believed that an institutional approach, which attempts to embrace both macro and micro levels of analysis and which incorporates both formal and informal institutions, offers a promising way to understand different forms of the contemporary MNEs and their influences on foreign capital inflows (Dunning & Lundan, 2008). The theory has the strength to theorise at multiple levels of analysis. It can offer a rich theoretical foundation for examining a wide range of critical issues, including socio-economic factors which is essential for FCI and MNEs research (Djelic & Quack, 2003). According to the institutional theory, institutions are defined, as "the rules of the game in a society or humanly devised constraints that shape human interaction, economic activity, and firm behaviour" (North, 1990: 3). In expounding national competitive framework, Dunning and Zhang (2008) argue that the national competitiveness is attained when a country possesses the unique resources, capabilities and access to market (RCM) together with right institutions (I). Immense significance is attached to the necessity of relevant institutions in cultivating the national competitiveness of a country (Dunning & Zhang,

2008). In this regard, Institution theory is included as a theory that provides the theoretical underpinnings in the national competitive framework. In particular, the institutional theory is featured in this study to explain how for instance health and wellbeing and education as part of formal institutions, contribute to the national competitive framework and ultimately to FCI inflows (Hotho & Pedersen, 2012; Dunning & Lundan, 2008; Mudambi & Navarra, 2002).

For instance, considering education as part of the formal institutional dimension as well as human based socio-economic factor. The education system, financial systems, health systems and market relations are considered as institutions in various societal domains which are reciprocally constituted and path-dependent (Hotho & Pedersen, 2012; Glaeser *et al.*, 2004). Dunning and Lundan, (2008) aver that factors such as education are included as the formal enforcement mechanism of the institutions, which affects the location advantages of the firm (2008: 583). Education has an impact in shaping and implementing the institutions. Other researchers argue that the enhancement of human capital through education enables economic growth, which in turn facilitates institutional upgrading (Glaeser *et al.,* 2004). The institutional theory adds value as it is also very relevant and applicable in developing countries than other theories because it helps to explain the unique features of formal and informal institutions in transition economies (Gelbuda *et al.,* 2008; Meyer & Peng, 2005). As argued by Wright et al., (2005), and Peng (2005), the institutional theory is the most useful theory when studying business strategies such as FCI location and entry mode in emerging markets (Meyer & Peng, 2005). This is because tradition theories were developed based on MNEs from western countries, thus incorporating an institutional-based view is very crucial in developing countries (Kand & Jiang, 2010). In this view, the theory is in line with the current study, as the study seeks to analyse the influence of socio-economic factors such as health and wellbeing and educations (which are part of host country's institutional dimensions) on FCI inflows.

2.3.0 Empirical Literature Review

This section of the review of literature is structured into two sub-sections. Namely, the review of studies conducted within Africa and the review of studies conducted outside Africa. A thorough review of empirical literature will certainly reveal the gaps in literature.

2.3.1 Empirical Literature Review: A review of studies conducted within Africa

The studies conducted within Africa are to be extensively reviewed in this section. For coherence and the flow of review, the study has reviewed literature according to the relationship of concepts and variables across the three objectives.

2.3.1.1 Foreign Capital Inflow and Trade Openness

Miao *et al.*, (2020) observed the complementary relationship between FDI and trade in Africa. The research was conducted using data from the World Bank Comparative Advantage Index and United Nations Commodity Trade Statistics (UN Comtrade) to compare the intensity of trade between China and selected African countries. According to the study, Africa has a competitive advantage in exporting to China and the rest of the world. The study adopted the two-step system Generalized method of moments (GMM) model in its estimating technique using robust data for 2003–2017. The work suffered some setback in the sense that 14 years of coverage in the study appear too short to determine the required nexus among the variables under investigation. Again, the comparative analysis study between China and some African countries was the main emphasis of this study. Moreover, a long-run equilibrium negative relationship between trade openness and FDI inflows was also observed in the Sudanese economy. This result was obtained after a study undertaken by Tahmad and Adow (2018) using the Johansson co-integration technique for the period 1990 to 2020. This study did not include other forms of FCI especially FPI, also, the study focused on only a single country Sudan and leave other countries which the current study is investigating. Kandiero and Chitiga (2006)

conducted a study on trade openness and foreign direct investment in Africa for four different periods (1980-1985, 1985-1990, 1990-1995 and 1995-2001) using generalised methods of moments (GMM). The research found that the ratio of FDI to GDP responds positively to trade openness. Again, this study excluded foreign portfolio investment as a form of foreign capital inflow which the current study is including. Furthermore, using data from 1986 to 2016 in Nigeria, Nwosa and Adeleke (2017) employed an E-GARCH approach to examine the nexus between foreign capital inflows and trade openness. They observed a significant positive relationship between trade openness and FDI, while trade openness and foreign portfolio investment showed an insignificant relationship. This study focused on only one country (Nigeria) and did not assess the possible non linearities between the variables. By employing the ARDL from 1990 to 2013,Tsaurai (2015) found that FDI and trade openness had no long-run relationship in Zimbabwe. This study focused on only one country Zimbabwe and excluded FPI as a form of foreign capital which is included in the current study. Another study by Ekeocha *et al.,* (2012) demonstrated a positive long-run nexus between foreign portfolio investments and trade openness in Nigeria. The study used the applied finite distributed lag model for quarterly data from 1981 to 2010. As well, this study did not include FDI in the analysis and the model used was linear. Similarly, Ekeocha (2008) applied an error correction model using quarterly data for the period between 1986 and 2006 on Nigeria. It was found that foreign portfolio investment was negatively related to trade openness in Nigeria. Also, this study focused on only one country (Nigeria) and one form of foreign capital inflow (FPI) and leave aside other forms of FCI especially FDI.

2.3.1.2 Foreign Capital Inflow (FCI) and its determinants

Sawkut *et al.,* (2009) analysed a sample of 20 African countries for a period of 16 years from 1990 to 2005. The study aimed to examine the determinants of FDI for a sample of African economies employing a panel data analysis. The Hausman test specifications confirmed the

adoption of the fixed effects model. All the explanatory variables specified in the econometric models were found to have a direct relationship in attracting FDI in Africa. The work suffered some setback because the 15 years period covered in the study appeared too short to determine the required nexus among variables under investigation. Again, fixed effect model as a method of analysis in the model was not dynamic and could not control for endogeneity in the model. Olayiwola *et al.,* (2019) analysed the impact of population health on net inflows of FDI in 15 members of the Economic Community of West African countries (ECOWAS) from 1980 to 2018 using the random effects model (RE). The study found that population health is a positive but insignificant factor influencing FDI inflows in ECOWAS countries. The random effects (RE) model as a method of analysis was not dynamic and could not control for endogeneity in the model, which is a major limitation of the study. Using the fixed effect model (FE), Talukdar and Parvez (2017) measured the impact of population health and education on foreign direct investment with particular emphasis on panel evidence from 46 countries. The study used a panel data analysis of 46 developing countries from 1996 to 2011. From the result, they concluded that FDI is strongly and positively affected by population health. The fixed effect as a method of analysis in the model was not dynamic and could not control for endogeneity in the model.

Furthermore, Asiedu *et al.,* (2015) developed a theoretical and empirical paper to examine the relationship between HIV/AIDS and FDI. To test the implications of the model, the authors constructed a model to analyse the relationship between HIV/AIDS and FDI. Panel data were employed from 41 countries in SSA over the period 1990–2008. For the theoretical model, the result indicated that HIV/AIDS had a negative and non-linear effect on FDI, and the study further derived the conditions under which the non-linear effect is negative and diminishing. HIV/AIDS was found to have a diminishing impact on FDI inflows even when the HIV prevalence rate was as low as 0.1% using panel data analysis with a non-linear model.

Moreover, FDI inflows in Ghana are significantly influenced by the population health measured by life expectancy, death rate, malaria incidence, infant mortality rate and under-five mortality rate using the instrumental two-stage least square regression according to the study conducted by Immurana (2020). By employing the ordinary least square (OLS) method, FDI was found to be positively influenced by population health using all indicators except for malaria incidence. The research was conducted for a period of 39 years, from 1980 to 2018. This study focused on only a single country (Ghana) and one form of foreign capital inflows (FDI). In a related study, Tuffour and Mensah (2018) investigated how FDI can be influenced by school enrolment rate and GDP in Ghana using the VECM estimation technique. Among other findings, school enrolment rate and GDP were found to have positive and significant impacts on FDI, especially in the long run. As well, Cleeve et al., (2015) assessed the determinants of FDI inflows in Sub-Saharan Africa for the period from 1980-2012 using panel data regression. The study found that all measures of human capital have a significant influence on FDI. The work suffered some setback because of the lack of the specific guiding theory although assessed the socioeconomic determinants of FDI inflows in SSA countries. Busse and Nunnenkamp (2009) used the Gravity model on bilateral FDI inflows to examine the determinants of FDI inflows covering an unprecedented number of both host and source countries of FDI. The results show that foreign investors are more likely to favour locations where education level is high. Again, this study lacks the specific guiding theory or framework.

Besides, no study was found to assess how food security affects foreign capital flows in a country while different studies assess how FDI impacts food security in a country. Such studies include Mihalache-O'Keef and Li (2011) who assessed the effects of FDI on food security in 56 LDCs in which African countries were inclusive, for the period between 1981 and 2001 by employing a fixed-effect model. The study found that manufacturing FDI was positively and significantly related to food security. Primary sector FDI was negatively and significantly

related to food security, while service sector FDI had a negative impact on food security. Fleming (2019) analysed the effect of foreign direct investment on food security for a case study of rural Mozambique using the logit model. The research found that FDI was positively and significantly affecting food security. In addition, Slimane *et al.,* (2013) used the three-stage least square (3SLS) method to examine the impact of FDI on food security for 63 developing countries from 1995 to 2009. The results showed that sectoral FDI had no direct effect on food security; rather, the indirect positive effects were observed in the secondary and agriculture sector FDI. Furthermore, tertiary FDI seemed to have a negative effect on food security while no effect of mining FDI on food security was observed (Gohou & Soumaré, 2012). In a related study, Djokoto (2012) examined the relationship between agricultural FDI and food security in Ghana using the ARDL approach. The study used daily energy consumption as a measure of hunger and daily protein consumption as a measure of nutrition. The findings showed that agricultural FDI inflows and food security indicators had a significant negative relationship in both the short- and long-run. Dhahri and Omri (2020) analysed the effects of FDI and foreign aid on ensuring food security and poverty reduction in 50 developing countries from 1995 to 2015 using the three-step approach proposed by Baron and Kenny (1986). The study observed that four types of foreign aid [investment aid (IA), social infrastructure aid (SIA), agriculture-forestry-fishing aid (AFFA) and Non-investment aid (NIA)], and FDI had a significant and positive effect on the reduction of poverty and food security, except for (NIA), which had an insignificant effect on food security. Therefore, the reviewed literature above provides evidence that no single paper was found that assess the impact of food security on FCI. This study fills the gap by investigating the influence of food security in the attraction of FCI in SSA countries.

2.3.1.3 Foreign capital inflows (FCI), trade openness and economic growth, otherwise known as output performance

Saibu (2014) studied the effects of capital inflow on economic growth and also investigated the role of trade openness in foreign capital inflow/growth nexus in Nigeria. To test the modernisation hypothesis in Nigeria, the paper adopted the Principal Component Analysis (PCA) technique and the autoregressive Distributed Lag (ARDL) bound testing methodology to analyse the time-series data. PCA was used to derive a unique index that captures the quantity and quality of the conventional measures of capital inflow and trade openness. The result showed that in interacting with trade openness, capital inflow had a significant impact on growth, thus providing empirical support for the modernisation hypothesis that capital inflow and trade policy are complementary and growth-enhancing. Although the study attempted to investigate the relationship between capital inflow and openness trade, the work suffered some setback in that it could not identify the linearity of models. The study also failed to disintegrate capital inflow in the model. Similarly, Saibu Anetor (2020) studied the development threshold, private capital inflows and economic growth in SSA countries from 1995 to 2017. The study adopted the system generalised method of moments (SGMM) in its methodology. The findings from these studies indicate that foreign direct investment had a significant impact on the economic growth of SSA. The study also established that portfolio investment had a positive impact on economic growth in the region. The interaction of foreign direct investment with financial development had a significant impact on economic growth. The findings reported by this study confirm the widely held view that foreign portfolio investment, foreign direct investment and gross foreign capital inflows increase the aggregate economic performance of the countries in the SSA region. The work suffered some setbacks in that many factors determine the economic performance of countries in the SSA region were not included in the model. More variables such as trade openness are required to ascertain

performance. Again, System GMM, adopted as the study's estimating technique, failed to confirm threshold effects which were the initial objective possibly.

Anetor (2021) examined the relationship between portfolio investment inflow and economic growth by employing the system generalised method of moments (SGM). The author further used panel data for 20 years, from 1995 to 2018, for the analysis. The findings consider gross foreign capital inflow and foreign direct investment to be fundamental factors that significantly influence the economic growth in the SSA region. The study further found that portfolio investment, foreign direct investment and gross foreign capital inflows positively and significantly impacted economic growth in the SSA region. The work suffered some setbacks in that many factors determine the economic performance of countries in the SSA region were not included in the model including trade openness. More variables are required to ascertain performance. More than 20 years are required to confirm the trend of relationships using GMM; otherwise, differenced GMM could have been adequate. Some studies also confirmed that capital inflow readily interacts with some macro-economic variables, some of such studies include the following: DinhSu and Phuc Nguyen (2020) investigated the nexus between human capital, foreign financial inflows (official development assistance, foreign direct investment and remittances) and economic growth in SSA countries. Combining fixed effect quantile regression and two-step system GMM as the study's methodology, annual data from 2002 to 20017 from 38 SSA countries were adopted. The results established that foreign direct investment, official development assistance and remittances had a negative impact on the economic growth of SSA countries. The work suffered some setbacks in that the 15 years period covered seemed too short to determine the required nexus among the variables under investigation.

From the foregoing discussion, the examined studies showed some weaknesses, especially in SSA. The following shortcomings have been identified:

(1) Certain studies suffered some setbacks in that they could not identify the linearity of the models. Examples of such studies include: (Saibu, 2014; Anetor, 2020 and Anetor 2021). Saibu (2014) failed to disintegrate capital inflows in the model.

(2) Again, the work of Anetor (2020) exhibits some weaknesses in that many factors which determine the economic performance of countries in the SSA region were not captured in the model. In the studies conducted by DinhSu and Phuc Nguyen (2020), Miao *et al.*, (2020) and Sawkut *et al.*, (2009), 14 to 15 years appeared too short to determine the required nexus among the variables under investigation.

(3) Miao *et al.*, (2020) limited their study to the comparative analysis between China and some African countries as the main emphasis of the study.

(4) Again, studies such as Nyauncho and Kabiru (2015); Liargovas and Skandalis (2012) and Sawkut *et al.*, (2009); Olayiwola *et al.*, (2019) adopted the fixed effect model as a method of analysis in the model. While fixed effect model is not dynamic, it cannot control for endogeneity in the model.

(5) As well, some studies lack the specific guiding theory or framework to assess the determinants of foreign capital inflows in SSA countries. Such studies include Cleeve *et al.*, (2015); Busse and Nunnenkamp (2009) and Noorbakhsh *et al.*, (2001).

Consequently, there is a need for more empirical investigation to fill the gaps identified in the literature using more recent data, new methodology, more extended periods and the inclusion of more panel units and diagnostic tests to have a thorough analysis.

2.3.2 Intercontinental Literature Review

This section addresses a review of empirical literature from the perspective of studies conducted outside the continent of Africa, first on capital inflow and trade openness, second

on capital inflow and other variables and thereafter, on capital inflow, trade openness and economic growth.

2.3.2.1 Foreign Capital Inflow and Trade Openness

Sharma and Kaur (2013) examined the causal link between international trade and FDI in China and India using secondary annual data from 1976 to 2011. The study employed Granger causality tests and found a unidirectional causality from FDI to exports and FDI to imports in China. For the case of India, the study observed bidirectional causality between FDI and exports as well as FDI and imports. Moreover, Ali *et al.,* (2019) observed a negative association between FDI and trade openness in Pakistan. The study employed the auto-regressive distributed lag model (ARDL) using annual data from 1975 to 2017.

Rahman (2011) also examined the nexus between FDI and trade openness in the case of Bangladesh for 1970 to 2007 by employing a multivariate granger causality model (VAR). The study found that FDI causes import in Bangladesh, while no causality was revealed in any other variables. Using the gravity model, Chaisrisawatsuk and Chaisrisawatsuk (2007) also found a complementary relationship between FDI and international trade, measured by exports or imports in 29 OECD countries and six (6) Asian countries from 1980 to 2004.

Donghui *et al.,* (2018) also analysed the link between trade openness and FDI flows in Asian countries using fixed effect and ordinary least square (OLS) regression models from 1990 to 2017. The study found that trade openness had a positive impact on FDI inflows in Asian countries both in short-run and long-run periods. Similarly, Klasra (2011) established a bi-directional causal link between FDI and exports for Turkey, both in the long- and short-run. This study also found exports and FDI to be complementary using the ARDL model.

Using ARDL, Mehar and Hasan (2018) found a negative and significant effect of trade openness on portfolio investment in Pakistani from 1981 to 2012. Furthermore, by employing

the Granger causality test, the study indicated that trade openness granger caused portfolio investment, while portfolio investment did not granger cause trade openness. Moreover, through the use of GMM from 1981 to 2011, Yang *et al.,* (2013) found a negative and insignificant effect of trade openness on portfolio investment in both static and dynamic models of Asia. In contrast, a negative and significant effect of trade openness on portfolio investment was revealed for the dynamic model of Latin America. The study found a negative and insignificant effect of trade openness on portfolio investment in Latin America for the static model.

Portes and Rey (2005) explored the relationship between capital flows and trade in 14 countries from 1989 to 1996 using contemporary data on financial flows. The results showed that a 10% increase in trade led to a 3.4% increase in equity flows across countries. Again, Aviat and Coeurdacier (2007) employed the simultaneous gravity model and found a statistically positive nexus between asset holdings and trade in goods. Using the OLS and IV estimations, the study also indicated that a 10% increase in asset holdings leads to a 2% increase in bilateral trade across countries. In addition, Jean-François and Sèna (2017) examined the role of international trade on financial flows for economic development in 125 countries, of which 37 were least developed. The results showed that international trade openness plays an important role in attracting financial flows for development. The study used the three-stage least square econometric approach for an unbalanced panel dataset. Meanwhile, Abrego (1999) found that trade openness causes capital outflow in Costa Rica and OECD countries, which lowers tax revenue and reduces the welfare of the people. The study was investigated from 1990 to 1991 using an applied general equilibrium model. Furthermore, Kalemli-Ozcan, Nikolsko-Rzhevskyy, and Kwak (2010) examined the causal links between trade and capital flows from 1859 to 1913. Using data on capital inflows and trade in Turkey, the study recorded a complementarity (significant positive relationship) between capital and trade flows.

Broner *et al.,* (2013) examined the impact of trade openness on gross capital inflows in general and its behaviour over the business cycle. The study found a positive association between openness to trade and capital inflows. To understand this nexus, the study constructed a unique database of returns, sovereign bond prices, and issuances at various levels of maturities for 11 emerging economies from 1990 to 2009. On average, these economies pay a lower risk premium on short-term than long-term bonds. The study analysed a simple model in which the maturity structure results from risk-sharing concerns between an emerging economy subject to risk-averse international investors and rollover crises. Again, Abrego (1999) investigated trade foreign direct investment and liberalisation with a special interest in an applied general equilibrium model for Costa Rica. The study investigated from 1990 to 1991 using an applied general equilibrium mode. The outcome revealed that trade openness caused capital outflow in Costa Rica and OECD countries, which lowered tax revenue and the people's welfare. Furthermore, Kalemli-Ozcan, Nikolsko-Rzhevskyy, and Kwak (2010) examined the causal links between trade and capital flows from 1859 to 1913. Using data on capital inflows and trade in Turkey, the study recorded a complementarity (significant positive relationship) between capital and trade flows. Furthermore, using the fixed effect (FE) model, Aizenman and Noy (2008) observed a positive link between FDI inflows and openness to trade in all underdeveloped countries. Additionally, the Granger causality test showed a bi-directional causality between the two flows from 1982 to 1998. The result implied that FDI and trade flows affected each other simultaneously. Sazali *et al.*, (2018) also investigated the causal links between FDI and trade openness in Malaysia. By employing the Granger causality test from 1977 to 2015, the results demonstrated the presence of unidirectional causality running from trade openness to FDI.

Singhania and Saini (2018) conducted a study in 19 developed and developing countries for ten years (2004-2013) using the GMM, RE and FE approaches. The results showed a positive

and significant relationship between FDI and trade openness, as well as trade openness and FPI. Moreover, Asghar (2016) examined the relationship between FDI and trade openness in seven south Asian economies for 12 years, from 1998 to 2010, using the random effects (RE) model. The study used three indicators of trade openness: exports, imports, and a combination of exports and imports. The results suggested that trade openness and FDI were positive and significantly related.

Caudros *et al.*, (2004) used a vector autoregressive model to analyse the causal relationship among inward FDI, trade and output in Mexico, Brazil and Argentina. The study revealed that trade and FDI complemented each other in Mexico, with causality running from FDI to exports. In Brazil, there was a substitutive or negative relationship between trade and FDI. In contrast, no causal relationship was exhibited in Argentina. Koojaroenprasit (2013) observed that trade and FDI flows are substitutes, meaning that the two flows are negatively related. This result was obtained after analysing the nexus between FDI and trade in Australia from 1986 to 2011 using the ordinary least square (OLS) method. Rahman (2011) employed a VAR model and Johansen's (1991) LR cointegration test to examine the relationship between foreign investment and trade openness in Bangladesh, using data from 1972 to 2007. The results showed that foreign investment caused import while no causality relationship was found between any other variables of interest. Additionally, a positive cointegration relationship was observed between the variables.

2.3.2.2 Foreign Capital Inflows and other Variables

Population health and foreign capital inflows

Health is one of the most essential components of human capital, especially in health development literature; health has been found to influence foreign capital inflows and can also affect economic performance through indirect mechanisms. Healthier workers with lengthier

life expectancies and lower rates of absenteeism acquire more job experience (Bloom *et al.,* 2003). Subsequently, a healthy labour force can improve workers' efficiency and increase foreign capital inflows. In contrast, a weak labour force means low worker efficiency and consequently deters the inflow of foreign investment into the country/region. However, there are few existing studies that have tried to investigate the effect of the health status of the population on foreign capital inflows are as follows:

Erdogan and Unver (2015) investigated the factors influencing FDI inflows for 88 countries from1985-2011 using fixed effects (FE) and system generalised method of moments (GMM) methods. The results showed that health has a negative and significant effect on FDI inflows. Meanwhile, in a panel data analysis, Alsan et al., (2006) found a positive and significant association between population health and FDI inflows in developing countries using the pooled OLS estimator. Similarly, Alsan *et al.,* (2004) analysed the effect of population health on FDI inflows in 74 countries from 1980 to 2000. The study used OLS regression and found that population health had a positive and significant influence on the attraction of FDI inflows. Moreover, using the multiple regression analysis, Azemar and Desborder (2009) employed the fixed effects model on the sample of 70 developing countries and found that FDI was positively influenced by the health of the population measured by the absence of malaria and HIV from 1985 to 2005. In the article written by Zlatković (2016), it was shown that improvements in health, primary education, higher education and training improved capital inflows in four (4) Western Balkan countries using the benchmark method. Ghosh and Renna (2015) examined the effect of population health on FDI inflows in 114 countries using OLS and the two-stage least square estimators. The study found that years of life lost due to commutable diseases and age-standardised mortality rate for communicable diseases had a detrimental effect on FDI inflows. Furthermore, half of all business leaders in low-income countries believe that their

country's access to FDI is affected by HIV/AIDS. This was revealed during a global business survey on HIV/AIDS sponsored by the World Economic Forum (Bloom *et al.,* 2003).

As stated above, population health is one of the crucial components of human capital in enhancing productivity, which, in turn, attracts foreign investment inflows (Hecock & Jepsen, 2013). Conversely, poor health might cause a high rate of absenteeism and workers turnover due to illness and mortality, which ultimately can increase production costs and reduce productivity, consequently deterring foreign investment inflows (Alsan *et al.,* 2006; Azemar & Desbordes, 2009). From the previous discussion, it is evident that very few studies have examined the effect of population health on FDI inflows, with none of the studies focused on foreign portfolio investment. Additionally, the combination of the impact of health and other factors, such as the education level of the population, is crucial because when the labour force is both healthy and highly educated, productivity improves. Consequently, more capital flows would be attracted to the country. However, the previous studies did not assess the combination of the two factors in influencing foreign capital inflows.

Human capital investment and foreign capital inflows

Another important component of human capital is the education level of the people. An educated labour force seems to be an incentive factor for attracting foreign investment inflows. In contrast, a low-skilled labour force and inadequate training are perceived to adversely affect the return to capital and therefore deter foreign capital inflows (Dorożyńska & Dorożyński, 2014). However, the empirical literature on the relationship between education level and foreign capital inflows shows mixed results, and is also limited. For example, Mughal and Vechiu (2010) found a negative relationship between FDI and tertiary education enrolments in 79 developing countries. FDI and post-secondary educational attainment were found to be positively related by Egger *et al.,* (2010). Gittens and Pilgrim (2013) found evidence of a

positive association between FDI and education level in 40 developing countries after conducting a panel data analysis on data averaged over five-year periods from 1970 to 2010. While another study by Zhuang (2017) shows mixed results as the study found evidence of a negative relationship between aggregate FDI and tertiary school enrolment, while a positive relationship was found between tertiary education and FDI.

Generally, a few studies in the review of the previous literature have shown that education level has a negative impact on the inflow of foreign investment, while other studies show a positive impact of education level on the attraction of foreign investment inflows. Based on these mixed findings and studies being conducted outside the continent of Africa, there is a need to examine the impact of education level on foreign capital inflows, including foreign portfolio investment, because most of the previous studies focused on foreign direct investment only. Furthermore, there is a need to conduct the study using recent data and long-trend periods and by employing a new methodology. Additionally, education level, in combination with other factors such as health and food security, has not yet been explored in the previous literature. This combination can improve the efficiency of labour and increase labour productivity and thereby increase the return to capital.

Food security and foreign capital inflows

Food security is another important variable that can affect the inflow of foreign capital. Alsan *et al.,* (2006) suggested that undernourishment or food insecurity can affect the physical fitness of employees, thereby affecting productivity, which eventually reduces foreign capital flows into the country. However, the previous studies investigated the effect of foreign capital inflows on food security and not food security on foreign capital inflows (Slimane *et al.,* 2013; Gohou & Soumaré, 2012). Therefore, the current study contributes to knowledge and literature by assessing how food security affects foreign capital inflows.

2.3.2.3 Foreign Capital Inflow (FCI), trade openness and economic growth, otherwise known as output performance

Çeviş and Çamurdan (2007) conducted a study in the developing economies of Asia, Eastern Europe and Latin America by employing a panel dataset of 17 countries from 1989 to 2006. Among other findings, the study reported a positive and significant impact of GDP on attracting foreign investment inflows in transition regions. A study by Sahoo and Sethi (2020) found that trade openness has a positive and significant influence on economic growth for the select South Asian countries. The study used the full modified ordinary least square (FMOLS) and dynamic ordinary least squares (DOLS) methods to find out the long-run dynamic relation between the variables over the time period 1990–2017. Moreover, Aziz *et al.,* (2015) revealed a positive and significant relationship between GDP growth rate and foreign portfolio investment (FPI) in Pakistan after employing a time series and ordinary least square (OLS) regression model from 2005 to 2014. Furthermore, Bakari and Sofien (2019) examined the impact of openness and foreign investment inflows on economic growth for the case of 24 Asian economies over the time span 2002-2017 through the use of the fixed and random effect models. The empirical results pointed out that foreign direct investment and exports are negatively affecting the growth path. Also, imports have no real impact on economic growth.

Disaggregating the structure of the reviewed literature of intercontinental studies from studies conducted within Africa has shown a lot of shortcomings existing in various literature. For instance, the study conducted by Kalemli-Ozcan, Nikolsko-Rzhevskyy, and Kwak (2010) on Costa Rica adopted outdated data from 1859 to 1913. Obviously, the findings from the studies may be of little relevance or no effect on the current economies. Again, Abrego's (1999) investigation of Turkey adopted fixed effects with time series of only two years from 1990 to 1991, which constitutes another major short coming. Asghar (2016) examined the relationship between FDI and trade openness in seven south Asian economies for 12 years, from 1998 to

2010, using the random effects (RE) model; another concern is the static nature of the analysis as a dynamic model may be more appropriate. This constitutes a major shortcoming of most of the reviewed studies. Again, most studies reviewed at the intercontinental were becoming obsolete as outdated data were adopted. Examples of such studies include Aizenman and Noy (2008); Rahman (2011) for the case of Bangladesh for the period 1970 to 2007; Chaisrisawatsuk and Chaisrisawatsuk (2007) 29 OECD and six (6) Asian countries covering the period from 1980 to 2004.

2.4 Summary

This chapter focused on the review of Sub-Saharan demographic structure, a brief overview of the SSA economies and the aggregate economic performance of the region, as well as the trends of international capital flows and global shocks in SSA countries. As revealed by IMF and World Bank data, the assessment of the region's economic performance in terms of the average growth rate in GDP per capita between 1980 and 2000 was discussed. The chapter also assessed the region's economic outlook between 2001 and 2006. The period between 2008 and 2015, marked by global shocks and how it retarded growth in the SSA countries, was covered. During this period, growth was weak due to global instability, low investment, insufficient funds and a decline in commodity prices. Furthermore, this chapter also covered and discussed the aftermath (2016 to 2020) of the three major global shocks that adversely affected SSA's economy. Various World Bank and OECD data were quoted to show the preliminary estimate of the performance of the economy of the region using the real GDP aggregate data. Studies such as Anetor (2020), Anetor *et al.*, (2021) and DinhSu and Phuc Nguyen (2020), in their views, highlighted the various ways in which gross foreign capital investment, foreign direct investment and foreign portfolio investment can be used to stimulate the economic performance of a region.

Given the analysis of the trends of international capital flows and global shocks in SSA countries, the chapter revealed how the international capital flows into the SSA region followed a distinct path from that of the global capital flows. It was revealed that three global or external shocks redefined the structure and composition of gross capital flows in the Sub-Saharan African region. These external shocks comprise the sharp fall in the oil price in 2014/2015, the European sovereign debt crisis in 2011/2012 and the global financial crisis in 2008/2009. How each of the global shocks occupied a substantial role in adversely affecting the degree and level of gross capital flows and the shift of investment inflows in the SSA region was also discussed. The degree to which the three global shocks affected SSA's economy, and in particular deceased the FDI, gross foreign capital flows, foreign portfolio investment and other capital flows, were highlighted by past empirical studies such as Macias and Massa (2009), Odhiambo (2017), Brambila and Massa (2010), Lippit (2014), Chea (2015), Hou *et al.,* (2015) and Baek and Kim (2020), among others. The sub-section ended by arguing that the three major global or external shocks, i.e. the sharp fall in the oil price in 2014/2015, the European sovereign debt crisis in 2011/2012 and the global financial crisis in 2008/2009 redefined the structure and composition of gross capital flows in the SSA region.

The chapter's arrangement of the literature review followed the sequence of the objectives: the first part of the literature review was based on the relationship between FCI and trade openness both within the SSA region and inter-continentally. The second part of the literature emphasised the FCI and its determinants, otherwise known as FCI and other variables. The third part of the review of the empirical study drew literature on FCI, trade openness and economic growth, otherwise known as output performance. The chapter that follows presents and discusses the research design, variables and their measurements, and the data on which this study is based. Also, the chapter discusses the justification for the panel data analysis as well as hypotheses and methods employed for data analysis.

CHAPTER 3

RESEARCH METHODLOGY

3.1 Introduction

This chapter focuses on the research design and the methodology through which the variables used in the study were adopted. Specifically, the chapter deals with the research design, variables and their measurements, various samples and data sources and the choice of panel data analysis for the study. As well, the chapter discusses the hypotheses to be tested and methods employed to analyse the data. The specific research methodology pertaining to each of the objective are well highlighted and discussed in the subsequent chapters. The reason behind this strategy is for the researcher to be able to carefully review the research methodology, considering their strengths and weaknesses and adopting the appropriate research tools in order to properly address the research questions emanating from each objective.

3.2 Research design

The research design of this study is quantitative in nature. Quantitative research involves gathering of information that yields statistical data (Collis & Hussey, 2013). Collis and Hussey (2009) depict that quantitative research engages the measurement of data and analysis of the causal relationship among variables of interest. Moreover, the current study employs secondary data, suggesting that the data is already available and collected for a different purpose (Creswell & Creswell, 2017). Therefore, if there are enough secondary data that respond to the intended research objectives, it is not necessary to gather primary data.

3.3 Variables and their measurements

The choice, measurements, and definitions of the variables in this study are from the review of various existing literature. All the variables used are expressed as either a percentage of GDP or in logarithm form. This is essential to achieve consistency and easy interpretation of the results. Natural logarithm has also been applied in order to make all variables stationary at a lesser order of integration and to ensure proper distributional properties of the variables. The following are the variables that will be examined in all three objectives of this thesis.

3.3.1 Foreign direct investment (FDI)

FDI is a form of business ownership or investment in one country by an entity based in another country. According to Todaro and Smith (2012), FDI is a form of foreign capital aiming to accelerate economic development. FDI inflows (% of GDP) is used in this study (see Tsaurai & Odhiambo, 2012). This is because FDI inflows (% of GDP) capture relatively significant and recent changes in the behaviour of FDI (Globerman & Shapiro, 2002). Moreover, the measure seems to be more appropriate for assessing the kinds of features of an economy that attract investors.

3.3.2 Foreign portfolio investment (FPI)

Foreign portfolio investment (FPI) is another form of foreign capital inflows aimed at accelerating economic growth. It deals with investment in categorising assets such as bonds, stock and cash equivalents (Otiwu, 2018).

Generally, FPI comprises securities and related financial assets that are passively held by foreign investors, it does not offer direct ownership of financial assets to investors and is comparatively liquid based on market volatility. It forms part of the capital account of an economy and is the balance of payment (BOP) of countries. The balance of payment measures

the quantum of money flowing from one economy to another within one financial year. It includes the country's capital investments and monetary transfers.

Additionally, foreign portfolio investment (FPI) can be described as investment activities at international dimensions through various passive ownership of securities or assets such as foreign stocks, bonds and other financial assets, with the investor having no active management participatory role or control of the securities issued, but which aims at maximising benefit and minimising risk. FPI inflows (% of GDP) is used in this study because it contains all the value of inward investment indirectly owned by non-resident investors in the reporting economy. Furthermore, this indicator has been used by several previous studies (see Bilal *et al.,* 2015; Mohammad, 2018; Nguyen *et al.,* 2021).

3.3.3 Trade openness (TO)

Trade openness is defined as the amalgamation of exports and imports as the ratio of GDP. The existing literature has shown different views about trade openness regarding whether the emphasis should be on export or import-led growth. Following the work of Squalli and Wilson (2009), this study combined both approaches as total trade divided by GDP.

$$\left(\frac{X+M}{GDP}\right).$$

Where X denotes the exports of goods and services, M represents the imports of goods and services and GDP is the gross domestic product.

The selection of this proxy to represent trade openness is based on the definition of Dollar and Kraay (2001). According to this study, trade openness is the percentage of the sum of exports and imports to GDP, as stated above. This proxy has been confirmed by Kandeiero and Chitiga (2006), who also employed the sum of imports and exports as a percentage of GDP to represent trade openness.

Furthermore, there are advantages to choosing this measure (indicator) of trade openness over the other measures (indicators), namely:

Firstly, its simplicity in application and intuitively appealing nature suggests that it measures the actual trade flows and does not suffer from the subjectivity of preclusion or inclusion of other variables.

Secondly, the wide availability of data from several countries spanning a long period suggests that the indicator has been used by many scholars, such as Sazali *et al.,* (2018), Ali *et al.,* (2019) and Cantah *et al.,* (2018). This allows comparisons with other studies that have been conducted.

Thirdly, the indicator captures gravity and policy components and other trade openness variables such as political differences, legal and language.

3.3.4 Health and well-being of the population (HE)

The health and well-being of the population is another variable used in this research. To account for the combined impact of health on foreign capital inflows, this study used life expectancy in SSA as a proxy to capture the health status in the SSA countries. This is because there is a positive relationship between a healthy labour force for a given population and life expectancy. Life expectancy is one of the most frequently adopted summary indicators for the overall health of a given population. Life expectancy is based on the set of observed age-specific death rates. For instance, a given age group together with the number of deaths in a given year, is divided by age group together with the average number of people alive in this year. Life expectancy at birth is the mean length of life at birth for every individual born in a specific year. This can be computed only for cohorts born so long ago that all their members have died. The World Health Organization has also included the health and well-being of population indicators in its Global Reference List of 100 core health indicators.

3.3.5 Human Capital Investment (HCI)

Human capital investment include skills, education, and knowledge, among others (Abba, Moosa, & Ramiah, 2022). This study used education level especially the school enrolment at tertiary level to proxy investment in human capital in contribution to foreign capital inflows in the SSA countries. The study aims to examine if a highly skilled workforce, who has permanent access to quality post-secondary education, such as colleges, vocational schools, technical training institutes, as well as private and public universities, would attract foreign capital inflows in SSA countries and vice versa. According to Hu and Wolniak (2010), the level of education is positively related to income level or earnings and helps to reduce poverty levels in the economy which can as well influence foreign capital inflows. Other studies that used education level especially tertiary education to proxy human capital investment are Mughal and Vechiu (2010), Mustafa and Valerica (2011), Zhuang (2017), Ravindranath (2018) and Abba, Moosa, and Ramiah (2022).

3.3.6 Food security (FoodSec)

The Food and Agricultural Organization (FAO) expanded its concept of food security in 1996 and formulated the following definition: Food security, at individual, household, national, regional and global levels is achieved when all people, at all times, have physical and economic access to sufficient, safe and nutritious food to meet their dietary needs and food preferences for an active and healthy life. The FAO concept of food security above highlights the food quality dimension. The recognition of macro- and micronutrients in food is regarded as a move away from curing towards averting food-related illness. A balanced diet and the consumption of various nutrients are crucial for vibrant and healthy life and for the body to develop, replace and repair cells and tissues; produce energy to keep warm, move and work; carry out chemical

processes such as the digestion of food; protect against, resist and fight infection and recover from sickness" (FAO, 2016b).

FAO describes food security as consisting of four equivalent dimensions: food access, food availability, food stability and food utilisation. The FAO describes the four equal dimensions of food security as follows.

(1) Food access consists of economic and physical access to food;

(2) Food availability involves the supply side of food security and also includes food production, net trade and food stock levels;

(3) Food utilisation consists of the type of food and how it is prepared for consumption. The nutritional status of a specific food is determined by the various diets, the distribution of food within a household and the preparation of the food (FAO, 2008).

(4) Food stability is an interaction of the availability, access and utilisation dimensions. A household or an individual is only food secure when utilisation, access and availability can be permanently guaranteed, regardless of natural, social or economic crises (FAO, 2006).

The current study used the ratio of total exports to food imports to proxy food security. This indicator was proposed by Díaz-Bonilla *et al.,* (2000) and has been used by several previous studies such as Diaz Bonilla *et al.,* (2002), Yu *et al.,* (2009), and Breisinger *et al.,* (2010). This indicator is commonly used to measure food security at the macro level. The logic behind its use is that a country uses foreign exchange from its exports to finance food imports. Therefore, the higher the total exports-to-food imports ratio, the higher the food security and *vice versa*. Thus, the indicator has the advantage of capturing both the ability of a country to export and the demand for imports.

3.3.7 Inflation (INF)

Inflation refers to the general rise in the price level of an economy over a given period of time. It is included as one of the domestic and socioeconomic factors that determine capital inflows (Fernandez & Arias, 1996). This index has been used by other authors such as Hailu (2010), Naude and Kruggel (2007) and Asiedu (2006), to mention a few.

3.3.8 Output performance (Y)

The production variable 'Y' is the industrial value added or contribution to GDP. It is the total value of goods and services produced by the economy. Various studies, such as Elbourne and De Haan (2006) and Kutu and Ngalawa (2016), have used this variable in their models to explain output performance.

3.3.9 Real Interest rate (RIR)

Interest rate is the average real repo rate set by the central bank of each of the SSA countries as a monetary policy indicator (Iturriaga, 2000; Disyatat & Vongsinsirikul, 2003). RIR is an adjusted interest rate to remove the impact of inflation. Once the interest rate is adjusted, it captures the real cost of the borrower's funds and the real lender's yield to an investor. RIR affects the rate of time preference for current goods over future goods.

3.3.10 Real Exchange rate (REXC)

While the exchange rate is the price of each country's currency expressed in another country's currency, the real exchange rate (REXC) between two nations' currencies is the product of the nominal exchange rate and the ratio of prices between the two nations. For instance, the dollar cost of a Rand (Ibrahim & Amin, 2005).

3.4 Sample and data sources

3.4.1 Sample

The focus of this study is on Sub-Saharan African (SSA) countries. The SSA region comprises countries geographically located to the south of the Sahara, which is on the African continent. The datasets used in this study are of "31 Sub-Saharan African countries, namely Angola, Benin, Botswana, Burkina-Faso, Cabo Verde, Cameroon, Seychelles, Zimbabwe, Gabon, Ghana, Guinea-Bissau, Sudan, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Nigeria, Republic of Congo, Senegal, Sierra-Leone, South Africa, Eswatin, Tanzania, Togo, Uganda and Zambia. The inclusion of only 31 countries in this study was due to the lack of data on variables for the countries that were excluded. Therefore, priority was not given to the number of countries, but rather the consistency of the work. Furthermore, obtaining data for all the variables across the required years of the study for the all SSA countries was a major challenge because the variables are different or independent from one objective to another. However, similar constraints also faced other studies in the same region (SSA) and other regions, such as Gutema and Bekele's (2003) that used data from only 13 countries in the region to examine education and economic performance in SSA countries. Furthermore, due to data limitations, Ngalawa, Tchana, and Viegi (2016) used a panel data set covering only 118 out of 211 countries that were initially under investigation over the period 1980 to 2004. Another study by Noah and Ichoku (2015) used 30 countries to conduct TFP Dynamics in SSA using the Malmquist index approach. Among other research works, these ones were able to attain their objectives despite data constraints; this encouraged the author to proceed using the same 31countries for the all three objectives. Furthermore, the study used annual data for 34 years starting from 1985 to 2018 across its three objectives. The starting date is based on data availability, while the cut-off date is an attempt to avoid the COVID-19 period in order to prevent seasonal breaks. Furthermore, this interval

is the most recent period where world capital flows and trade have increased dramatically. In addition, this is the period of globalisation where the net capital inflows and gross capital inflows started to diverge significantly (Ndiweni & Bonga-Bonga, 2021).

3.4.2 Data sources

Data on foreign capital inflows (FDI and FPI) were obtained from the International Monetary Fund (IMF), balance of payments yearbook and World Development Indicators (WDI), while data on trade openness were obtained from World Development Indicators and United Nations Conference on Trade and Development (UNCTAD). Data for the output performance, interest rate, exchange rate, population health, human capital investment, food security and inflation rate were obtained from the relevant large public datasets of international organisations such as the World Bank (WB), United Nations Development Programme (UNDP), IMF African Department database, the Organization for Economic Co-operation and Development (OECD)" database and UNCTAD.

3.5 The choice of panel data analysis

Following Hasio (2014) and Mahembe (2014), this study employs panel data analysis because of the following advantages:

- It gives more degrees of freedom and explanatory power than time-series or cross-sectional data analysis (Baltagi, 2008:8);
- It provides less collinearity among the variables and can control for heterogeneity among the individual data (Baltagi, 2008:6);
- It is capable of revealing more effects that are not detectable in time series and cross-sectional analysis (Baltagi, 2008:8);
- It is appropriate for studying dynamic adjustments in a model (Baltagi, 2008:7);

- Finally, it removes the problems of non-standard distributions that are usually associated with unit root tests in time series analysis (Baltagi, 2008).

3.6 Hypotheses and methods of data analysis

The hypothesis to be tested in objective one which investigates the relationship between foreign capital inflows and trade openness in Sub Saharan African countries is as follows;

H_0: There is no relationship between foreign capital inflows and trade openness in SSA countries.

H_A: There is a relationship between foreign capital inflows and trade openness in SSA countries.

In analysing objective one, this study uses nonlinear model called panel smooth transition regression (PSTR). Adopting a non-linear approach in the study's model helps to determine the asymmetric and threshold relationship in the study. It better provides for effective parsimony, predictability and interpretability required in the model, which a linear model may not sufficiently supply. Moreover, the PSTR model is important because it permits a smooth change between regimes and allows for various types of nonlinearities and asymmetric dynamics based on the types of transition function (Omay *et al.*, 2014). The PSTR model also tolerates the estimation of nonlinearities that may occur between variables. The model permits the choice of the suitable switching variable and the type of transition function. This is examined in more detail in chapter four.

The hypothesis to be tested in objective two that examines the socioeconomic determinants of foreign capital inflows in Sub Saharan African countries is as follows;

H_0: Socio-economic factors do not determine foreign capital inflows in SSA countries.

H_A: Socio-economic factors determine foreign capital inflows in SSA countries.

In analysing objective two, this study employs both the static panel models of random and fixed effects within the regression, with preferences on random effects as suggested by the Hausman test and dynamic panel models of the systemic generalised method of moments (SYSGMM) to investigate the socio-economic determinants of foreign capital inflows in SSA countries. The fixed effects model (FEM) and random effects model (REM) have been used because they allow to compare and validate results from the two models and select the most appropriate one for the study (Borenstein *et al.,* 2010). Also, FEM and REM allow the study to conduct the test of significant differences in intercepts among the SSA countries by adopting fixed effect least square dummy variables (LSDV) (Akinola & Bokana, 2017). FEM and REM are Relatively straightforward to implement as an extension of commonly used regression models (Clark & Linzer, 2015). Lastly, the two models (FEM and REM) Permit the use of dummy variables in accounting for group-level variations (Williams, 2015). Further, the Systemic Generalised Method of Moments (SYSGMM) has been used because it has proven to produce efficient results over time. Also, the SYSGMM has the ability to control for the model's endogeneity problem and to account for the dynamics of the study's model. Finally, the system GMM has been considered the most appropriate method of estimation. This is examined in more detail in chapter five.

The hypothesis to be tested in objective three which investigates the impact of foreign capital inflows and trade openness on output performance in Sub Saharan African countries is as follows;

H_0: Foreign capital inflows and trade openness do not impact output performance in SSA countries.

H_A: Foreign capital inflows and trade openness impact output performance in SSA countries.

In analysing objective three, this study engages the static panel models of random and fixed effects with preferences on random effects as suggested by the Hausman test and dynamic panel models of SYS-GMM to investigate the impact of foreign capital inflows and trade openness on output performance in SSA countries. The reasons for employing FEM, REM and SYSGMM have been provided in objective two above. The study employs both static models (FEM and REM) and dynamic model (SYSGMM) so as to make comparisons as the world is in reality not static in nature. This is examined in more detail in chapter six.

3.7 Summary

The chapter discussed the general research design and methodology employed to gather data for the research study and the nature of the investigation. The chapter described the sources of data, sample selection and techniques employed to estimate the data so as to ensure the validity and reliability of the models. The chapter examined the research design, which is quantitative in nature and involves secondary data. Furthermore, Variables of the study were also discussed and their measurements identified. The chapter also illustrated the research hypotheses to be tested so as to draw conclusions and methods employed to analyse the data. Each of the three objectives listed and analysed above are expanded in the following chapters 4, 5, and 6 which are devoted to discuss all the quantitative analysis-based results.

CHAPTER 4

THE RELATIONSHIP BETWEEN FOREIGN CAPITAL INFLOWS AND TRADE OPENNESS IN SUB SAHARAN AFRICA COUNTRIES

4.1 Introduction

This chapter addresses objective 1, which examines the relationship between foreign capital inflows and trade openness in the Sub-Saharan African countries. In this chapter, the panel smooth transition regression model was employed to estimate the relationship between foreign capital inflows and trade openness.

The rest of this chapter discusses the objective and relevant data for the study. This chapter also develops the hypotheses, discusses the brief empirical literature review on the relationship between foreign capital inflows and trade openness, and explains the methodology adopted. The latter part of the chapter presents and discusses the results and draws conclusions based on the results derived from the panel smooth transition regression (PSTR) model.

4.2.1 Objective of the chapter

This chapter aims to examine the relationship between foreign capital inflows and trade openness in selected Sub-Saharan African countries.

4.2.2 Hypothesis of the Study

H_0: There is no relationship between foreign capital inflows and trade openness in the Sub-Saharan countries of Africa.

H_A: There is a relationship between foreign capital inflows and trade openness in the Sub-Saharan countries of Africa.

4.3 Brief Review of Literature

This section reviews the literature on trade openness and foreign capital inflows. Cantah *et al.*, (2018) adopted the principal component analysis to examine the link between net FDI and trade openness in SSA from 1990 to 2017. The dynamic panel estimation technique was adopted to investigate the relationship between trade policy openness and FDI inflows in SSA countries. The study revealed a positive link between FDI and trade openness. The major weakness of this study is limited variable bias. Nyauncho and Kabiru (2015) found that FDI had a positive impact on trade openness in a sample of 30 African countries using fixed effects regression for the period from 1980 to 2012. The fixed effect model as a method of analysis was not dynamic and could not control for endogeneity in the model.

Furthermore, Liargovas and Skandalis (2012) analysed the role of trade openness on FDI inflows in developing economies involving four African countries, namely Kenya, South Africa, Tunisia and Morocco. Eight (8) different indicators of trade openness were used in the analysis while employing the fixed effect regression model. The results of the study showed that five out of the eight indicators of trade openness had a positive and significant effect on FDI inflows and two were only positive but not significant, while one indicator was negative and insignificant. Again, the fixed effect model as a method of analysis in the model was not dynamic and could not control for endogeneity in the model, which is a major limitation of the study. Using annual panel data for 25 years from 1977 to 2009, Seyoum *et al.*, (2014) also examined the granger causality between FDI and trade openness in 25 SSA economies. The study adopted recent econometric testing techniques for Granger non-causality heterogeneous panels that consider the impacts of cross-section dependence across the units of the panel data set to investigate the FDI–trade nexus in the SSA region. The empirical results showed a bi-directional causality between trade openness and FDI in SSA economies. Kandiero and Chitiga (2006) conducted a study on trade openness and foreign investment in Africa for four different

periods (1980-1985, 1985-1990, 1990-1995 and 1995-2001) using generalised methods of moments (GMM). The research found that the ratio of FDI to GDP responds positively to trade openness. Furthermore, using data from 1986 to 2016 in Nigeria, Nwosa and Adeleke (2017) employed an E-GARCH approach to investigate the determinants of Foreign Direct Investment (FDI) and Foreign Portfolio Investment (FPI) volatility in Nigeria. The result revealed a significant positive relationship between trade openness and FDI, while trade openness and foreign portfolio investment showed an insignificant relationship. In another study titled modelling the long-run determinants of foreign portfolio investment in an emerging market: evidence from Nigeria. Results from Ekeocha *et al.,* (2012) demonstrated a positive long-run nexus between foreign portfolio investments and trade openness in Nigeria. The study used the applied finite distributed lag model for quarterly data from 1981 to 2010. In addition, while applying the error correction model using quarterly data for the period between 1986 and 2006, Ekeocha (2008) modelled the long-run determinants of foreign portfolio investment in an emerging market: evidence from Nigeria. The study found that foreign portfolio investment is negatively related to trade openness in Nigeria.

4.4 Econometric framework

This study uses a PSTR model to estimate the relationship between foreign capital inflow and trade openness. According to Omay *et al.,* (2014), there are several reasons for selecting a PSTR specification, which include:

Firstly, the PSTR allows for a smooth transition between regimes while models such as the Markov regime-switching model and panel transition regression (PRS) permit sudden changes that are only acceptable once all agents simultaneously change their behaviour in the same direction.

Secondly, it permits diverse types of nonlinearities and asymmetric dynamics based on the type of the transition function.

Thirdly, the PSTR model also enables researchers to estimate the nonlinearities that may transpire.

Lastly, the model permits the use of the suitable switching variable and the type of the transition function. Therefore, the following offers a brief review of the nonlinear panel cointegration and causality tests.

4.4.1 Nonlinear panel co-integration

Consider the following panel regression model:

$y_{i,t} = \alpha_i + \beta_i x_{i,t} + \mu_{i,t}$ for $i = 1, \dots N \; and \; t = 1, \dots 1, \dots T;$ (4.1)

Where $y_{i,t} \; and \; x_{i,t}$ represent the observable I (1) variables, $\beta = (\beta_1, \dots, \beta_m)$ are parameters to be estimated; $\mu_{i,t}$ is the error term. $y_{i,t}$ is a scalar, and $x_{i,t} = (x_{1,t}, x_{2,t}, \dots, x_{m,t})$ is an $(m \times 1)$ vector and finally, α_i is the fixed effect (heterogeneous intercept). The assumption is that an $(n \times 1)$ vector $Z'_{i,t} \equiv (y_{i,t}, x'_{i,t})$ is generated as $z_{i,t} = z_{t-1} + \varepsilon_{i,t}$, where $\varepsilon_{i,t}$ are i.i.d. with mean zero, positive definite variance-covariance matrix $\sum$, and $\mathrm{E}\left|\varepsilon_{i,t}\right|^s < \infty$ for some $s > 4$.

If the error term $\mu_{i,t}$ in regression (4.1) is stationary, then the vector $z_{i.t}$ is said to be co-integrated, and $\mu_{i,t}$ is called the equilibrium error (Engle & Granger, 1987). Here, the assumption is that $\mu_{i,t}$ can be modelled using the following nonlinear model:

$$\mu_{i,t} = \gamma_i \mu_{i,t-1} + \varphi_i \mu_{i,t-1} F\left(\mu_{i,t}; \theta_i\right) + \xi_{i,t} \quad (4.2)$$

Where"$\xi_{i,t}$ is a zero-mean error and $F(\mu_{i,t}; \theta_i)$ is a smooth transition function of $\mu_{i,t-1}$. By imposing $F(\mu_{i,t}; \theta_i) = 0$ or $F\left(\mu_{i,t}; \theta_i\right) = -\gamma_i \mu'_i$ where μ'_i is the vector of level parameters, one obtains a conventional linear cointegration equation (Kapetanois et al., 2006a). Following

previous literature (see, Kapetanois *et al.*, 2003, 2006; Ucar & Omay, 2009; Maki, 2010) on nonlinear cointegration, the study assumes that the transition function $F(\mu_{i,t};\theta_i)$ is of the exponential form:

$$F\left(\mu_{i,t-1};\theta_i\right) = 1 - exp\left[-\theta_i \mu_{i,t-1}^2\right] \quad (4.3)$$

It is further assumed that $\mu_{i,t}$ is a mean zero stochastic process and that $\theta_i \geq 0$. The transition function $F(\mu_{i,t-1};\theta_i)$ is bounded between zero and one; and is symmetrically U-shaped around zero. The parameter $\theta_i$determines the speed of the transition between the two extreme values of the transition function $F(\mu_{i,t-1},\theta_i)$. The exponential transition function enables adjustment to the long-run equilibrium based on the size of the disequilibrium.

Substituting (4.3) in (4.2) and re-parameterising the resultant equation, the following regression model was obtained:

$$\Delta\mu_{i,t} = \mu_{i,t-1} + \varphi_i \mu_{i,t-1}\left[1 - exp\left\{-\theta_i \mu_{i,t-1}^2\right\}\right] + \varepsilon_{i,t} \qquad (4.4)$$

If $\theta_i > 0$, then it controls the rate of the reversion of the mean. If $\varphi_i \geq 0$, then the process may show signs of unit process root or explosive behaviour for small values $\mu_{i,t-1}^2$. However, if the variations from the equilibrium are substantially large, for values of $\mu_{i,t-1}^2$, it has constant dynamics and as a result, is geometrically ergodic provided that $\varphi_i + \psi_i < 0$[3].

Imposing $\varphi_i = 0$, implying that $\mu_{i,t}$ follows a unit root process in the middle regime, and further permitting for possible serial correlation of the error term in (4.4), the following regression was obtained:

$$\Delta\mu_{i,t} = \psi_i \mu_{i,t-1}\left[1 - exp\left\{-\theta_i \mu_{i,ti-1}^2\right\}\right] + \sum_{j=1}^{p} p_{ij}\, \Delta\mu_{i,t-j} + \varepsilon_{i,t} \qquad (4.5)$$

Test of cointegration can be based on the specific parameter θ_i, where it is zero under the null hypothesis of no cointegration and positive under the alternative hypothesis. Testing for the

null hypothesis directly is not possible because ψ_i is not known under the null. To address this challenge, one may follow Luukkonenet *et al.*, (1988) by replacing the transition function $F(\mu_{i,t};\theta_i) = 1 - exp\{-\theta_i \mu_{i,t-1}^2\}$ with its first-order Taylor approximation under the null, which gives rise to the following regression model.

$$\Delta\mu_{i,t} = \delta_i \mu_{i,t-1}^3 + \sum_{j=1}^{P_i} \rho_{ij}\, \Delta\mu_{i,t-j} + e_{i,t} \qquad (4.6)$$

where $e_{i,t}$ comprises the original shocks $\varepsilon_{i,j}$ in equation (4.5), as well as the error term resulting from the Taylor estimate. Here, the study allows for various lag order p_i for each variable in the regression equation (4.6). Consequently, the null hypothesis of no cointegration and the alternative can be stated as follows.

H_0: $\delta_i = 0$, for all i, (no cointegration)

H_o: $\delta_i < 0$, for some i, (Non-linear cointegration)

In empirical applications, the number of augmentation terms in the auxiliary regression (4.6) is chosen using any convenient lag selection method. In line with Ucar and Omay (2009), the cointegration test can be constructed by standardising the average of individual cointegration test statistics across the whole panel. The cointegration test for the *i*-th individual is the t-statistics for testing $\delta_i = 0$ (see Kapetanois *et al.*, 2003a; Ucar & Omay, 2009) in equation (4.6) defined by:

$$t_{i,NL} = \frac{\Delta\mu_i' M_t \mu_{i,-1}^3}{\hat{\mathrm{G}}_{i,NL}(\mu_{i,-1}' M_t \mu_{i,-1})^{3/2}} \qquad (4.7)$$

Where $\hat{\mathrm{G}}_{i,NL}^2$ is the consistent estimator such that $\hat{\mathrm{G}}_{i,NL}^2 = \frac{\Delta\mu_i' M_t \mu_i}{T-1}$, $M_t = I_T - \tau_T(\tau_T'\tau_T)^{-1}\tau_T'$with $\Delta\mu_i = \left(\Delta\mu_{i-1,}\Delta\mu_{i-2}, \ldots \Delta\mu_{i-T}\right)'and\tau_T = (1,1, \ldots 1)$. Furthermore, when the invariance property and the existence of moments are satisfied, the usual normalisation of $\bar{t}_{NL}$ statistic is obtained as follows:

$$\overline{K}_{NL} = \frac{\sqrt{N}(\bar{t}_{NL} - E(t_{i,NL}))}{\sqrt{var(t_{i,NL})}} \qquad (4.8)$$

Where $\overline{t}_{NL} = N^{-1}\sum_{i=1}^{N} t_{NL}$, and $E(t_{i,NL})$ and var $(t_{i,NL})$ are the expected value and variance of the $t_{i,NL}$ statistic given in equation (4.7).

One of the commonly encountered problems in panel regression is the existence of cross-section dependence. This may arise due to spatial correlations, omitted global variables, spill-over effects, economic distance and common unobserved shocks (for instance, Omay & Kan, 2010). The presence of correlated errors through individuals makes the classical unit root and cointegration testing procedure invalid in panel data models. Banerjee *et al.,* (2004) assessed the finite sample performance of the available tests and discovered that all tests experience severe size distortions when panel members are cointegrated. Some tests based on the regression equation, including the unobserved and/or observed factors as the additional regressors are proposed to overcome this issue. The study can note the work of Moon *et al.,* (2004), Bai and Ng (2004), Pesaran (2007), Bai *et al.,* (2009), Omay and Kan (2010), and Kapetanios *et al.,* (2003b, 2006b). Similarly, scholars such as Chang (2004) and Ucar and Omay (2009) consider the bootstrap-based tests to achieve good size properties. Therefore, the presence of cross-sectional dependence must be checked before the implementation of the testing procedure. Pesaran (2004) employs the following testing procedure:

$$\text{CD} = \sqrt{\frac{2T}{N(N-1)}}\left[\sum_{i=1}^{N-1}\sum_{j=i+1}^{N}\hat{\rho}_{ij}\right] \qquad (4.9)$$

Where $\hat{\rho}_{ij}$ is the estimated correlation coefficient between error terms for the individuals *i* and *j*. The sieve bootstrap method is employed to deal with the cross-sectional dependence problem in line with Ucar and Omay (2009). Once cointegration and long-run relationships are established, the study proceed to estimate the panel error correction model. The research follows Omay *et al.,* (2014) and the PSTRVEC model to examine regime-wise interactions

between foreign capital inflow and trade openness in Sub-Saharan Africa. This is justified by the fact that not only the adjustment to the long-run equilibrium level but also the dynamic interrelationship between the variables might be nonlinear.

4.4.2. Specification of the PSTRVEC model

In line with earlier studies such as those of Gonzalez *et al.*, (2005) and Omay and Kan (2010), as modified by Omay *et al.*, (2014), the current study specifies the following PSTRVEC models to examine the regime-wise interactions between foreign capital inflows and trade openness in SSA as follows:

$$\Delta to_{i,t} = \mu_1 + \beta_1 ec_{i,t-1} + \sum_{j=1}^{p_i} \theta_{1j}\, \Delta to_{i,t-j} + \sum_{j=i}^{q_1} \vartheta_{ij}\, \Delta fci_{i,t-j} + G(S_{it};\gamma,c)\left[\tilde{\beta}_1 ec_{it-1} + \sum_{j=1}^{p_i} \tilde{\theta}_{1j} \Delta to_{it-j} + \sum_{j=1}^{q_i} \tilde{\vartheta}_{1j} \Delta fci_{it-j}\right] + \varepsilon_{1it} \quad (4.10)$$

$$\Delta fci_{it} = \mu_2 + \beta_2 ec_{it-1} + \sum_{j=1}^{r_i} \theta_{2j}\, \Delta to_{it-j} + \sum_{j=i}^{s_1} \vartheta_{2j}\, \Delta fci_{it-j} + G(S_{it};\gamma,c)\left[\tilde{\beta}_2 ec_{it-1} + \sum_{j=1}^{r_i} \tilde{\theta}_{2j} \Delta to_{it-j} + \sum_{j=1}^{s_i} \tilde{\vartheta}_{2j} \Delta fci_{it-j}\right] + \varepsilon_{2it}$$

The variables in the models are explained below:

i denotes 1, …, N, and *t* = 1, …, T, where *N* and *T* represent the cross-section and time dimensions of the respective panels; to_{it} represents trade openness and fci_{it} is foreign capital inflows. Both to_{it} and fci_{it} are stated as a percentage of GDP. In addition, μ_i is the fixed individual effect, ec_{it} symbolises the estimate of the error correction term from the regression (1) (i.e., $ec_{it} = \hat{v}_{it}$ from equation (1), and ε_{it} denotes the random error term implicit as the

martingale difference of the history of the vector $Z'_{it} \equiv (FCI_{it}, TO_{it})'$ up to time $t-1$, that is, E $\left[\varepsilon_{it} \mathrm{I} z_{it-1}, z_{it-2,} \ldots, z_{it-p,\ldots}\right] = 0$, and that the conditional variance of the error term is constant, that is E $\left[\varepsilon_t^2 \mathrm{I} z_{it-1}, z_{it-2,} \ldots, z_{it-p,\ldots}\right] = \sigma_i^2$.

The study then allows for contemporaneous association across the errors of the *N* equations $\left(i.e., cov\left(\zeta_{lit}, \zeta_{ljt}\right) \neq 0 \; for \; l = 1,2 \; and i \neq j\right)$.

Following the studies of Gonzalez *et al.*, (2005) and Omay and Kan (2010), this study considers the following logistic transition function for the time series STAR models.

$$G\left(s_{i,t}; \gamma, c\right) = \left[1 + exp\left(-\gamma \prod_{j=1}^{m} (s_{it} - c_j)\right)\right]^{-1} \; with \; \gamma > 0 \; and \; c_m \geq \cdots \geq c_1 \geq c_0; \qquad (4.11)$$

Where $c = (c_1, \ldots, c_m)'$ is an m-dimensional vector of location parameters, and the slope parameter γdenotes the smoothness of the transition between the regimes. A value of 1 or 2 for m, often meets the common types of variation. In cases where $m = 1$, for instance, taking first-order logistic transition function, the extreme regimes correspond to low and high values of s_{it} and its coefficients in the regression model (4.10) change smoothly from $\beta_j, \theta_j \; and \; \vartheta_j to \beta_j + \tilde{\beta}_j, \theta_j + \tilde{\theta}_j \; and \; \vartheta_j + \tilde{\vartheta}_j$, respectively, as s_{it} increases. When $\gamma \to \infty$, the first-order logistic transition function $G(s_{i,t}; \gamma, c)$ becomes an indicator function I$[A]$, which takes a value of 1 when event A occurs and 0 otherwise. Therefore, the PSTR model is reduced to Hansen's (1999) two-regime threshold model.

When $m = 2, G\left(s_{i,t}; \gamma, c\right)$ takes a value of 1 for both low and high s_{it}, minimising at $\left(\frac{c_1 + c_2}{2}\right)$. In that case, if $\gamma \to \infty$, the PSTR model is reduced into a panel three-regime threshold regression model. If $\gamma \to 0$, the transition function $G(s_{i,t}; \gamma, c)$ will reduce into constant, and therefore, the PSTR model will collapse to a linear panel regression for any value of m.

This study follows the empirical specification procedures for PSTR employed by Gonzalez *et al.*, (2005), Omay and Kan (2010) and Omay *et al.*, (2014), which involve the following steps:

1. State the suitable linear panel model for the data being investigated.
2. Test the null hypothesis of linearity against the alternative of smooth transition type nonlinearity. If linearity is rejected, select the appropriate transition variable $s_{i,t}$and the form of the transition function.
3. Estimate the parameters in the chosen PSTRVEC model.

The test for linearity in the model is complex because of the existence of unknown nuisance parameters inherent in the null hypothesis (Hansen 1999a; Omay *et al.*, 2014). The linearity's null hypothesis can be stated variously. Apart from the equality of the parameters in the two regimes that can be expressed as $H_0: \beta_j = \tilde{\beta}_j$ and $\theta_j = \tilde{\theta}_j$, a specification like $H_0': \gamma = 0$ also generates a linear model (Omay *et al.*, 2014). This problem can be resolved by replacing the transition function $(s_{it}; \gamma, c)$ with a suitable Taylor approximation following Luukkonenet et al. (1988). For instance, a k^{th}order Taylor approximation for the first-order logistic function around $\gamma = 0$ results in the following auxiliary regression:

$$\Delta z_{i,t} = \succ_i + \pi_0' ec_{i,t-1} + \sum_{j=1}^{p_i} \psi_{0j} \Delta z_{i,t-j} + \sum_{h=1}^{k} \tilde{\pi}_h' s_{i,t}^h ec_{it} + \sum_{h=1}^{k} \sum_{j=1}^{p_i} \tilde{\phi}_{hj} s_{i,t}^h \Delta z_{i,t-j} + e_{it} \qquad (4.12)$$

Where $z_{it}' \equiv (FCI_{it}, TO_{it})' and \succ, \pi', \psi, \tilde{\pi} \; and \; \tilde{\psi}$ are functions of the parameters $\mu_i, \beta, \theta_j, \vartheta_j, \tilde{\beta}, \tilde{\theta}_j, \tilde{\vartheta}_j, \gamma,$ and $c_i, and \; e_{i,t}$ include the original disturbance terms ξ_{it} as well as the error term arising from the Taylor approximation. Now, testing $H_0: \gamma = 0$ in (4.10) is equal to testing the null hypothesis. $H_o: \varpi_1 = \varpi_2 = \varpi_3 = 0$ where$\varpi_i \equiv (\tilde{\pi}_i, \tilde{\psi}_i)$ in (12). This test can

be done by an LM-type test. This test follows an approximate F-distribution and is defined as follows:

$$LM = \frac{(SSR_0 - SSR_1)/kp}{SSR_0/(TN - N - k(p+1))} \sim F\big(kp, TN - N - k(p+1)\big) \qquad (4.13)$$

Where $SSR_0\ and\ SSR_1$ are the sums of squared residuals based on the null and alternative hypotheses, respectively. The LM statistics can be estimated for several candidates to choose an appropriate threshold variable S_{it} and the one for which the p-value of the statistic is the smallest can be selected.

The next step in the specification of a PSTR model is to choose between $m = 1$ and $m = 2$. A decision rule based on a sequence of tests in equation (4.12) can be used according to Terasvirta (1994). For instance, using the auxiliary regression (4.12) with $k = 3$, test the null hypothesis $H_0^*: \varpi_1 = \varpi_2 = \varpi_3 = 0$. If it is rejected, test $H_{03}^*: \varpi_3 = 0$, then $H_{02}^*: \varpi_2 = 0 | \varpi_3 = 0$ and$H_{01}^*: \varpi_1 = 0 | \varpi_2 = \varpi_3 = 0$. F-tests are used to test these hypotheses, represented by F3, F2 and f1, respectively. The following is the decision rule: if F2 has the smallest p-value, then the exponential transition function would be chosen, while on the other hand, a first-order preference should be given to the first-order logistic function.

4.4.3. Estimation of PSTRVEC models and regime-wise Granger-causality tests

After selecting the transition variable and form of the transition function, the study estimates the PSTRVEC model by employing a convenient nonlinear least squares estimator. The study then disburdens the optimisation algorithm by using good starting values. Concerning the fixed values of the estimates in the transition function, $\gamma\ and\ c$, the PSTRVEC model is linear in parameters $\mu_i, \beta, \theta_{j,}, \vartheta_j, \tilde{\beta}, \tilde{\theta}_j, \tilde{\vartheta}_j$ which can be determined by using least squares. From this point, an appropriate means to determine the realistic starting values for the nonlinear least

squares is by conducting a two-dimensional grid search over $\gamma \; and \; c$, and choosing those values that minimise the panel sum of squared residuals.

The approximation of panel regression models is associated with the cross-section dependency problem. Emphasis must be made that in model (4.10), the study allowed for contemporaneous correlation across the errors of the equation in the system, that is $\left(cov(\zeta_{lit}, \zeta_{ljt}) \neq 0 for l = 1, 2 \; and \; i \neq j\right)$. In this study, the cross-section dependency problem might be a serious concern because of the strong link among the selected countries. The study followed Omay *et al.*, (2014) to solve the problem of cross-section dependency by estimating the foreign capital inflows and trade openness equations for all the countries contemporaneously using a nonlinear generalised least square (GLS) estimator iteratively. This process generates maximum likelihood (ML) estimates (see Greene, 1997:681-682).

Given equation (4.10), after estimating the coefficients of the PSTRVEC model, the next step is to conduct Granger causality tests to examine causal relationships between the two variables. Therefore, the estimated model allows for regime-dependent dynamics between these variables.

There was the need to conduct Granger causality test after estimating the parameters of PSTRVEC in equation 4.10. This was done to examine the bidirectional causal association between foreign capital inflow and trade openness. The Granger causality test is performed separately for each regime (see Li, 2006; Omay *et al.*, 2014). In addition, the regimes in the PSTRVEC model are connected with extreme values of the transition function, $F(s_{it}, \gamma, c)$. For instance, if a suitable transition variable s_{it} in the transition function is foreign capital inflow and the transition function is a first-order logistic function, then the regimes will be related to low growth and high growth episodes. As a result, one needs to proceed to conduct separate causality tests for the periods of low and high growth with the assumption that the

transition variable is foreign capital inflow and that the function is a first-order logistic function. In the framework given in equation (4.10), the null hypothesis of no Granger causality can be framed for both low and high growth periods as follows:

Table 4.1: Tests of Granger causality

Foreign capital inflow does not Granger cause trade openness in low growth periods (i.e. when foreign capital inflow rate is less than some threshold value) in the short run	$H_o: \delta_1 = 0$
Foreign capital inflow does not Granger cause trade openness in low growth periods (i.e. when foreign capital inflow rate is less than some threshold value) in the long run	$H_0: \alpha_1 = 0$ and/or $H_0: \alpha_1 = \delta_1 = 0$
Foreign capital inflow does not Granger cause trade openness in high growth periods (i.e. when foreign capital inflow rate is greater than some threshold value) in the short run	$H_0: \delta_1 = \hat{\delta}_1 = 0$
Foreign capital inflow does not Granger cause trade openness rate in high growth periods (i.e. when foreign capital inflow rate is greater than some threshold value) in the long run	$H_0: \alpha_1 = \hat{\alpha}_1 = 0$ and/or $H_0: \alpha_1 = \hat{\alpha}_1 = \delta_1 = \hat{\delta}_1 = 0$
Trade openness does not Granger cause foreign capital inflow in low growth periods (i.e. when foreign capital inflow rate is less than some threshold value) in the short run	$H_0: \varphi_2 = 0$
Trade openness does not Granger cause foreign capital inflow in low growth periods (i.e. when foreign capital inflow rate is less than some threshold value) in the long run	$H_0: \alpha_2 = 0$ and/or $H_0: \alpha_2 = \varphi_1 = 0$
Trade openness does not Granger cause foreign capital inflow in high growth periods (i.e. when foreign capital inflow rate is greater than some threshold value) in the short run	$H_0: \varphi_2 = \hat{\varphi}_2 = 0$
Trade openness does not Granger cause foreign capital inflow in high growth periods (i.e. when foreign capital inflow rate is greater than some threshold value) in the long run	$H_o: \alpha_2 = \hat{\alpha}_2 = 0$ and/or $H_0: \alpha_2 = \hat{\alpha}_2 = \varphi_2 = \hat{\varphi}_2 = 0$

Source: Author's adaptation from Omay *et al.,* (2014)

4.5 Data

The study used panel data covering the period from 1985 to 2018. All data were sourced from the World Development Indicators of the World Bank, United Nations Conference on Trade and Development (UNCTAD) and International Monetary Fund (IMF) databases. Data are quoted in US dollars and expressed in real terms. Both variables (foreign capital inflow and trade openness) are converted as a percentage of gross domestic product (GDP) so that they can be interpreted in growth terms after taking the first difference. Foreign capital inflow was proxied by total foreign capital inflows (FCI) as a ratio of GDP, while trade openness was proxied by total exports and imports as a ratio of GDP (TO).

4.6 Empirical results

For comparison purposes, the test for the presence of unit root was carried out based on both the linear IPS test of Im *et al.,* (2003) and the nonlinear UO test of Ucar and Omay (2009). The results are provided below.

Table 4.2: The unit root test

Variables	IPS test				UO test			
	Intercept		Intercept & trend		Intercept		Intercept & trend	
	W-stat	t-stat	W-stat	t-stat	W-stat	t-stat	W-stat	t-stat
FCI	-8.772	-2.932	-7.770	-3.327	-1.801***	-0.005***	-2.002***	-0.011***
TO	-4.049	-2.145	-2.860	-2.532	-2.203	-0.606	-1.977***	-2.457***

Note: The (***, **, *) denotes rejection of the null hypothesis that states the presence of unit root at 1%, 5%, and 10% levels of significance using bootstrap p-values. Maximum of 7 lags used

Source: Author's Computation, 2022

The results of the linear tests (intercept, intercept and trend) and the nonlinear intercept test for the TO model show the presence of unit root as the null hypothesis is retained at the 1%, 5%, and 10% significance levels, but the nonlinear tests reject the null hypothesis at 1% level on

the TO intercept and trend model. The linear fixed effect relationships between the variables are established below:

$$FCI_{i,t} = \underset{(9.2594)}{0.0637TO_{i,t}}$$

$$TO_{i,t} = \underset{(9.2594)}{1.2183FCI_{i,t}}$$

In both regression models, the FCI and TO are positive and significant; the residuals are extracted to perform the linear and nonlinear cointegration tests. The Pesaran (2004) cross-sectional dependence test was performed, and with a test statistic of 18.5195 and a p-value of less than 0.0001, the presence of cross-sectional dependence could be seen. The results of the cointegration tests are provided below.

Table 4.3: Linear and nonlinear cointegration tests

Model	Linear test		Nonlinear test	
	W-stat	t-stat	W-stat	t-stat
$\mu_{i,t} = FCI_{i,t} - 0.0637TO_{i,t}$	-0.266	-0.912	0.977**	-0.721**
$\mu_{i,t} = TO_{i,t} - 1.2183FCI_{i,t}$	0.244	0.616	0.987**	2.056**

** denotes significance at the 5% level using bootstrapped p-values. Maximum of 4 lags with 800 bootstraps were used.

Source: Author's Computation, 2022

The linear tests do not reject the null of no cointegration under the two models, but the nonlinear cointegration stresses that cointegration exists in both models. These outcomes confirm the superiority of nonlinear tests over their counterparts, because based on linear tests, the study would conclude that the variables are not cointegrated. Omay *et al.*, (2014) caution against the low power and size properties of linear tests. However, foreign capital inflow and trade openness are nonlinearly cointegrated in the study. The next thing is to estimate a nonlinear

panel model. The first step is estimating a linear panel vector error-correction model (PVEC) and conducting a linearity test. The PVEC model provides the following results:

$$\Delta \mathrm{FCI}_{i,t} = \mu_1 - \underset{(-8.8478)}{0.3311 ect_{i,t-1}} - \underset{(-7.2230)}{0.2560 \Delta \mathrm{FCI}_{i,t-1}} - \underset{(-2.5932)}{0.0719 \Delta \mathrm{TO}_{i,t-1}}$$

$$\Delta \mathrm{TO}_{i,t} = \mu_2 - \underset{(-0.2756)}{0.0118 ect_{i,t-1}} - \underset{(-4.2866)}{0.1354 \Delta \mathrm{TO}_{i,t-1}} - \underset{(-0.2756)}{0.010 \Delta \mathrm{FCI}_{i,t-1}}$$

The error correction terms are negative and statistically significant (at 1% level with p-value of 0.000) in both models. Looking at the FCI equation, an increase in TO has a significant (at 5% level with p-value of 0.0277) but negative impact on FCI in the short run. In the TO equation, an increase in FCI has a significant (at 5% with p-value of 0.0403) but negative impact on TO in the short run. The study proceeds to test the linear PVEC model for linearity. This is done separately for both equations with the TO, FCI and error correction terms used as transition variables. If the TO is selected as the transition variable, this means that nonlinearities between FCI and TO are explained by the rate of change of TO. If the FCI is selected as the transition variable, this implies that the nonlinearities are explained by the rate of change of FCI. If the error correction term is selected, then the deviations from equilibrium are responsible for the nonlinearities. The selection of the transition variable is based on the one that strongly rejects linearity. The test results are provided below.

Table 4.4: Linearity tests

	Transition variables		
Model	$\Delta \mathrm{TO}_{i,t-2}$	$\Delta \mathrm{FCI}_{i,t-2}$	$\mathrm{ect}_{i,t-2}$
	F-test	F-test	F-test
FCI	0.328***	2.313	3.678**
TO	1.911***	1.745*	2.677***

Test of linearity against a PSTR specification, ***, **, * denote significance at 1%, 5%, and 10% levels, respectively.

Source: Author's Computation, 2022

The null of linearity was rejected for the FCI model, at the 1% level of significance, when TO was used as a transition variable, and linearity was also rejected for the FCI model at the 5% level of significance when the error correction term was used as a transition variable. The null was not rejected for the FCI model when the FCI was used as a transition variable. The null of linearity for the TO model was rejected by all three variables at different levels of significance, with FCI, TO, and ECT rejecting linearity at the 10%, 1%, and 5% levels of significance, respectively.

It is observable that the strongest rejection of linearity was obtained when TO was used as the transition variable; the TO is therefore selected as the appropriate transition variable. The different F-tests are provided below with the aim that m = 2 is selected if F_2 records the strongest rejection of the null and selects m = 1 for other alternatives.

Table 4.5: Choice of transition

	F_1	F_2	F_3
	F-test	F-test	F-test
FCI	0.328***	0.982*	1.361*
TO	1.911***	1.022**	1.364*

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

Source: Author's Computation, 2022

All three tests reject the null hypothesis, with F_1 rejecting with 1% level and F_3 rejecting with 10% level. F_2 rejects the null hypothesis at 10% level on the FCI model and rejects it at a 5% level on the TO model. Then F_2 is therefore selected and this implies that the logistic transition function is the appropriate function and having m = 1, which implies one threshold and two regimes.

The PSTRVEC model is estimated next by using the nonlinear GLS iteratively to solve for possible cross-section dependence, providing the maximum likelihood estimates. To speed up the estimation method, good starting values for the slope of the transition function (γ) and the threshold (c) are obtained using a grid search procedure. The results are presented below.

$$\Delta \mathrm{FCI}_{i,t} = \mu_1 - \underset{(-9.304)}{0.516} ect_{i,t-1} - \underset{(-2.481)}{0.564} \Delta \mathrm{FCI}_{i,t-1} + \underset{(12.264)}{0.345} \Delta \mathrm{TO}_{i,t-1}$$

$$+ \left[\underset{(0.000)}{0.319} ect_{i,t-1} + \underset{(1.704)}{0.486} \Delta FCI_{i,t-1} - \underset{(0.000)}{0.384} \Delta TO_{i,t-1}\right] . G(s_{i,t-1}; \gamma, c),$$

$$\Delta \mathrm{TO}_{i,t} = \mu_2 + \underset{(0.066)}{0.020} ect_{i,t-1} - \underset{(-0.873)}{0.944} \Delta \mathrm{FCI}_{i,t-1} + \underset{(5.800)}{0.899} \Delta \mathrm{TO}_{i,t-1}$$

$$+ \left[\underset{(-0.160)}{-0.041} ect_{i,t-1} + \underset{(1.499)}{1.779} \Delta FCI_{i,t-1} - \underset{(0.000)}{1.232} \Delta TO_{i,t-1}\right] . G(s_{i,t-1}; \gamma, c)$$

Where

$$G(\Delta \mathrm{FCI}_{i,t}; \gamma, c) = \left(1 + exp\left(\underset{(2.484)}{-1.4454} \left(\Delta \mathrm{TO}_{i,t-1} - \underset{(0.007)}{0.0376}\right)\right)\right)^{-1}$$

The speed of transition γ is low and significant, suggesting a smooth transition between extreme regimes. The estimated value of $c = 0.0376$ is close to zero, indicating that the extreme regimes in the PSTRVEC model correspond to negative and positive values of trade openness or the low growth and high growth regimes. Regime I happens whenever the rates of trade flow are lower than the threshold, while regime II corresponds to higher growth rates. Considering our estimates from the PSTRVEC and taking cognisance of the foreign capital inflow equation first, in the low growth regime (i.e., when trade openness is decreasing and this is denoted as $G(\Delta \mathrm{TO}_{i,t}; \gamma, c) \approx 0$), the estimated coefficient of the error correction term is equal to -0.517 and is statistically significant under regime I. This implies that foreign capital inflow reverts to long-run equilibrium after a deviation. The estimated coefficient of the lagged is equal to 0.345 and is statistically significant at the 1% significance level. This implies that the foreign capital inflow rate increases with trade openness in the low growth regime. For

regime II, when trade is positive and this is denoted as $G(\Delta \mathrm{TO}_{i,t}; \gamma, c) \approx 1$), the estimated coefficient of the error correction term becomes -0.197 and statistically significant. The estimated coefficient of the lagged trade openness turns to -0.039 (0.345-0.384), indicating that the effect of trade openness on foreign capital inflow declines slightly in regime II.

The focus is now on the trade openness equation. The estimated coefficient of the error correction (EC) term is equal to -0.022 (=0.020-0.042) and is statistically insignificant. This indicates that trade does not respond to deviation from long-run equilibrium in regime I. The estimate on foreign capital inflow is negative and insignificant. Therefore, a decrease in foreign capital inflow does not increase trade under regime I. The speed of adjustment remains (-0.021) and insignificant under regime II. Again, there is no adjustment to deviation from long-run equilibrium. Even though positive (-0.944+1.779= 0.835), the foreign capital inflow estimate remains insignificant. A rise in foreign capital inflow does not increase trade under regime II.

Next is the analysis of the regime-wise Granger causality tests. According to Omay *et al.*, (2014), the test is conducted by analysing the lagged explanatory variables for the short run and the speed of adjustment for the long-run causality. The joint significance test of the EC term and lagged explanatory variables is performed for the stronger form of Granger causality. The various tests are conducted for regime I, $G(\Delta \mathrm{TO}_{i,t}; \gamma, c) \approx 0$), and for regime II, $G(\Delta \mathrm{TO}_{i,t}; \gamma, c) \approx 1$, separately. The results of the test are summarised in Table 4.6 below.

Table 4.6: Regime-wise causality test

Source of causation	Dependent variables			
	ΔFCI		ΔTO	
	Low growth regime	High growth regime	Low growth regime	High growth regime
Short-run				
ΔTO	0.76	150.40***		

ΔFCI			150.40***	1.80
Long-run				
ECT	86.57***	86.57***	0.004	0.02
Joint test (short- and long-run)				
ECT /ΔTO	46.81***	147.60***		
ECT /ΔFCI			105.88***	0.91
*** denotes the significance at 1%level				

Source: Author's Computation, 2022

The results of the short-run granger causality test indicate that trade openness granger causes foreign capital inflow in the high growth regime but does not granger cause in the low growth regime. The test is significant at 1%. However, there is strong statistical evidence of foreign capital inflow granger causing trade in the low growth regime. The null hypothesis of foreign capital inflow not granger causing trade is rejected only at 1%. Considering the long-run results, it must be noted that the trade openness index granger causes foreign capital inflow in both regimes. The null hypothesis is strongly rejected in both cases. Meanwhile, foreign capital inflow does not granger cause trade flow in the long run, both in low and high-growth regimes. The joint test, which is a combination of short- and long-run tests, indicates strong evidence of trade openness significantly granger causing foreign capital inflow in both regimes. It can then be deduced that the primary effect of trade openness on foreign capital inflow is from the short-run effects. The joint test also shows that foreign capital inflow granger causes trade only under regime I. The evidence is statistically strong.

4.7 Summary

This study examines the relationship between trade openness and foreign capital inflows in Sub-Saharan African countries, which, according to (Chuhan-Pole *et al.,* 2018), seems to attract a small share of global trade and capital flows. The nexus between the two flows is very significant for academia as well as policymakers. The study employed a panel smooth

transition regression (PSTR) model to estimate the relationship between foreign capital inflow and trade openness for a panel of 31 countries.

One of the novelties of this work is that the study proposed using a nonlinear smooth transition regression framework, which is a panel co-integration test and further estimated a nonlinear panel vector error correction model. The findings revealed a strong cointegration of variables, which implies that the adjustment of capital and trade flows to the long-run equilibrium level was essentially nonlinear. The study further used a nonlinear smooth transition panel vector error correction model to estimate possible regime-dependent dynamics between trade and capital flows. The nonlinear estimated model suggested that the dynamic interrelationship between the two variables depended on the phases of the economy. To assess whether the causal link between foreign capital and trade openness varies across phases of the business cycle, the study further conducted regime-dependent Granger causality tests.

The summary of the findings of the Granger causality tests showed that, in the short run, trade openness increased foreign capital inflows only in the high-growth regime, while foreign capital inflows increased trade in the low-growth regime only. Meanwhile, in the long run, trade openness increased foreign capital inflows in both high-growth and low-growth regimes, while foreign capital inflow did not increase trade in both regimes. Also, considering a joint test (combination of short-run and long-run tests), the study found that trade openness caused foreign capital inflows in both regimes, whereas foreign capital inflows granger caused trade only in the low and not high growth regime.

The findings of this study have several implications for both academia and policymakers. Academia, especially international economists, must take account of possible nonlinearities in investigating dynamic interactions between variables and their causal relationship. The test

results showed the presence of short-run and long-run non-linear dynamic relationships of the variables. Such nonlinear dynamics and regime dependence are crucial for policy design.

Generally, the study concludes that foreign capital inflows and trade openness are crucial for the short- and long-term economic growth and development of SSA economies. Therefore, the study recommends that governments in the SSA region should study various regimes available in the economy before enacting policies on both trade openness and capital inflow. From the study, it is evident that certain factors affect these macroeconomic variables differently at different regimes both in the short run and long run. For instance, since the results indicated that trade openness tends to increase foreign capital inflows in the high growth regime, a policy favouring foreign investment is required as an incentive for investors during that regime period. Again, the result showed that foreign capital inflows increased trade in the low growth regime. This result supports the findings of Saibu (2014), who observed that capital inflow, when interacted with trade openness, had a significant impact on growth. This result is also consistent with the argument of Adusah-Poku (2016) and Chorn and Siek (2017) who advocated for other sources of capital outside the domestic economy and that there is the need to liberalise the financial systems with a view to attracting an inflow of capital to the SSA countries. In this regime, the government should open its border for export and grants from donors should be pursued. Such a regime would be of immense benefit to encourage trade with the expectation of economic growth. Meanwhile, in the long run, trade openness increased foreign capital inflows in both high-growth and low-growth regimes. A long-term policy favourable to trade openness is expected since foreign capital inflows would increase in both regimes. The findings support the recent decision by African countries to sign the Intra-Africa Continental Free Trade Agreement to boost trade, which ultimately will raise foreign capital inflows in Africa. Policymakers must consider such nonlinearities and be sure that policy actions affecting capital inflow and trade are not enacted without reference to both regimes.

CHAPTER 5

THE SOCIOECONOMIC DETERMINANTS OF FOREIGN CAPITAL INFLOWS IN SUB SAHARAN AFRICA COUNTRIES

5.1 Introduction

The need for foreign capital flows in developing countries to enhance domestic savings, boost investment and stimulate economic growth cannot be overemphasised as it bridges the gap between domestic capital demand and supply (Forget, 2018). Over the years, developing countries have been confronted with alarming unemployment levels, poverty, sluggish output growth and challenges of diversifying their economies in achieving industrialisation (Bhagwati & Panagariya, 2013). Government policies are often inconsistent and tailored toward accomplishing a political agenda rather than stimulating investment and economic development (Akinmulegun, 2012). As a result, it leads to financial or capital flight and inefficiency in the economy. In view of these challenges, scholars such as Adusah-Poku (2016) and Chorn and Siek (2017) have tried to look for other sources of capital outside the domestic economy and the need to liberalise the financial systems with a view to attracting an inflow of capital to the SSA countries.

While there are various types of capital flows such as equity and debt flows, foreign aid, remittances, foreign direct investment and foreign portfolio investment, among others, the extent to which they (the various capital flows) have been attracted to the developing countries and the factors responsible for their attractiveness remain unclear. This is because the level of foreign capital inflows especially in the SSA countries is still low (Calderon *et al.,* 2019). So, if they have been attracted, what are their socioeconomic determinants in SSA countries? Against this background, this study seeks to explore the foreign capital inflows and determine the factors responsible for the flow to SSA countries.

With all the efforts exerted to achieve capital flows and sustainable economic development such as removing barriers that hinder the flow of investment finance in the region, engaging with policymakers in every country to improve the legal and regulatory environment and create a more predictable business climate, it is surprising that SSA countries' growth has been declining (Frankema & Austin 2016). The World Bank regional grouping confirms that the SSA countries have the second lowest GDP per capita of about $1422.28 per annum of all the countries in the world after South Asia ($1409.79 per annum). According to World Bank, WDI (2013), "when compared to other developing countries such as East Asia and Pacific (EAP) region that hither to had a lower GDP per capita than SSA (notably in the 1980s and early 1990s), the GDP per capita in EAP increased by over ten times from $417.44 in 1990 to $4693.38 in 2011, whereas in the SSA region, GDP per capita increased by less than three times over the same period (from $592.48 in 1990 to $1422.28 in 2011)". This development has been blamed on differentiated growth dynamics, changes in global demand patterns and the unclear nature of the factors responsible for attracting foreign capital inflows in the SSA countries (Chorn & Siek, 2017).

The focus of this study is therefore on the socioeconomic determinants of foreign capital inflows in the SSA countries in stimulating economic development, as there are few existing studies in this regard, thus making this study relevant. Such studies include (Zlatković, 2016; Erdogan & Unver, 2015; Asiedu *et al.*, 2015; Hecock & Jepsen, 2013; Rodriguez & Pallas, 2008; Kahai, 2004; Dunning, 1988). The idea for this focus area is rooted in the neoclassical growth theory, evolutionary economics and institutional economics that maintain that capital flows are essential for economic development (Prasad *et al.*, 2006), and its socioeconomic determinants are essential in determining its attractiveness. Therefore, the study investigates the socioeconomic determinants of foreign capital inflows in the SSA countries.

5.2 Objective of the chapter

This chapter aims to investigate the socioeconomic determinants of foreign capital inflows in SSA countries.

5.3 Hypothesis of the Study

H_0: Socioeconomic factors do not determine foreign capital inflows in SSA countries.

H_A: Socioeconomic factors do determine foreign capital inflows in SSA countries.

5.4 .1 Brief Review of Empirical Literature

Erdogan and Unver (2015) investigated the factors influencing FDI inflows for 88 countries from 1985-2011 using fixed effects (FE) and system generalised method of moments (GMM) methods. The results showed that health had a negative and significant effect on FDI inflows. Usually, higher life expectancy is associated with lower morbidity and overall better health status which expects to attract FDI inflows. The study did not assess the combination of health and wellbeing and education to observe if the adverse effect of health on FDI inflows can be mitigated by quality education. Meanwhile, in a panel data analysis, Alsan *et al.,* (2006) found a positive and significant association between population health and FDI inflows in developing countries using the OLS estimator. The OLS regression is a very basic method of estimation and can lead to widely varying conclusions depending on the initial set up of the regression. This is because the regression results are sensitive to functional form if the error term is not adequately interpreted. Similarly, Alsan *et al.,* (2004) analysed the effect of population health on FDI inflows in 74 countries from 1980 to 2000. The study used OLS regression and found that population health positively and significantly influenced the attraction of FDI inflows. Again, the OLS regression method could not control for endogeneity in the model, which is a major limitation of the study. Moreover, using the multiple regression analysis, Azemar and Desborder (2009) employed the fixed effects model on the sample of 70 developing countries

and found that FDI was positively influenced by the health of the population measured by the absence of Malaria and HIV from 1985 to 2005. In the article paper written by Zlatković (2016), it was shown that improvements in health, primary education, higher education and training improved capital inflows in four (4) Western Balkan countries using the benchmark method. Ghosh and Renna (2015) examined the effect of population health on FDI inflows in 114 countries using OLS and the two-stage least square estimators. The study found that years of life lost due to communicable diseases and age-standardised mortality rate for communicable diseases had a detrimental effect on FDI inflows. Furthermore, half of all business leaders in low-income countries believed that HIV/AIDS affected their countries' access to FDI. This was revealed during a global business survey on HIV/AIDS sponsored by the World Economic Forum (Bloom *et al.,* 2003).

On the impact of education level on foreign investment inflows to 46 developing countries, Talukdar and Parvez (2017) found education level to have no significant impact on the attraction of foreign capital inflows. The study reached that conclusion after employing the fixed effect model (FE) from 1996 to 2011. Furthermore, using the fixed effect approach, FDI was found to be negatively influenced by low human capital in terms of education level in 70 developing countries using annual panel data from 1985 to 2005 (Azemar & Desbordes, 2009). By utilising extreme bounds analysis, Suter and Walter (2008) showed that average years of schooling in the population of age above 25-years was positive and significant factor that influenced portfolio equity and FDI inflows across 100 countries from 1984 to 2003. The study used average years of schooling to measure the progress of education. Though the mean years of schooling provide the duration of the school, the variable does not give the level of the education system.

Nonnenberg and Mendonca (2004) concluded that FDI correlated to the level of schooling, risk and variables related to macroeconomic performance, such as the average rate of economic

growth and inflation. The analysis was conducted using panel data of 38 developing countries (including transition economies) from 1975 to 2000. Again, the study used average years of schooling to measure the education progress, the variable does not give the level of the education system. Mohammad *et al.*, (2013) also found general educational attainment to have a significant positive impact on FDI inflows to 50 developed and developing countries. The study was undertaken from 1975 to 2005 and employed the generalised method of moments (GMM) approach.

Besides, Akin and Vlad (2011) tested the hypothesis of the Zhang-Markusen (ZM) theory that there is an inverse U-shaped association between human capital and foreign direct investment (FDI) using the generalised least square (GLS), fixed effects (FE) and random effects (RE) methods. The results of the analysis partly conformed with the ZM theory that education level (especially tertiary education) and FDI are positively related for upper- and middle-income countries. Meanwhile, an inverse relationship between human capital (proxied by education level) and FDI was observed in poor countries with low human capital and rich countries with high human capital. Cheng and Kwan (2000) estimated the effects of education level on FDI inflows in 29 Chinese regions from 1985 to 1990 using the GMM approach, and the results showed that education levels had a positive impact but was not a statistically significant factor influencing FDI inflows. Moreover, O'Meara (2015) observed an insignificant and negative effect of education level on FDI for 99 developing and developed countries. The researcher used cross-sectional data from 2005.

Hammami (2019) found among 39 low-income and middle-income countries that education and GDP per capita, among other variables, had significant positive effects on FDI inflows using fixed effects and the two-stage least square estimators from 1990 to 2009. Ravindranath (2018) examined the relationship between foreign direct investment and tertiary education in developing countries from 2001 to 2015. The findings showed that tertiary education and FDI

inflows had positive associations in developing countries, although the findings differed in different income groups. The study found a positive relationship between FDI and tertiary education in middle-income countries, while a negative association was observed in low-income countries.

Bryant C and Javalgi R. (2014) found human capital investment to have a significant impact on global economic integration as proxied by FDI. The study was conducted in 60 developing countries over the period 2005 to 2010 using OLS regression. Finally, Noorbakhsh *et al.,* (2001) employed the panel data regression (OLS) to examine the nexus between human capital and FDI inflows to 36 developing countries from Africa, Asia and Latin America. The study found that human capital is a statistically significant determinant of FDI inflows. The weakness of this study is that, it lacks the specific guiding theory or framework.

5.4.2 Theoretical Foundation and modelling

This study is rooted in the neoclassical growth model of the Cobb-Douglas production function to effectively model foreign capital inflow and its determinants in SSA countries. The choice of this neoclassical growth model is based on four major reasons:

Firstly, it is stated by the empirical argument that countries with low per-capita incomes grow faster than those with high per-capita incomes. Therefore, there is a likelihood that foreign capital will flow from the high per-capita income countries to the low per-capita income countries and over time, per-capita incomes will converge (Fuente, 2011). Zerbo and Darné (2018) revealed that all SSA countries are developing economies with a per-capita income lower than that of the Euro Area and G7 countries. This satisfies the empirical argument that SSA countries are expected to grow faster than developed countries.

Secondly, the neoclassical growth model describes that there is a higher marginal return of capital in developing economies than in developed economies (Lipsey, 2000). Therefore,

capital will flow to developing economies where there is not enough capital, which has a strong possibility of high marginal returns (Bradley *et al.*, 2012).

Thirdly, the neoclassical growth model describes long-run growth as originating from economic activities that create new knowledge and technological relationships between two or more inputs or variables in the production process (Zerbo & Darné, 2018). These postulations align with the aim of this study, as it seeks to investigate the relationship between foreign capital inflows and its socioeconomic determinants in SSA countries.

Finally, the neoclassical framework is a growth model that leaves a role for policymakers in stimulating economic activities. As stated by Frimpong and Oteng-Abayie (2006), this model holds that policy measures explain the long-run growth rate of output in an economy. Therefore, there are policy measures to stimulate foreign capital inflows in SSA countries such as liberalisation of the SSA foreign investment inflows regimes and pursuing policies of regional trade liberalisation and integration so as to raise the size of the market (Bradley *et al.*, 2012).

Given the above reasons for the choice of the neoclassical model, the point of departure for the Cobb-Douglas production function employed in this study is related to an economy in which there are two types of factors of production (reproductive and non-reproductive economy). This occurs under the assumption that countries use the same factors of production, the same goods produced, and homogenous technology with constant returns to scale. The competitive free international trade (globalisation) model depicts that output depends on labour, capital, and technological progress or total factor productivity. The homogenous technology is justifiable in respect of the SSA region having common features in terms of economic structures, growth patterns, and similar rate of development in ICT-related facilities, similar techniques as primary producers of agricultural and mining products for export, etc. Constant returns to scale is

relative in the SSA region due to the less developed nature of technology, leading to a common experience where an increase in input often results in a proportional increase in output. This constant return to scale is evidenced as SSA growth was estimated at 4% in 2021, recovering from the economic activity of 2% in 2020. However, the regional growth was expected to decelerate further in 2022 due to the global environment of multiple shocks, uncertainty and high volatility. Only a relative economy expansion by 3.6 % is envisaged in 2022, down from the 4% in 2021 (World Bank, 2022).

RELATIONSHIP BETWEEN COBB-DOUGLAS PRODUCTION FUNCTION, SOCIOECONOMIC DETERMINANTS AND FOREIGN CAPITAL INFLOWS

Through capital stock, international capital enters the model directly. Therefore, a simple neoclassical growth theory is modelled in the form of Cobb-Douglas production function as proposed by Mankiv *et al.*, 1992 and Fuente (2011) in the following form:

$$Y_{it} = A_{it}(K_{it}^{\alpha k} H_{it}^{\propto h} L_{it}^{\propto l}),\ 0 < a < 1 \qquad (5.1)$$

where Y_{it} is total output (total goods produced in a year) at time t; A_{it} is total factor productivity at time t; L_t is labour input (total number of man-hours employed over a given period); K_t is capital input (equipment, machinery and buildings used in the production process at a time t); and $\propto k, \propto h, \propto l$ are the output elasticity of capital and labour and human capital, respectively. These values are constantly determined by available technology. The labour supply is equal to the population $\left(L_t = N_t\right)$ and each factor is paid its marginal product because factor markets are perfectly competitive. H = human capital representing the socioeconomic factor.

Nevertheless, Lucas (1990) claimed that the notion of capital being influenced by higher marginal returns of capital and labour in poorer countries is inadequate as it fails to describe the real observed situation of the nature of capital flows. Consequently, model 5.1 could be

log-linearised to factor out the capital as the study's dependent variable. This linearity is found in equation 5.2 as follows: $logY_{it} = logA_{it} + \alpha klogK_{it} + \propto hlogH_{it} + \propto llogL_{it}$ 5.2

$logK_{it} = logA_{it} - ylogY_{it} + \propto hlogH_{it} + \propto llogL_{it}$ 5.3

Where $logA_{it}$ are the vectors of factors impacting K but not captured by $Y_{it} + H_{it}$ and L_{it} respectively. These factors include life expectancy, human capital investment, food security, GDP growth and inflation.

Using an example of the US and India, Lucas reported that although India was 58 times higher than the US in terms of marginal return of capital, still capital flowing to the US from India was far higher than what the neoclassical theory could fully account for. These factors not accounted for include inflation and the country's general healthy and competitive environment, among others. Therefore, in reality, capital has been flowing either from poor to rich countries or between developed countries that have narrow differential returns to capital (Lipsey, 2000). This situation is generally known as the Lucas puzzle or Lucas paradox.

Assuming the lower cases are adopted to assume the log of each factor from equation 5.3, this leads to equation 5.4.

$$k_{it} = \partial_{it} + \partial_2 \mathrm{GDPgrow}_{2it} - \partial_3 \mathrm{RIR}_{3it} - \partial_4 \mathrm{LEX}_{4it} - \partial_5 \mathrm{INF}_{5it} - \partial_6 \mathrm{REXC}_{6it} - \partial_7 \mathrm{Food\ sec}_{7it} - \partial_8 \mathrm{HCI}_{8it} \quad \text{……...5.4}$$

To make the model dynamic and to account for white noise for all variables not captured within the model, the error term of β_{it} and the lag of dependent variables have been introduced into the model to form equation 5.5.

$$k_{it} = \partial_{it} + \alpha k_{it-1} - \partial_2 \mathrm{GDPgrow}_{2it} + \partial_3 \mathrm{RIR}_{3it} + \partial_4 \mathrm{LEX}_{4it} + \partial_5 \mathrm{INF}_{5it} + \partial_6 \mathrm{REXC}_{6it} + \partial_7 \mathrm{Food\ sec}_{7it} + \partial_8 \mathrm{HCI}_{8it} + \beta_{it} \quad \text{……...5.5}$$

Consequently, the current study follows the expositions of Lucas (1990) and Alfaro *et al.,* (2008), who used the context of capital (K), and economic growth (Y) to assume a small open economy operating with labour (L) via a constant return to scale production function of the following form:

$$Y_{it} = A_{it}F\left(K_{it,}L_{it}H_{it}\right) \quad F_K(.)>0, F_L(.)>0\ F_H(.)>0 \quad F_{KK}(.)<0, F_{LL}(.)\ F_{HH}(.)<0 \ldots\ldots\ldots (5.6)$$

5.5 Methodology

5.5.1 Aim and objectives

This study aims to investigate the socioeconomic determinants of foreign capital inflows in SSA countries.

5.5.2 Variables of the study

Following similar work conducted by Sikandar et al., (2021), this study employs annual data for the SSA countries from 1985 to 2018. The variables are drawn from the literature and rooted in the Cobb-Douglass growth theory or production function. To investigate which factors determine foreign capital inflows in the SSA region, regression analysis is conducted with foreign direct investment (FDI) and foreign portfolio investment (FPI) as the model's dependent variables. Other variables such as human capital investment (HCI), food security (Foodsec), life expectancy (LEX), real interest rate (RIR), real exchange rate (RER), GDP growth (GDPGrowth), and inflation (INF) are expected to determine some variations in the dependent variables. The brief definitional terms are as follows:

- **Foreign Direct Investment (FDI)**

  This proxy all income coming from abroad in the form of investible fund. This is one of the dependent variables and its changes depend on the specific explanatory variable.

- **Foreign portfolio investment (FPI).**

  Comprises of investment activities at international dimensions through various passive ownership of securities or assets such as foreign stocks, bonds and other financial assets. This is expected to be another dependent variable and its changes depend on the specific explanatory variable.

- **Human Capital Investment (HCI)**

  Education level is used as a proxy for human capital investment and it is represented by school enrolment at the tertiary level (SET) in the current study. According to Hu and Wolniak (2010), the level of education is positively related to income level or earnings and helps to reduce poverty levels in the economy. Therefore, human capital investment is expected to influence foreign capital inflows positively.

- **Food security (FoodSec)**

  The inclusion of food security in the model helps to measure the prevalence of undernourishment (UN, 2016), as ending poverty and hunger depends on food security and the development of the agricultural sector as well as the attractiveness of the inflows of foreign capital inflows. According to human capital theory, food security is expected to positively influence the attraction of foreign capital inflows.

- **Gross domestic product growth rate (GDPGrowth)**

  This variable was adopted to examine how the growth of the economy attracts FCI. In this study, the role that GDP growth plays in stimulating capital inflows is further elaborated in line with Ehigiamusoe and Lean (2019). Furthermore, GDP growth rate is included to assess the validity of the view that stabilizing output and inflation can attract FDI and FPI (Sahoo, 2017). GDP growth rate is expected to have a positive effect on foreign capital inflows.

- **Inflation (INF)**

  The inclusion of this variable is in line with Sahoo (2017) to be able to determine the trade relationship and how prices attract capital flows and determine the level of investment in the economy. It also serves as a control variable linked to monetary policy decisions, especially with regard to promoting FDI and FPI through which economic stability is achieved. This measure is commonly used in the literature (Okonkwo *et al.*, 2015) and is further included to capture the possible effects of macroeconomic instability in SSA countries. The impact of inflation rate on foreign capital inflows is expected to be positive, negative, or insignificant.

- **Life Expectancy (LEX)**

  This variable was included to capture the health status of the population/workers in stimulating FCI in SSA countries. For instance, Alsan *et al.,* (2006) revealed that poor health might cause a high rate of absenteeism and workers turnover due to illness. This ultimately can increase production costs and reduce productivity, deterring foreign investment inflows. Therefore, a good health status of the population is expected to attract an inflow of foreign capital, while a poor health population has a negative effect on foreign capital inflows.

- **Real Exchange rate (REXC)**

  While exchange rate is the price of each country's currency expressed in another country's currency, the real exchange rate (RER) between two nations' currencies is the product of the nominal exchange rate and the ratio of prices between the two nations. For instance, the dollar cost of a Rand (Ibrahim & Amin, 2005). The impact of real exchange rate on foreign capital inflows is expected to be positive, negative, or insignificant.

- **Real Interest rate (RIR)**

Real interest rate (RIR) is an adjusted interest rate to remove the impact of inflation. Traditionally, capital flows from the country with lower real interest rate to the country with the relatively higher real interest rate (Warnock & Warnock, 2009; Alshubiri, 2022). Therefore, the real interest rate is expected to positively influence foreign capital inflows.

5.6 Data sources

The data for this study were obtained from the World Bank's WDI. The IMF's International Financial Statistics (IFS) database, the balance of payments yearbook and the relevant large public datasets of UNDP, the OECD database and UNCTAD. All data are expressed in percentages or indices. The annual data spanned from 1985 to 2018 due to data unavailability.

5.7 Estimation techniques: System GMM

To control for the model's endogeneity problem and to account for the dynamics of the study's model, system GMM has been considered the most appropriate method of estimation. The literature identified dynamic panel models as an appropriate technique to improve the estimators' performance in any panel model. The approach suitable for this estimation, as popularized by Arellano and Bond (1991), is system GMM. Oyedokun, Folly, and Chowdhury (2009) argued that when a fixed effects model with static specification interacts with autoregressive coefficients alongside the lagged value of the dependent variable, it enhances feedback from current or past shocks relative to the current value of the dependent variable. The approach for such a specification is otherwise known as system GMM. The dynamic specification prevents a spurious regression from being run as it eliminates the temporal autocorrelation in the residuals, which may result in inconsistent estimators. The system GMM model that has been found adequate to explain the relationship between foreign capital inflows and the variable factors that explain the inflow in SSA countries is hereby specified thus:

$$\delta_{it} = \partial_{it} + \alpha\delta_{it-1} - \partial_2 \mathrm{GDPgrow}_{2it} - \partial_3 \mathrm{RIR}_{3it} - \partial_4 \mathrm{LEX}_{4it} - \partial_5 \mathrm{INF}_{5it} - \partial_6 \mathrm{REXC}_{6it} - \partial_7 \mathrm{Foodsec}_{7it} - \partial_8 \mathrm{HCI}_{8it} - \beta_{it} \quad \ldots\ldots\ldots\ldots 5.7$$

With the inclusion of the lagged value of the dependent variable, equation (5.8) is a modification of equation (5.7) in dynamic panel data form.

Consequently, taking the first difference of equation (5.7), one obtains equation (5.8) as follows: $\Delta\delta_{it} = \partial_1 + \alpha\Delta\delta_{it-1} - \partial_2 \Delta\mathrm{GDPgrow}_{2it} - \partial_3 \Delta\mathrm{RIR}_{3it} - \partial_4 \Delta\mathrm{LEX}_{4it} - \partial_5 \Delta\mathrm{INF}_{5it} - \partial_6 \Delta\mathrm{REXCa}_{6it} - \partial_7 \Delta\mathrm{Foodsec}_{7it} - \partial_8 \Delta\mathrm{HCI}_{8it} - \pi_{it} \quad \ldots\ldots\ldots\ldots\ldots (5.8)$

By avoiding a possible correlation between $\delta_{it-1}$and π_{it}, Z′ has been introduced as an instrumental variable. Consequently, the model that will correlate with both will be obtained through the matrix transposition of the explanatory variable.

Equation (5.9) is obtained by multiplying the vector form of equation (5.8) by Z′ leading to $Z\Delta y_{it} Z'\Delta\delta_{it} = \partial_1 + Z'(\Delta\delta_{it-1})\alpha - Z'(x_{it})\partial - Z'\Delta\pi_{it}$ ……. (5.9)

Regressing equation (5.10) by adopting the generalized least square (GLS) produces one-step consistent GMM estimators.

However, further input on the methods adopted by Arellano and Bond (1991) has developed over the years as advanced by Blundell *et al.*, (2001). The new method is otherwise known as system-GMM. The difference between the new method and initial GMM is that SYS-GMM is more cautious in adopting the instrumental variables. The approach was built to handle the possible problem of weak instrumental variables that might probably emerge in GMM. Consequently, SYS-GMM could produce more efficient and consistent parameter estimates, particularly when larger time periods are involved in the model. Consequently, this informed the preference for the SYS-GMM estimator in this study.

Where Y_{it} is the vector of endogenous factors capturing foreign capital inflows; ∂_1 is the vector of the constant term; i denotes the SSA countries; Δ represents the first difference operator. As

earlier stated, the endogenous variables are the foreign direct investment (FDI) and foreign portfolio investment (FPI) for country i at time t, while the explanatory factors are RIR, LEX, INF, REXC, HCI, GDPgrowth, and Foodsec. Based on *a* priori expectation, a positive relationship is expected between FCI and RIR, LEX, REXC, HCI, GDPgrowth, Foodsec and INF.

5.8 Data Analysis and Model Estimation

This section showcases the result of summary statistics obtained from the pooled observations for this study. All the variables to be adopted in the analysis are described to understand at a glance the series that determine foreign direct investment and foreign portfolio investment among the SSA countries under investigation. The descriptive characteristic operates around the minimum and maximum values, standard deviation, mean, and median across variables in the panel data.

Table 5.1: Summary Descriptive Statistics on the series: FDI, FPI, LEX, INF, REXC, Foodsec, HCI, RIR, GDPgrowth

Variables	Observation	Mean	Standard Dev	Minimum	Maximum
INF	1054	24.98253	176.4266	0.0178712	4800.532
LEX	1054	56.05148	7.691133	37.083	74.51463
RIR	1054	45.2185	28.54896	3.42084	115.9565
REXC	1054	34.27316	27.22613	.49829	117.8827
FPI	1054	1.479034	6.208197	0.0001425	105.1994
HCI	1054	34.27316	27.22613	.49829	117.8827
GDPgrowth	1054	3.761919	4.692731	-28.09998	26.41732
FDI	1054	3.067698	4.656444	0.0002018	57.83755
Foodsec	1054	2.076712	1.705319	.1536552	12.82599

Source: Author's Computation, 2022

Table 5.1 captured the specific attributes associated with each member of the central tendency in the series, each mean in the series exhibited low values as all the outcome tended to be closer to the minimum rather than the maximum. The observed mean in relation to standard deviation values for all variables consistently collapsed within the minimum rather than the maximum

range. The relatively low values exhibited by the standard deviations in all parts of the series indicate that data were clustered around the means and only negligible amounts of the actual data were obtainable from the values of the mean in the series. Of importance are the foreign direct investment (FDI) and foreign portfolio investment (FPI) which also are the dependent variables in the model. The study found that their maximum values were 57.83755 and 105.1994, whereas the minimum values were as low as 0.0002018 and 0.0001425 with means of 3.067698 and 1.479034 closer to the maximum than the minimum. The claim is strongly confirmed by standard deviation since it is closer to the mean. This result substantially negates extant a priori expectations that foreign direct investment and foreign portfolio investment are low in the SSA region. While the values generally are relatively closer to the maximum, it indicates that foreign direct investment and foreign portfolio investment could possibly impact growth in the region given policy implementation in the right direction.

Table 5.2: Correlation Matrix on the series FDI, INF, LEX, RIR, REXC, FPI, HCI, GDPgrowth, Foodsec

Variables	FDI	INF	LEX	RIR	Rexcha	FPI	HCI	GDPgrowth	Foodsec
FDI	1.0000								
INF	0.0383	1.0000							
LEX	0.2418*	-0.1195*	1.0000						
RIR	0.1610*	-0.0219	0.4053*	1.0000					
Rexcha	0.1759*	-0.1016*	0.6102*	0.7320*	1.0000				
FPI	0.0196	- 0.0044	0.0349	0.0612*	0.0806	1.0000			
HCI	0.1759*	-0.1016*	0.6102*	0.7320*	1.000*	0.0806*	1.000		
GDPgrowth	0.0760*	0.0304	0.1180*	-0.0728*	0.0007	0.0048	-0.0007	1.0000	
Foodsec	0.2524*	0.0344	0.2058*	0.2615*	0.2900*	0.0096	0.2900*	0.0260	1.0000

Source: Author's Computation, 2022

Table 5.2 reports the result from the series INF, LEX, RIR, REXC, FPI, HCI, GDPgrowth, FDI and Foodsec. From the result, it is clear that there is no problem of multi-collinearity in the model. All variables adopted showed a positive correlation with FDI, with the highest value having less than 0.4. This indicated that there is no multicollinearity among the variables.

Table 5.3: Fixed-effects (within) regression on the series FDI, INF, LEX, RIR, REXC, HCI, GDPgrowth, Foodsec

Fixed-effects (within) regression				
Number of obs		1,007		
Number of groups		31		
within	0.0960		Min	18
between	0.1251		Avg	32.5
overall	0.0749		Max	34
Prob > F	0.0000		Corr (u_i, Xb)	-0.5441
F(7,969)	14.69			
Variables	Coefficients	Standard Error	t-statistics	P-value
INF	.0006088	0.0008052	0.76	0.450
LEX	.1262639	0.0363	3.48	0.001
RIR	0.0815875	0.0295861	2.76	0.006
REXC	-0.0320004	0.00283834	-1.13	0.260
HCI	0	Omitted		
GDPgrowth	0.0347501	0.0304079	1.14	0.253
foodsec |	0.8026737	.1324829	6.06	0.000
_cons	-8.72556	1.892026	-4.61	0.000

Source: Author's Computation, 2022

sigma_u | 2.7260149

sigma_e |4.2786032 Prob > F = 0.0000

Table 5.4 Random model with FDI as the dependent variable

Random-effects (within) regression				
Number of obs		1,007		
Number of groups		31		
within	0.0919		Min	18
between	0.1884		Avg	32.5
overall	0.0979		max	34
Prob > F	0.0000			
Variables	Coefficients	Standard Error	t-statistics	P-value
INF	0.0007407	.0008017	0.92	0.356
LEX	0.1328513	.0328798	4.04	0.000
RIR	0.0308499	.0165118	1.87	0.062
REXC	-.0069348	.0172506	-0.40	0.688
HCI	0	Omitted		
GDPgrowth	.0401759	.0303339	1.32	0.185
foodsec |	.7093955	.1185754	5.98	0.000
_cons	-7.415057	1.729215	-4.29	0.000

Source: Author's Computation, 2022

Table 5.5: Hausman Test for Fixed or Random Effects

Table 5.5 reports the findings from the analysis conducted through the Hausman test to ascertain the preferred model between random and fixed effects.

Variables	(b)	(B)	(b-B)	sqrt(diag(V_bV_B))
	fe	Re	Difference	S.E.
INF	.0006088	.0007407	-.0001318	.0000745
LEX	.1262639	.1328513	-.0065873	.0154301
RIR	.0815875	.0308499	.0507376	.02455
REXC	-.0320004	-0.0069348	-0.0250656	.0225396
FPI	.0173313	-0.0180868	-.0007554	
GDPgrowth	.0347501	.0401759	-0.0054258	0.0021202
foodsec |	0.8026737	0.7093955	0.0932783	0.0590898
b = consistent under Ho and Ha; obtained from xtreg; B = inconsistent under Ha, efficient under Ho; obtained from xtreg. Test: Ho: difference in coefficients not systematic chi2(7) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 20.92 Prob>chi2 = 0.0039				

Source: Author's Computation, 2022

Tables 5.4 and 5.5 reflect the findings in the panel model under investigation. The outcomes from both the random and fixed effects have been reported in this study. The Hausman test conducted further investigated the preferred model, and the outcome revealed that there were evident variations between the two identified models.

The study's hypothesis testing:

Ho = Random effects model is the preferred model for the study's analysis.

Ha = Fixed effects model is the preferred model for the study's analysis.

The outcome of the Hausman test showed that the study cannot reject the null hypothesis (Ho); the study accepts the null hypothesis and rejects the alternative hypothesis, and consequently, the study failed to accept the fixed effects model as the preferred model for the study. The acceptance of the preferred model was premised on the argument that it will adequately control for the possible heterogeneity effect that might impact the outcome of the study's findings. In the random effects model, real interest rate, life expectancy and food security variables were

statistically significant. An engagement with a dynamic model may be suggested before a decision of a more reliable and consistent result could be confirmed.

Table 5.6 Random model with FPI as the dependent variable

Random-effects (within) regression				
Number of obs		1,007		
Number of groups		31		
within	0.0919		Min	18
between	0.1884		Avg	32.5
overall	0.0979		max	34
Prob > F	0.0000			
Variables	Coefficients	Standard Error	t-statistics	P-value
INF	-0.0137045	0.0272119	-0.50	0.615
LEX	-0.0234994	0.0474943	-0.49	0.621
RIR	0.0033948	0.0187333	0.18	0.856
REXC	0	Omitted		
HCI	0.024905	0.0193458	1.29	0.198
GDPgrowth	0.0223361	0.0672487	0.33	0.740
foodsec |	-0.0769408	0.1661201	-0.46	0.643
_cons				

Source: Author's Computation, 2022

Table 5.6 addresses the comparable static result of foreign portfolio investment with respect to foreign direct investment. From the table, it is evident that none of the variables that significantly impacted foreign direct investment also impacted foreign portfolio investment. The following section investigates the determinants of FDI and FPI from the dynamic perspective.

5.9 Dynamic Panel Data Analysis

Most researchers argued that while outcomes from the static panel data may be consistent, the result may sometimes be inefficient. A robustness check must be conducted as a follow-up and an improvement on the static panel data results. Consequently, dynamic panel data estimation developed by Blundell and Bond (1998) and Arellano and Bond (1991) is employed. The method is commonly known as the Systemic Generalised Method of Moments (SYSGMM) and has proven to produce efficient results over time. Hence, this section of the study analyses

the dynamic panel model for the impact of RIR, HCI, LEX, INF, REXC, GDPgrowth and Foodsec on FDI and FPI. The outcome will function as a robust check on the findings acquired in the static panel models. The findings from the dynamic panel data estimations are presented in the Tables below. The findings in Table 5.7 indicates a variation from the former outcome obtained from the static panel model of random effects. For instance, in the reported random effects on FDI, only food security, real interest rate and life expectancy are statistically significant, whereas in the dynamic model, in addition to food security and real interest rate, real exchange rate, inflation and GDP are also statistically significant. However, life expectancy failed to statistically impact FDI against the static model. In the reported random effects on FPI, it was discovered that no variable significantly impacts FPI. Since the dynamic panel SYSGMM provides a more robust and consistent outcome to corroborate the study's findings, much attention would be devoted to explaining areas of variations and differences from what was obtainable under the random panel models.

Comparing the static and dynamic results on FDI

In the static model, life expectancy (LEX), real interest rate (RIR) and food security (Foodsec) are statistically significant and have a direct relationship with the FDI. However, in the dynamic model, real interest rate, real exchange rate, inflation, GDP growth and food security significantly impact FDI. While all significant variables under the static model also directly impact the FDI, in the dynamic model, real exchange rate and inflation rate are inversely related to FDI.

While life expectancy and human capital investment are not statistically significant in the dynamic model, these attributes and features were shared for real exchange rate and GDP growth in the static model, whereas HCI was omitted because of the multicollinearity of the variable in the model. Further information in system GMM is the positive and none significant

relationship flowing from the lag of foreign direct investment to its dependent variable, indicating no consistent relationship from the past period to the current in the endogenous variable.

Table 5.7: Dynamic panel-data estimation, one-step system GMM on FDI and the series:

Number of obs	967			
No of instruments	= 13		No of groups	31
Wald chi2(6)	11888.84		Obs per group:	min = 17
Prob > chi2	0.000		Avg	31.19
Time variable:	Year		Max	33
Variables	Coeff	Standard Error	Z-Statistics	P-Value
L. FDI	-0.0254249	0.0625488	-0.41	0.684
RIR	0.0293317	0.0148465	1.98	0.048
LEX	0.0558898	0.0468604	1.19	0.233
HCI	-0.0237301	0.0225429	-1.05	0.292
REXC	-2.04e-12	3.26e-13	-6.26	0.000
INF	-0.0186	0.0008886	-20.93	0.000
GDPgrowth	0.4687613	0.1032974	4.54	0.000
foodsec |	1.161974	0.3022071	3.84	0.000
Cons	-4.636113	2.669919	-1.74	0.082

Source: Author's Computation, 2022

Note: FDI implies foreign direct investment, HCI implies human capital investment; LEX implies life expectancy; INF implies inflation; RIR implies real interest rate; REXC implies real exchange rate; GDPgrowth implies GDP growth rate; Foodsec implies food security.

Table 5.8: Hansen test of over-identifying restrictions

H0: over-identifying restrictions are valid		
	chi2(5)	13.68
	Prob > chi2	0.018

Source: Author's Computation, 2022

The findings indicated that the null hypothesis could be rejected; consequently, restrictions on over-identification are invalid. By implication, the adopted number of instruments in the SYSGMM analysis model does not negatively impact the SYSGMM estimators. A better performance model is expected as the P-value is close to one. Consequently, the findings are sufficient to establish no restriction on over-identification. In addition, the number of instruments is less than the number of countries (group). Information from the model diagnostics indicated that the Arellano-Bond SYSGMM estimator produces the most preferred estimates at AR (2). A degree of serial correlation could be expected at the initial level of AR (1) estimation but must be corrected at the level of AR (2) estimate. Consequently, a significance level may be expected at AR(1), which must be at AR(2). Finally, the overall P-value is significant.

Table 5.9: Result on Serial Correlation

Method	**Z-Statistics Result**	**P-Value**
Arellano-Bond test for AR(1)	z = -5.23	Pr > z = 0.029
Arellano-Bond test for AR(2)	z = 0.95	Pr > z = 0.982

Source: Author's Computation, 2022

Comparing the static and dynamic results on FPI

Tables 5.6 and 5.10 are the summary results of the static and dynamic models on FPI, respectively. Both tables shared similar features in terms of the direction of the relationship among variables and the level of significance, except for food security which remained significant in the dynamic model but was not in the static model.

Table 5.10: Dynamic panel-data estimation, one-step system GMM on FPI and the series:

Number of obs	681			
No of instruments	= 13		No of groups	31
Wald chi2(6)	1828.67		Obs per group:	min = 4
Prob > chi2	0.000		Avg	21.97
Time variable:	Year		Max	33
Variables	Coeff	Standard Error	Z-Statistics	P-Value
L. FPI	0.6415767	0.0400726	16.01	0.000
RIR	0.07552	0.0552077	1.37	0.171
LEX	-0.0083768	.0262971	-0.32	0.750
HCI	-.0453943	0.0428638	-1.06	0.290
REXC				
INF	.039762	0.0376932	1.05	0.291
GDPgrowth	0.0885935	0.062944	1.41	0.159
foodsec |	-.1899588	0.1116798	-1.70	0.089
Cons	-1.632894	1.883195	-0.87	0.386

Source: Author's Computation, 2022

Table 5.11: Result on Serial Correlation

Method	**Z-Statistics Result**	**P-Value**
Arellano-Bond test for AR(1)	z = -5.23	Pr > z = 0.313
Arellano-Bond test for AR(2)	z = 0.95	Pr > z = 0.324

Source: Author's Computation, 2022

Table 5.12: Hansen test of over-identifying restrictions

H0: over-identifying restrictions are valid		
	chi2(5)	6.99
	Prob > chi2	0.221

Source: Author's Computation, 2022

5.10 Discussion of findings

Table 5.4 reflects the result of the static random model with FDI as the dependent variable. Table 5.6 showcases the static random model with FPI as the dependent variable. Table 5.7 contains the outcome of the dynamic panel-data estimation on FDI and the corresponding series that followed. Table 5.10 is the result of the dynamic panel-data estimation on FPI and the series of factors that determine FPI in the model. Evidently, the model exhibited a mixed relationship. Categorically, four different scenarios are active in the outcome of this analysis:
(i) The study provided evidence that under the static model where FDI assumed an endogenous variable, INF, REXC and GDP growth rate are not statistically significant. This indicates that these macro-economic variables are not behaving well enough in the SSA region to impact FDI. Again, it is evident from the static model that no inverse relationship exists among factors that determine FDI, while LEX, RIR and food security exhibit a direct relationship with the FDI. These findings are consistent with the prediction of human capital theory in explaining FCI flows in SSA (section 2.2.4.1).
(ii) In the second scenario, all variables were not statistically significant in the static model where foreign portfolio investment (FPI) assumed the dependent variable. This is similar to the result obtained under the dynamic model in scenario three, where food security is the only known determinant of FPI with a statistically significant direct relationship. The result is consistent with the hypothesized relationship by human capital theory that the prevalence of undernourishment reduces the physical fitness of people which could affect productivity and hence reduce FCI flows. In the fourth scenario, under dynamic model where FDI assumed the endogenous variable. Here, life expectancy (LEX) and human capital index (HCI) are not statistically significant. There is a mixed result in the direction of the relationship as RIR, GDP growth rate and food security all have a positive relationship with the FDI, whereas INF and REXC are found to be inversely related to FDI. In this regard, the result agreed with the

prediction of the human capital theory. Life expectancy and human capital investment failed to significantly impact foreign direct investment. The implication is that both variables are not doing enough in the SSA region to impact FDI. This level of non-statistical significance seems to negate Simionescu and Naroş (2019), who found a positive relationship in conducting a similar empirical investigation on the relationship between FDI and human capital investment for a competitive labour market for the European Union countries.

Implicitly, while inflation and real exchange rate exhibit inverse relationships, the reverse is the case with GDP growth rate, real interest rate and food security which exhibit a direct relationship. The direct nexus connotes that a unit increase in GDP growth rate, real interest rate, and food security would cause FDI to increase in a flow with high frequency, but a negligible decline in FDI is expected with a unit increase in real exchange rate and inflation rate. While the latter may be expected by a priori expectation the implication is that life expectancy and food security could be better enhanced through domestic financing rather than depending on foreign aid to stimulate growth in the region.

One can recall that there are direct relationships between GDP growth rate and food security in explaining FDI. This implies that as the economies grow and access to food increases in the region, it would attract more foreign direct investment into the region. This result supports the findings of Liargovas and Skandalis (2012) and Nwosa and Adeleke (2017), who found a positive relationship between the determinants of FDI in those countries under investigation. This finding under the system GMM results further support the work of Ezeoha and Cattaneo (2012), Fowowe and Shuaibu (2014) and Mowlaei (2018), who confirmed a positive relationship between GDP growth and foreign capital inflows in their various studies. There are divergent views in the literature on the impact of inflation on foreign investment in the economy. Some studies have found a significant positive impact on the nexus (Baghebo & Apere, 2014; Waqas *et al.*, 2015; Adeola, 2017), and others have found a long-run negative

significant relationship, revealing that inflation erodes FDI in the economy (Ekeocha, 2008; Ezeanyeji & Maureen, 2019). Again, the expression by Kanu (2015) and Adem and Güvercin (2020) suggest that a moderate increase in general price levels boosts foreign investment inflows and the level of productivity in the economy. However, this study found no level of significance between inflation and FDI under the static model. While under the dynamic model the study found a negative statistically significant relationship between inflation and FDI. This result supports the findings of Ekeocha, (2008) and Ezeanyeji and Maureen, (2019), who found a positive relationship between inflation and foreign direct investment.

Finally, this study further found that the health variable (life expectancy) significantly and positively impacts FDI in SSA countries under the static model. This means that an increase in life expectancy will increase FDI in SSA countries. This agrees with Waheed (2004), Alsan *et al.,* (2006) and Dhahri and Omri (2020) who argued that FDI is positively influenced by population health, and illness has a negative relationship with FDI in low- and middle-income countries. However, this study found no level of significance between life expectancy and foreign direct investment under dynamic model. This could be partly because life expectancy is low in the SSA region, consequently, its impact is not noticeable to cause foreign direct investment in the economy.

5.11 Summary

This chapter examined the socioeconomic determinants of foreign capital inflows from two perspectives of foreign direct investment and foreign portfolio investment, respectively, in the SSA countries using both static and dynamic panel data analysis with annual data covering the period 1985 to 2018. The study's hypotheses are stated as follows, **H_0:** Socioeconomic factors do not determine foreign capital inflows in SSA countries. **H_A:** Socioeconomic factors do determine foreign capital inflows in SSA countries. To establish the functional relationship between foreign direct investment and foreign portfolio investment separately and the factors

that determine them. Both static model (summary statistics, correlation matrix and the random effect model) together with the dynamic model of system GMM were adopted as the study's models. The preliminary findings from the correlation matrix clearly showed no problem of multi-collinearity in the model. The brief analysis from the summary statistics further showed that most series skewed slightly toward the maximum when considering the cluster of variables around their mean and standard deviation. For instance, the study found that their maximum values are 57.83755 and 105.1994, whereas the minimum values are as low as 0.0002018 and 0.0001425 with means of 3.067698 and 1.479034 which are closer to the maximum than the minimum. The standard deviation strongly confirms the claim since it is closer to the mean. This result substantially negates extant a priori expectations that foreign direct investment and foreign portfolio investment are low in the SSA region. While the values generally are relatively closer to the maximum, it indicates that foreign direct investment and foreign portfolio investment could possibly impact growth in the region given policy implementation in the right direction. Results from the static and dynamic models clearly showed four different scenarios of the separate adoptions of FDI and FPI as dependent variables. Since literature argued that the model must be dynamic to yield a robust result, as variables were not statistically significant in the static model where FPI was adopted as the dependent variable. Consequently, the study proceeded to report the dynamic system GMM. From the result of dynamic system GMM, the study provides evidence as follows:

(i) The static model where foreign direct investment assumed endogenous variable, inflation, real exchange rate and GDP growth rate are not statistically significant. Indicating that these macroeconomic variables are not behaving well enough in the SSA region to impact foreign direct investment. Again, it is evident from the static model that no inverse relationship exists among factors determining FDI, while life expectancy, real interest rate and food security exhibit a direct relationship with FDI. These findings are consistent with the prediction of the

human capital theory (section 2.2.4.1). Therefore, food security, health and wellbeing of the population (life expectancy) and interest rate are vital when making investment location decisions.

(ii) In the second scenario, all variables were not statistically significant in the static model where foreign portfolio investment (FPI) assumed the dependent variable. This result is similar to the result obtained under the dynamic model in scenario three, where food security is the only known statistically significant determinant of FPI with a direct relationship. In the fourth scenario, under dynamic model where FDI assumed the endogenous variable. Here, life expectancy (LEX) and human capital investment (HCI) are not statistically significant. While no statistical significance may not be expected by a priori expectation, the implication could be because FDI flows mostly likely do not look for quality health facilities and technological innovations or quality human capital investment in developing countries such as SSA. There is a mixed result in the direction of the relationship as real interest rate, GDP growth rate and food security all have a positive relationship with the FDI, whereas inflation and real exchange rate are found to be inversely related to FDI. In this regard, the result agreed with the hypothesized relationship by human capital theory which advocates that food insecurity affects the physical fitness of the population as well as social stability which in results affects FDI flows (Kucera, 2002). As well, the result means that when GDP increases, the FDI flows to SSA countries increases. The result is consistent with expectations and is similar to many research (Kumari and Sharma, 2017; Anyanwu, 2011). Life expectancy and human capital investment failed to significantly impact foreign direct investment. The implication is that both variables are not doing enough in the SSA region to impact foreign direct investment. This level of non-statistical significance seems to negate Simionescu and Naroş (2019), who found a positive relationship in conducting a similar empirical investigation on the role of human

capital investment on foreign direct investment for a competitive labour market for the European Union countries.

The health variable (life expectancy) and food security have significant and positive impacts on FDI in SSA countries under the static model, an increase in life expectancy will lead to an increase in FDI in SSA countries. The policy implication of this result is that, better health services and pattern of life with the support of a mechanised system of farming from foreign counterparts and home-grown technology will empower citizens to be productive enough to improve the economy over time. Improved health is an engine for effective national productivity. Also, the positive significant impact of food security on FDI implies that, when there is food security in SSA countries, capital flows to SSA countries should increase.

Lastly, policymakers in SSA countries are now able to understand the importance of the significant influences of foreign capital inflows mentioned in the study and take steps to articulate policies that encourage foreign capital inflows. Such measures could include improving food security, investing in the nation's human capital, developing market size (GDP growth), and making regulations more international trade-friendly. Also, investing in vocational training in order to supply MNEs with more suitably trained/ skilled labours as MNEs as well as other domestic firms steadily move into more sophisticated production processes and services sectors. As policymakers have an interest in the national competitiveness (Borozan, 2008; Von Tunzelmann, 1995), the findings of this study imply that public and private scientific research institutions, industrial concentrations and highly skilled R&D employees in a country constitute the fundamental force behind the development and success of foreign capital flow levels. Policymakers can consult these findings in order to evaluate which type of foreign capital they can attract in consideration of the existing location factors in their country.

CHAPTER 6

THE IMPACT OF FOREIGN CAPITAL INFLOWS AND TRADE OPENNESS ON OUTPUT PERFORMANCE IN SUB-SAHARAN AFRICA COUNTRIES

6.1 Introduction

Eradicating poverty and promoting employment through sustainable growth of industrial output production are among the fundamental goals of the United Nations' Sustainable Development Goals (SDGs) to be reached by 2030 (United Nations, 2020). In achieving these objectives, foreign capital inflows, trade openness and the development of the industrial sector have been identified as some of the key strategic plans to be promoted in SSA countries. The plan is to create employment, increase domestic savings, encourage foreign investment, export promotion (remove trade restrictions and high tariffs), and boost industrial output production through innovation and infrastructural development (Nurunnabi *et al.,* 2020). Unfortunately, over the last two decades, the region experienced the worst economic performance on record compared with other regions of the world. For example, the region is threatened by high levels of unemployment, poverty, sluggish output growth and challenges of diversifying their economies in achieving industrialisation and export growth.

Preliminary investigations revealed that since 1998, the SSA region experienced its most dawdling growth rate in 2015 (Akinola & Bokana, 2017). According to IMF Regional Economic Outlook for Africa (2016), the growth rate in the region fell from 5.1% in 2014 to 3.4% in 2015. Akinola and Bokana (2017) also revealed that the SSA real GDP growth rate only increased by 1.1% in the first quarter of 2016, simultaneously followed by an equivalent decline of 1.0% in the third quarter. Infact, in 2016, IMF prediction for GDP and export growth for the region dropped from 2.9% to 1.4%. This drop was attributed to the nature of the products and the activities in the industrial and agricultural sectors. The inability to diversify the

economy, enhance trade liberalisation and development of the critical sector (such as the industrial sector) have been hypothesised to be some of the major reasons why the SSA region is experiencing such low economic growth and performance. The oil-exporting countries among them saw the most significant shock to their economies as their industrial production forecast became negative. Equatorial Guinea, South Sudan and Nigeria's economies contracted by 9.9%, 13.1% and1.7%, respectively. In a related development, Frankema and Austin (2016) revealed that Sub-Saharan Africa (SSA) has the lowest industrial (manufacturing) output per capita and export growth on the planet.

The IMF World Economic Outlook (2021) projection further revealed that the recovery rate in the SSA region is likely to lag behind the rest of the world with an aggregate growth rate of 3.6% over the 2020-2025 period, as compared to the rest of the world, which is put at 14%. Within the period, the income gap based on real GDP per capita between the SSA region and the rest of the world is projected to grow wider. This situation is not acceptable; therefore, the need for examining the impact of foreign capital inflows and trade openness on industrial output performance in the SSA region.

In view of the foregoing, there is a need to examine whether foreign capital inflows and trade openness affect the industrial sector's contribution to output performance in the SSA region. However, several studies have revealed overwhelming evidence that more open economies experience higher growth rates than less open ones. For example, Mazhikeyev *et al.,* (2015) and Siyakiya (2017) revealed that open countries attract more foreign capital inflows and boost output performance than isolated ones because they are more connected to the external world. Nonetheless, as cited by Gwartney *et al.,* (2009) and Murinde (2009), some countries in the SSA region are open but still struggling to attract foreign capital inflows and consequently, have slow growth rates. Given this puzzling situation, this study seeks to examine the impact of foreign capital inflows and trade openness on output performance in SSA countries.

After a critical review of the literature, it was discovered that the majority of similar studies that have been conducted focused on individual and developed countries (see Adenutsi, 2007; Yaoxing, 2010; Saibu, 2014; Ayodele Folorunso *et al.,* 2019; Nketiah *et al*., 2019; Abebaw, 2019; Ali *et al.,* 2020). In Africa, Siyakiya (2017) and Sikandar *et al.,* (2021) attempted to examine the impact of foreign capital inflows and trade openness on the economy. For instance, while Siyakiya (2017) assessed the impact of trade openness on output performance in selected African countries, he failed to include foreign capital inflows in the study. As well, Sikandar *et al.,* (2021) studied the impact of foreign capital inflows on agricultural development and poverty reduction in developing countries but the study failed to include trade openness. Other studies that were conducted in Africa but failed to include either foreign capital inflows, trade openness or focused on a single country include Asamoah *et al.,* (2019); Adu-Gyamfi *et al.,* (2019), Ayodele *et al.,* (2019) and Nketiah *et al.,* (2019). From the foregoing, it is clear that none of these studies covered the focus area (industrial sector) and the scope (trade openness, foreign capital inflows and output performance) currently being investigated. Therefore, this study seeks to fill this gap and contribute to the body of knowledge, especially on the scarce existing literature on the impact of foreign capital inflows and trade openness on output performance in SSA countries.

6.2 Objective three: To establish the impact of foreign capital inflows and trade openness on output performance in SSA countries.

6.3 Research Hypothesis

H_0 = foreign capital inflows and trade openness do not impact output performance in SSA countries.

H_A = foreign capital inflows and trade openness do impact output performance in SSA countries.

6.4 The Brief Review of Empirical Literature

Empirical analyses of foreign capital inflows and trade openness and their comparative impacts on output performance in SSA countries make sense. They are relevant based on the premise that they are adequately related to the means through which a country can accelerate economic development. Empirical studies that summarise the relevance and nexus of foreign capital inflows, trade openness and output performance are hereby reviewed.

Yaoxing (2010) studied the relationship between foreign direct investment, trade openness and outgrowth in Cote d'Ivoire using a bound testing co-integration approach and the VAR Granger causality/block exogeneity Wald tests. The study's findings revealed a long-run relationship between foreign direct investment, trade openness and output. The VAR Granger causality/block exogeneity Wald tests revealed a unidirectional causal relationship running from foreign direct investment, trade openness to output and from output, foreign direct investment to trade openness. Both foreign direct investment and trade openness were found to have a significant positive effect in explaining output growth in Cote d'Ivoire. This study focused on one country only (Cote d'Ivoire) and excluded other SSA countries that are included in the current study.

While examining the modern campaigns for increased foreign capital inflows into Africa and greater openness to accelerate economic growth, Ayodele *et al.,* (2019) investigated the interactions among trade openness, foreign private capital inflows and economic growth in Nigeria. Employing annual data and Granger causality methods, the study showed that foreign capital inflows (not trade openness) caused economic growth. Nonetheless, the error correction model results indicated that both trade openness and foreign capital inflows have long-run positive effects on economic growth in Nigeria. The study concluded that increased foreign private capital inflows would be necessary if made for all sectors of the economy simultaneously. A similar study was previously conducted by Saibu (2014) using the principal

component analysis (PCA) technique and autoregressive distributed lag (ARDL) bound testing methodology. The results revealed that when combined with trade openness, capital inflow had a significant positive impact on growth, thereby providing empirical support for the transformation hypothesis that capital inflow and trade policy are complementary and growth enhancing.

Khobai and Moyo (2021), examined the effect of trade openness on industry performance in selected SADC countries using the Pooled Mean Group estimator employing the data from 1990 to 2017. Their findings revealed that overall, trade openness has a positive effect on industrial sector performance. In addition, trade openness is detrimental to the manufacturing sector which has witnessed job losses and lower output levels due to lack of competitiveness and a rise in imports. This study did not include foreign capital inflows and the focus was only on SADC countries.

Similarly, Asamoah *et al.*, (2019) investigated the empirical role of institutional factors and the nexus among trade openness, FDI as well as economic growth in Sub-Saharan African countries. Using the structural equation modelling (SEM) technique with data spanning the period 1996 to 2016, the findings revealed significant positive impact of FDI and trade openness on economic growth and a positive effect of institutions on trade openness. The authors excluded FPI as a form of foreign capital inflows in their analysis.

Another study conducted by Babatunde (2011) examined the interconnection among trade openness, infrastructure, FDI and growth using a panel of 42 Sub-Saharan African countries from 1980 to 2003. Based on the RE method, it was revealed that FDI was determined by trade openness and GDP per capita. The results further showed that the interaction between trade openness and infrastructure resulted in a considerable increase in FDI. Further findings

indicated that FDI had a positive and significant effect on growth. This study did not include foreign portfolio investment that the current study is including.

In Ethiopia, Abebaw (2019) analysed the effect of some macroeconomic variables on industry sector output growth using time series data from 1991 to 2018. The study employed an auto-regressive distributed lag (ARDL) bound test co-integration and error correction model. The results derived from the regression analyses established a long-run relationship between industrial output growth and lending rate, inflation rate and trade balance. Both lending rate and trade balance were found to have a negative impact on industrial output growth, while inflation had a positive impact. The study recommended that government has to keep lending rate to the level that could be amenable for firms and maintain the trade balance via manipulating the export and import. The focus of this study was only on a single country Ethiopia and also excluded foreign capital inflows in the analysis.

In the study conducted by Nketiah *et al.,* (2019) on the link between foreign direct investment, trade openness and economic growth in Ghana, it was found that trade openness was the leading factor affecting industrial production. Both foreign direct investment and inflation had positive and negative impacts but were not statistically significant on GDP growth. This study focused on one country only (Ghana) and leave other countries that the current study is including. Furthermore, Adu-Gyamfi *et al.,* (2019) employed some macroeconomic variables such as trade openness, inflation, real exchange rate and investment to investigate their impacts on economic growth in nine West African countries. Using panel random effects and the fixed effects model, the results revealed that inflation had a negative and significant impact on industrial production, while trade openness, real exchange rate and investment showed a significant positive impact. Again, this study focused on only few west African countries and also employed only the static models of RE and FE.

In a similar study, Sakyi *et al.*, (2015) also investigated the long-run impact of foreign direct investment and trade openness on economic growth in Ghana using annual data from 1970 to 2011. Employing the autoregressive distributed lag bounds testing methodology, the findings revealed that foreign direct investment and exports are crucial in fostering growth in Ghana. As a result, the study recommends channelling foreign direct investment to export-oriented sectors and promoting export-led growth strategies in long-term development plans. Liargovas and Skandalis (2012) examined the relative importance of trade openness in attracting foreign direct investment inflows and stimulating output growth in a sample of 36 developing economies from 1990 to 2008. The results from the panel regression revealed a long-run positive contribution of trade openness to the inflow of FDI and output growth in developing economies using a fixed effect model.

Finally, both Orji *et al.*, (2014) and Awad (2011) explore the nexus among foreign capital inflows, openness and economic growth in the West Africa Monetary Zone (WAMZ). The studies examined the implications of six different types of foreign capital inflows, namely foreign direct investment (FDI), official development assistance (ODA), foreign portfolio investment (FPI), remittances (REM) and external debts on output growth. The results revealed some differences in the growth impact of the various forms of foreign capital inflows. Some indicators showed positive impacts, while others showed negative impacts. Given the above literature review, it is evident that empirical studies into the impact of foreign capital inflows and trade openness on industrial output performance in the SSA region is scarce. Therefore, this study seeks to conduct an empirical analysis that addresses this gap.

6.5 The Review of Theoretical Literature:

This study reviews the two-gap model as a start-up theory in explaining the relevance of foreign capital inflows and trade openness on output performance in SSA countries. As an extension of the Harrod-Domar growth model, the two-gap model argues that growth is driven by

physical capital formation. Further, in the same Harrod-Domar model, output performance is a function of the rate of investment and investment productivity. Savings gap occurs in the system since domestic savings alone cannot sufficiently finance the required investment needed to attain and sustain a target growth rate in the economy. The implication is that in addition to the savings gap, foreign exchange or trade gaps exist based on the assumption that not all investment goods can be domestically produced. The aggregation of these two gaps translates into the two-gap model. A progression from the two-gap model is the third concern of fiscal gap where government expenditures and revenue appear inadequate in investment financing leading to three-gap as models proposed by Barro (1990) and Akande & Ola-David (2010). Other theories that explain the direction of the international inflow of capital for investment purposes are the Pull- Factor and Push-Factor Theories. Bacha, (1990) argues that the push-factor theory attributed the direction of capital flows to events on the international front. Such events include business cycles in industrial countries, falling international interest rates, and the rising trend toward international diversification (Bacha, 1990). The pull-factor theory attributed factors responsible for capital flows to domestic factors such as increases in domestic capital productivity, autonomous increases in the domestic demand for money function, and increasing integration of domestic capital markets with global capital markets (Eldar, 2005). The theory of International Financial Puzzle presented five views on the finance-growth nexus as identified by (Bacha, 1990). The first part of this model's perspective was attributed to Hamilton, Bagehot and Schumpeter, with the justification that finance ignites growth. The second perspective was credited to Adam Smith with an opposing view that finance hurts growth. The third perspective emanated from Robinson, who argued that finance is growth-led. The fourth perspective, as postulated by Lucas, indicates that growth is finance-neutral, while the fifth perspective originated from the World Bank and IMF with the conclusion that finance matters because there is a financial crisis. Finally, the study assumes a theoretical

foundation by deducing that if finance matters in investment promotion, then foreign capital inflows (FCI), being a part of the financial flows needed to finance investments, equally matter.

6.6 Methodology

6.6.1 Model Specification

The study follows the direction of flow from the theory of international financial puzzle, to account for output performance as induced by capital inflow in the SSA region, this research kickstart with the dual gap theory. Developing nations, such as countries in the SSA region, rely heavily on the inflow of capital to augment the investment-savings gap. The dual-gap model operates at equilibrating conditions when:

$$S_{it} = I_{it} \qquad 6.1$$

The study proxies the countries' savings levels in the region as S_{it} and I_{it} at the regional investment level. The SSA region has been predominantly low in terms of domestic savings amidst lofty investment. The investment-savings gap generates a vacuum necessitating the need for external capital inflow to meet the lofty investment expectation. The functional relationship is expressed as:

$$S_{it} + Capt_{inflow} = I_{it} \qquad 6.2$$

Unvaryingly, the study re-evaluates the capital stock function to include all forms of capital inflows with openness:

$$K_{it} = S_{it} + Capt_{inflow}op + (1 - \beta)k_{it-1} = I_{it} \qquad 6.3$$

Where K_{it} represents all parameters for capital stock, S_{it} is the savings level for all countries in the region, $Capt_{inflow}$ op represents the aggregate of all the capital inflows to the SSA region with trade openness, β measures capital depreciation and I_{it} measures the predominant level of investment.

The study estimates the output performance model in an augmented Cobb-Douglas production function level such that:

$$Y_{it} = AL_{it}^{1-\beta} K_{it}^{\beta} Capt_{flow} op_{it} \qquad 6.4$$

Y_{it} proxy the output performance in countries within the region of SSA; $AL_{it}^{1-\beta}$ is the elasticity measurement of output per unit of effective labour; K measures output per unit of effective capital $Capt_{flow} op_{it}$ measures the capital inflows with trade openness to the countries in the region. A deviation in the original model is required to accommodate the lag of the dependent variable to be included with the explanatory variables to make the model dynamic. This leads to model 6.5

$$Y_{it} = Y_{it-1} + AL_{it}^{1-\beta} K_{it}^{\beta} Capt_{flow} op_{it} \qquad 6.5$$

The capital inflow-industrial output growth-induced model is expressed as follows:

$$Y_{it} = A + \sum_{i}^{n=1} \partial Y_{_{it-1}} + \sum_{i}^{n=1} \alpha_n AL_{it} + \sum_{i}^{n=1} \gamma_n K_{it} + \sum_{i}^{n=1} \sigma_n Capt_{flowit} op_{it} + \delta_{it} \quad 6.6$$

$\partial, \alpha, \gamma, \sigma$ are the human capital (L) elasticity, physical capital (K), and capital flows with trade openness, respectively. Y_{it} is the output performance for all the countries in the region, A is a constant representing the efficiency of the productive regional economy. Y_{it-1} is the lag of output performance. AL represents the working population or labour force, K_{it} represents the domestic stock of capital, $Capt_{flowit} op_{it}$ is the capital inflow into the SSA region, (*it)* is the panel symbol made up time series *(t*) and cross-section (*i*) characteristics of the data set (1985-2018). Given the purpose of this study which is to examine the effect of capital inflow and trade openness on industrial output performance; to generate the following function, the study further takes the semi-logarithms and time derivatives of equation (6.6):

$$lnY_{it} = A + \sum_{i}^{n=1} ln\partial Y_{_{it-1}} + \sum_{i}^{n=1} \alpha_n lnAL_{it} + \sum_{i}^{n=1} \gamma_n lnK_{it} + \sum_{i}^{n=1} \sigma_n lnCapt_{flowit} op_{it} + \delta_{it} \qquad 6.7$$

Explicitly, the explanatory model intended to capture detailed determinants of output performance is expressed in equation (6.8)

$$lnY_{it} = A + \sum_{i}^{n=1} ln\partial Y_{it-1} + \sum_{i}^{n=1} \alpha_n lnL_{it} + \sum_{i}^{n=1} \gamma_n lnK_{it} + \sum_{i}^{n=1} \sigma_n lnop_{it} + \sum_{i}^{n=1} \pi_n lnREXC_{it} + \sum_{i}^{n=1} \tau_n lnINF_{it} + \sum_{i}^{n=1} \vartheta_n lnRIR_{it} + \sum_{i}^{n=1} ב_n lnFDI_{it} + \sum_{i}^{n=1} \mu_n lnFPI_{it} + \delta_{it} \quad 6.8$$

This chapter aims at investigating the impact of foreign capital inflows and trade openness on output performance in SSA countries. To appropriately model the data and achieve this objective, a summary statistics and unit roots test is conducted on the data and the study employed the fixed effects model (FEM) and random effects model (REM). Although basing on the results of the Hausman test, the preferred model is random effects. The justifications for the choice of these models are given in section 6.8

6.6.2 Brief definition of variables

In line with Sikandar *et al.,* (2021), this study employs annual data collected from SSA countries from 1985 to 2018. The variables were drawn from similar studies, such as Cinar and Nulambeh (2018) and Ayirikame (2021), as well as a dual gap theory which estimates the output performance model in an augmented Cobb-Douglas production function level. Those variables are discussed in Chapter 3 and briefly listed below:

- Output performance (Y)

  This output performance variable acts as the dependent variable in the current objective. The study adopted industrial production to capture output performance. The variable is included in the model because it helps to show the dynamics in the economic activities in any of the countries.

- Labour force productivity (LabF)

  Labour enters the model to represent all human efforts directed toward production. Labour in the model measures the employment proportion of the working population. In this study, LabF is calculated using gross employment rate divided by GDP.

- Foreign direct investment (FDI)

  This is a form of business ownership or investment in one country by an entity based in another country. According to Todaro and Smith (2012), FDI is a form of foreign capital aiming to accelerate economic development.

- Foreign portfolio investment (FPI)

  This is another form of foreign capital inflows aiming to accelerate economic growth. It deals with investment in a grouping of assets such as stocks, bonds, and cash equivalents (Otiwu, 2018).

- Real Interest rate (RIR)

  Real interest rate is the cost of borrowing and it allows this study to measure the process through which it is used to control inflation in the economy. For example, if inflation is high, central banks increase the repo rate, which eventually reduces the money supply in the economy and thereby helps curb inflation (and *vice versa*). RIR is an adjusted interest rate to remove the impact of inflation. Once the interest rate is adjusted, it captures the real cost of the borrower's funds and the real lender's yield to an investor. RIR affects the rate of time preference for current goods over future goods.

- Trade openness (TO)

  Trade openness is simply the ratio or sum of a country's exports and imports. In this study, trade openness as a percentage of GDP, i.e. (Imports + Exports) is employed, which is in line with Wiredu *et al.,* (2020). It is included in the study to see its impact on output performance.

- Real Exchange rate (RER)

  Including this variable in the model allows the study to investigate how variations in the US dollar value affect selected variables in SSA countries, as posited by Bacchetta and Van Wincoop (2000). SSA countries' currencies against the US dollar is used in this study because, as Rodrik (2006) posited, the US is the most industrialised country in the world and their currency is the most traded in the foreign exchange market.

- Capital Productivity (CAPP)

  It measures how well physical capital is used in providing goods and services. OECD measures CAPP in terms of the volume of output, GDP and the volume of capital input. Conceptually, it is the flow of productive services that capital delivers to production. In this study, CAPP is calculated using gross capital formation divided by GDP.

6.7 Data sources

As explained in Chapter 3 of this thesis, the use of panel data for the SSA countries, especially in this objective, is extracted from the World Bank's WDI, the IMF's International Financial Statistics (IFS) database, UNDP and OECD database. All data have 2010 as their base year and are expressed in percentages or indexes. The annual data spanned from 1985 to 2018. The start date is based on data availability, while the cut-off date is an attempt to avoid the COVID-19 period in order to prevent seasonal breaks.

6.8 Estimation technique

Following the empirical studies of Akinola and Bokana (2017) and Wiredu *et al.,* (2020), this study employs the fixed effects model (FEM) and random effects model (REM) to investigate the impact of foreign capital inflows and trade openness on output performance in SSA countries. However, the chosen model basing on the results of the Hausman test is random effects. The reasons for using these models are based on several reasons:

- Firstly, it allows the study to compare and validate results from the two models and select the most appropriate one for the study (Borenstein *et al.*, 2010).
- It allows the study to conduct the test of significant differences in intercepts among the SSA countries by adopting fixed effect least square dummy variables (LSDV) (Akinola & Bokana, 2017).
- Relatively straightforward to implement as an extension of commonly used regression models (Clark & Linzer, 2015).
- Allows the use of further analysis, such as the Hausman test, to resolve confusion between two models (Clark & Linzer, 2015).
- Permits the use of dummy variables in accounting for group-level variations (Williams, 2015).
- Given that both models are panel analyses, it gives more degrees of freedom and explanatory power than time-series or cross-sectional data analysis (Baltagi, 2008).

In addition, the panel FEM and REM are appropriate for this study because they can accommodate second-generation unit root tests like Levin, Lin, Chu (LLC) and Im, Pesaran, Shin (IPS), which account for one or two structural breaks and can further account for cross-sectional dependence tests to prevent biases and spurious results.

Supposing the panel fixed effects and random effects regression model for the SSA countries are specified as follows:

$$Y_{it} = \beta_{i0} + \beta_1 Y_{it-1} + \beta_2 X_{1it} + \beta_3 X_{2it} \ldots\ldots + \beta_P X_{nit} + \mu_{it} \quad (6.9)$$

Where $Y_{it}$is the output performance in SSA countries; β_{i0} is the constant term; i denotes individual countries in the SSA region; $X_1 - X_n$ and Y_i are explanatory variables (for every i = 1……n); β_1-β_P represent the coefficient of the explanatory variables in the model; and μ_{it} is the error term. As earlier stated, the variables in the two models are Y, FDI, FPI, TOP, REXC,

LabF, CAPP and RIR. Based on a priori expectation, a positive relationship is expected between Y and FDI, FPI, TOP, LabF, CAPP, while REXC and RIR may show a negative relationship.

6.9 Estimation results

6.9.1 Interpretation of results

This section showcases the summary statistics results obtained from the pooled observations for this study. All the variables to be adopted in the analysis are described here to understand the brief effects of output (Y) as a proxy for national output performance and its correspondent series among the SSA countries under investigation. The characterised descriptive operates around the minimum and maximum values, standard deviation, mean, and median across variables in the panel data.

Table 6.1: Summary Descriptive Statistics on the series FDI, FPI, CAPP, LabF, REXC, RIR, TO, Y

Variables	Observation	Mean	Standard Dev	Minimum	Maximum
FDI	1,054	3.067698	4.656444	0.0002018	57.83755
FPI	732	1.479034	6.208197	0.0001425	105.1994
CAPP	951	8.97e-09	2.19e-08	-2.85e-09	2.72e-07
LabF	870	55.85231	28.02163	32.39	91.39
REXC	1,054	401.1719	741.9965	2.99e-08	7931.632
RIR	1,054	7.936252	5.869704	0.4	55
TO	1,054	68.48025	34.60134	9.135846	225.0231
Y	1,054	25.49074	12.46147	4.555926	72.71737
INF	1,054	24.98253	176.4266	0.0178712	4800.532

Source: Author's computation using World Bank (2020) data

Table 6.1 presents an overview of the dataset using the raw data of the variables. The results reveal the measures of the central tendency (using the mean and median) and measures of dispersion (standard deviation). As shown in Table 6.1, the summary statistics cluster around

its mean in the model since the mean gives the average value of each of the variables, while the median gives the middle value of each of the eight variables in the model. The minimum and maximum values indicate the smallest and largest value of each of the variables, while the standard deviation is the deviation of the sample mean for each of the variables. It is evident from the results in the table that the values of output performance, foreign direct investment, foreign portfolio investment and trade openness are closer to the minimum than the maximum. This indicates low output performance relative to capital flows with respect to FDI and FPI in SSA countries. These results support the claims by Atardi and Sala-i-Martin (2003) that Africa's growth is unstable. Again, the observation also showed that the mean in relation to standard deviation values for labour force productivity, real exchange rate, real interest rate and trade openness consistently collapsed within the minimum rather than the maximum range. The relatively low values exhibited by the standard deviations on the series indicate the deviation of only a negligible amount of the actual data obtainable from the values of the mean in the series. The industrial production representing output performance is important, which is also the dependent variable in the model. The study found that its maximum value is 72.71737, whereas the minimum is as low as 4.555926 with a mean of 25.49074, indicating closeness to the minimum than the maximum. The standard deviation strongly confirms the claim since it is closer to the mean. This result substantially supports a priori expectations that output performance is low in the SSA region.

Correlation Matrix on the series Y, FDI, FPI, INF, CAPP, LabF, REXC, RIR, TOP

To ascertain that the problem of multi-collinearity does not exist in the study's estimations, this section presents the degree of association among the variables.

Table 6.2 Pair Wise Correlation on the series Y, FDI, FPI, INF, CAPP, LabF, REXC, RIR, TOP

	Y	FDI	FPI	INF	CAPP	LabF	REXC	RIR	TOP
Y	1.0000								
FDI	0.1960	1.000							
FPI	-0.0062	0.0167	1.0000						
INF	0.1525	0.0407	-0.0285	1.0000					
CAPP	-0.1761	0.0412	-0.0209	0.1436	1.0000				
LabF	-0.1325	-0.0269	-0.0161	0.0677	-0.1173	1.0000			
REXC	-0.2251	0.1004	-0.0275	-0.0452	-0.0989	0.1672	1.0000		
RIR	0.0079	-0.0440	-0.0017	0.0502	-0.0776	-0.0885	0.0861	1.0000	
TO	0.4516	0.4649	0.0490	0.1089	0.0650	-0.1781	-0.1953	-0.1010	1.0000

Source: Author's computation using World Bank (2020) data

Table 6.2 above reflects the correlation matrix for all the variables adopted in this panel model. All variables displayed all pairs of degrees and associations with each another. However, the study prioritised associations between output and the explanatory variables; FDI, FPI, CAPP, LabF, REXC, RIR and TO, which are the main focus of the study. Generally, the pairs of variables are all positively correlated with Y, except for FPI, CAPP, LabF, and REXC, with a negative correlation. It implies that as the level of output performance (industrial production) increases, it increases with corresponding independent variables. A strong correlation exceeding 0.5 exist in the pair of variables, and weak association dominates the whole relationship. For instance, a weak association exists between industrial production rate and FDI, FPI, CAPP, LabF, REXC, RIR, and TO. The findings in this section corroborates those results found in the summary statistics in Table 6.1. The outcome shows that the variables to be estimated did not suffer from the problem of multicollinearity. However, descriptive and correlation analysis are only pre-test to give a brief overview of the variables under investigation. The econometric analysis is employed to either refute or confirm the sketchy outcomes obtained from the descriptive analysis. Consequently, the study progresses to panel

data analyses which begin with fixed and random effects and the findings are shown in Table 6.3 below.

Table 6.3: Fixed effects model on the series Y, FDI, FPI, INF, CAPP, LabF, REXC, RIR and TO

Fixed-effects (within) regression				
Number of obs		619		
Number of groups		29		
within	0.0976		Min	5
between	0.1331		Avg	21.3
overall	0.1149		max	29
Prob > F	0.0000		corr(u_i, Xb) =	-0.1484
F (8,582)	7.87			
Variables	Coefficients	Standard Error	t-statistics	P-value
FDI	-0.1199136	0.0471477	-2.54	0.011
FPI	-.0133091	.0200507	-0.66	0.507
INF	.0573184	.0166954	3.43	0.001
CAPP	-1.30e+08	5.92e+07	-2.19	0.029
LabF	-.4279917	.0838572	-5.10	0.000
REXC	-.0015736	.0005544	-2.84	0.005
RIR	-.2859641	.1083946	-2.64	0.009
TO	.0411006	.0142177	2.89	0.004
Cons	55.67252	5.879314	9.47	0.000

Source: Author's computation using World Bank (2020) data

sigma_u | 1.2129317

sigma_e | 4.6005026

rho | .06499445 (fraction of variance due to u_i)

F test that all u_i=0: F(33, 1012) = 2.10 Prob > F = 0.0003

Table 6.4: Random- effects model on the series Y, FDI, FPI, INF, CAPP, LabF, REXC, RIR and TO

Random-effects (within) regression				
Number of obs		1,054		
Number of groups		34		
within	0.0939		Min	5
between	0.2072		Avg	21.3
overall	0.1686		max	29
Prob > chi2	0.0000			
Variables	Coefficients	Standard Error	t-statistics	P-value
FDI	-.1179871	0.0478594	-2.47	0.014
FPI	-.0139777	0.0203995	-0.69	0.493
INF	.0603699	0.0169478	3.56	0.000
CAPP	-1.62e+08	5.90e+07	-2.74	0.006
LabF	-.3308064	0.0713309	-4.64	0.000
REXC	-.0016523	0.0005234	-3.16	0.002
RIR	-.2659645	0.1056963	-2.52	0.012
TOP	.0538578	0.0140552	3.83	0.000
sigma_u	8.0932392			
sigma_e	3.9631503			

Source: Author's computation using World Bank (2020) data

6.6.1 The random effects test results

Tables 6.3 and 6.4 are the two outcomes from the static regression results when analysing the effects of FDI, FPI, INF, CAPP, LabF, REXC, RIR, and TO**,** on output performance by adopting panel fixed effects and random effects models, respectively. Although the outcomes of the two models portrayed similar behaviours, only the random effects model is considered based on Hausman's suggestion. All the variables in Table 6.4 are statistically significant to impact output performance except for foreign portfolio investment. This suggests that these macroeconomic variables are behaving well to determine output performance in the SSA region with the static model. It is a snappy indication that the static model can determine output

performance by the interactions among the observed variables in the SSA countries under investigation.

However, foreign portfolio investment failed to significantly impact output performance. This is an indication that foreign portfolio investment is not doing well to impact the output performance in the region in a static economy. Past studies such as Yaoxing (2010); Awad (2011); Orji *et al.,* (2014); Sakyi *et al.,* (2015); Ayodele *et al.,* (2019); Asamoah *et al.,* (2019) also found a significant relationship between output performance and these macroeconomic variables under investigation. The study seeks further justification from the dynamic model to substantiate the study's claims. No economy is static in the world. The assumption that a model will behave well for any given economy in the static world must be supported with dynamic evidence. Consequently, the study opted for a dynamic model of system GMM.

Hausman Test Regression

This section reports the results from the Hausman test conducted to ascertain the more appropriate model between fixed and random effects.

Table 6.5: Hausman Test for Fixed or Random Effects

Variables -.0015514 .001134	(b) fe	(B) Re	(b-B) Difference	sqrt(diag(V_bV_B)) S.E.
FDI	-0.1199136	-0.1179871	-0.0019265	-
FPI	-0.0133091	-0.0139777	0.0006685	-
INF	.0573184	.0603699	-.0030515	-
CAPP	-1.30e+08	-1.62e+08	3.20e+07	5285728
LabF	-.4279917	-.3308064	0.0971853	0440901
REXC	-.0015736	-0.0016523	0.0000788	0.000183
RIR	-.2859641	-2659645	-0.0199996	0.0240349
TO	0.0411006	0.0538578	-0.0127572	0.002144

b = consistent under Ho and Ha; obtained from xtreg; B = inconsistent under Ha, efficient under Ho; obtained from xtreg. Test: Ho: difference in coefficients not systematic chi2(1) = (b-B)'[(V_b-V_B)^(-1)](b-B) = 36.74; Prob>chi2 = 0.0000

Source: Author's Computation *using World Bank (2020) data*

Table 6.5 shows the result of the Hausman test. Through the Hausman test, the study investigates the most appropriate model between the fixed effects and random effects models. Based on the probability value, the result from the Hausman test shows that the random effects model is the appropriate model to be adopted for the study. At the 5% level, the null hypothesis (Ho) is rejected, which indicates that the random effects model is more suitable than the fixed effects model and therefore is adopted for this study. In line with Wilfred and Bokana (2017), the adoption of the random effects model is premised upon the justification that it can handle heterogeneity effects that may influence the outcome of the study's findings. All the same, all the significant variables found in the random effects model are also found to be significant in the fixed effects model; the signs and sizes of coefficients from both models are relatively the same. This confirms the earlier assertion that foreign capital inflows and trade openness affect the industrial sector in contributing to output performance in the SSA region.

6.10 Dynamic Panel Data Analysis

Table 6.6: Dynamic panel-data estimation, one-step system GMM

Number of obs	619			
No of instruments	= 13		No of groups	29
Wald chi2(6)	140493.71		Obs per group:	min = 5
Prob > chi2	0.000		Avg	21.34
Time variable:	Year		Max	29
Variables	Coeff	Standard Error	Z-Statistics	P-Value
Y. L1	0.8970514	0.0411171	21.82	0.000

FDI	0.5634075	0.1006801	5.60	0.000
FPI	-.0306877	0.0118452	-2.59	0.010
INF	-0.0279013	0.0379032	-0.74	0.462
CAPP	-1.10e+08	5.99e+07	-1.83	0.067
LabF	-.234145	0.0714196	-3.28	0.001
REXC	.00064	0.0003212	1.99	0.046
RIR	-0.1643646	073189	-2.25	0.025
TO	-.0164017	0.0118746	-1.38	0.167
Cons	19.07168	5.535954	3.45	0.001

Source: Author's Computation *using World Bank (2020) data*

Table 6.6 explains the results of the system GMM estimation carried out on the series Y, TO, REXC, CAPP, FPI, FDI, INF, RIR, and LabF in this section. The total output variable has been adopted to proxy output performance in the model. From the results, capital productivity (CAPP), foreign direct investment (FDI), foreign portfolio investment (FPI), real interest rate (RIR), labour force (LabF) and real exchange rate (REXC) are all statistically significant whereas, trade openness (TO) and inflation (INF) are not statistically significant to impact output performance. The implication is that these variables (TO and INF) are not impactful enough to influence output performance in the SSA region. A further investigation indicates that while capital productivity (CAPP), real interest rate (RIR), labour force productivity (LabF) and foreign portfolio investment (FPI) all inversely impact output performance, only real exchange rate (REXC) and foreign direct investment (FDI), has a direct relationship.

Again, as capital productivity increases by one unit, according to the results, output performance decreases only marginally. Capital productivity is the ratio of gross capital formation over GDP. This is a case where locally-made products are consumed by the nation more than imported goods. More of these occur when there is no control over capital flight and brain drain in the SSA region. In addition, a 1% increase in real interest rate would cause output performance to decrease by 16%. This result is expected as interest rate increases, cost of

imported raw materials and other capital required to develop home industries could become more expensive for output performance. There is a positive relationship between output performance and foreign direct investment. It simply means that a 1% increase in foreign direct investment would cause output performance to increase by 56.3 units. This follows a priori expectation as multiple economies of scale could emerge to enhance output performance as foreign direct investment increases, all things being equal.

Sargan test of over-identifying restrictions

To ascertain that over-identification and serial correlation in the dynamic panel data do not occur. The section attempts to test for the instruments' validity as adopted in the model. The method for testing the instrument under the system GMM is the Sargan test. Roodman (2009) raises serious concerns about the reliability of the test in cases where quite a number of instruments are to be estimated. What determines too many instruments is yet to be known in the literature (Ruud, 2000). However, the two common methods by which appropriate instrumental variables become acceptable are the check for orthogonality with the error term and correlation on the endogenous variable(s). Confirming the validity of moment conditions in the systemic dynamic panel data estimates is the proper procedure for establishing the correct outcomes. The validity of conditional moment can only be tested on cases of over-identification, which in turn, can only be tested when they appear unidentified in the model. The validity of the over-identifying restrictions confirms the Sargan test of a null hypothesis. Over-identification is a common case associated with dynamic panel data in SYSGMM in literature. Most problems identified in the system GMM regression are connected to the attribute of the finite sample in the analysis of SYSTEM GMM as being affected by two major issues; the strength of identification and the number of moment conditions (Arvanitidis, Pavleas, & Petrakos, 2009). Hassen /Sagan test, otherwise known as the J test, appears to be the most adequate test available in the literature when testing for the validity of the

identification problem. Under conditional weak asymptotic moments, particularly when the number of instruments is significant in the cross-sectional regression, the test remains valid (Kwon, 2009; Wong, 2012). Again, the possibility of having autocorrelation of serial correlation in the dynamic panel data analysis is another major concern affecting dynamic panel data estimators. It simply implies that the efficiency of SYSGMM estimators has its limitation (Arvanitidis et al., 2009). The result of the overidentification test and the test for serial correlation are presented in Tables 6.7 and 6.8, respectively.

Table 6.7: Sargan test of over-identifying restrictions

H0: over-identifying restrictions are valid		
	chi2(25)	6.79
	Prob > chi2	0.659

Source: Author's Computation *using World Bank (2020) data*

The findings indicated that the null hypothesis could be rejected; consequently, restrictions on over-identification are invalid. By implication, the adopted number of instruments in the SYSGMM analysis model does not negatively impact the SYSGMM estimators. A better performance model is expected as the P-value is close to one. Consequently, the findings are sufficient to establish no restriction on over-identification. In addition, the number of instruments is less than the number of countries (group). Information from the model diagnostics indicated that the Arellano-Bond SYSGMM estimator produces the most preferred estimates at AR (2). A degree of serial correlation could be expected at the initial level of AR (1) estimation but must be corrected at the level of AR (2) estimate. Consequently, a significance level may be expected at AR(1), which must be at AR(2). Finally, the overall P-value is significant.

Table 6.8: Result on Serial Correlation

Method	Z-Statistics Result	P-Value
Arellano-Bond test for AR(1)	z = -2.58	Pr > z = 0.010
Arellano-Bond test for AR(2)	z = -1.20	Pr > z = 0.229

Source: Author's Computation *using World Bank (2020) data*

6.11 Summary

This chapter examined the impact of foreign capital inflows and trade openness on output performance in the SSA countries. The study adopted panel data analysis for both static and dynamic models with annual data from 1985 to 2018 to achieve the study's objective. It was hypothesised for H_0: that foreign capital inflows and trade openness do not impact output performance in SSA countries and for H_A: that foreign capital inflows and trade openness do significantly impact output performance in SSA countries. Systematic procedures were employed, beginning with summary statistics and a correlation matrix on the dataset to determine the behaviours of the data. Further, the study progressed to employ panel fixed effects and random effects models to analyse the data as well as the Hausman test to select the suitable static model for the study. Evidence from the Hausman test showed that the random model was the preferred static analysis method. Firstly, the estimation results from the summary statistics and correlation matrix showed that the summary statistics cluster around their mean in the model and the values of output, foreign direct investment, foreign portfolio investment and trade openness are closer to the minimum than the maximum. This indicates low productivity and capital flows in SSA countries. The results from the correlation matrix showed that there is a strong relationship among the macroeconomic variables in the model. The implication of this is that Y, To, REXC, CAPP, FPI, FDI, RIR, and LabF could impact output performance in SSA countries. Consequently, there is a strong association among the

variables. The result from the random effects models showed that aside from foreign portfolio investment, all the macroeconomic variables in the models were doing enough to explain the output performance in the SSA countries.

The implication of these findings is that policymakers in SSA countries have to formulate policies that can successfully promote foreign capital inflows and ensure trade openness or liberalisation. Given the opportunities offered by world markets to promote global trade, policies towards managing a good combination of domestic investment and foreign capital inflows as well as trade openness must be formulated to boost output performance in the SSA countries.

Finally, the result from the Hausman test shows that the random effects model is the appropriate model to be adopted for the study. At the 5% level, the null hypothesis (Ho) is rejected, which indicates that the random effects model is more suitable than the fixed effects model and consequently adopted for this study. However, since past studies such as Yaoxing (2010); Awad (2011); Orji *et al.*, (2014); Sakyi *et al.*, (2015); Ayodele *et al.*, (2019); Asamoah *et al.*, (2019) all found a significant relationship between output performance and these macroeconomic variables under investigation, the study seeks for further justification from the dynamic model. No economy is static in the world. The assumption that a model will behave well for any given economy in the static world may be misleading. Consequently, the study opted for a dynamic model of system GMM. Based on the result from the dynamic system GMM, the study provides evidence as follows:

(1) Trade openness (TO) and inflation (INF) are not statistically significant to impact output performance.

(2) From the result, capital productivity (CAPP), foreign direct investment (FDI), foreign portfolio investment, real interest rate, labour force and real exchange rate are all statistically significant.

(3) Capital productivity (CAPP), real interest rate (RIR), labour force (LabF) and foreign portfolio investment (FPI) all inversely impact output performance; only real exchange rate (Rexch) and foreign direct investment (FDI) have a direct relationship.

(4) For foreign portfolio investment (FPI), a unit increase in foreign portfolio investment (FPI) would decrease output performance by three units.

(5) Again, as capital productivity increases by one unit, according to the result, output performance decreases only marginally. Capital productivity is the ratio of gross capital formation over GDP. This is a case where locally-made products are consumed by the nation more than imported goods. More of these occur when there is no control over capital flight and brain drain in the SSA region.

(6) In addition, a 1% increase in real interest rate would cause output performance to decrease by 16%. This result is expected as interest rate increases, cost of imported raw materials and other capital required to develop home industries could become more expensive for output performance. There is a positive relationship between output performance and foreign direct investment.

(7) It simply means that a 1% increase in foreign direct investment would cause output performance to increase by 56.3 units. This follows a priori expectation as multiple economies of scale could emerge to enhance output performance as foreign direct investment increases, all things being equal.

As a policy recommendation, SSA countries should reposition trade openness (TO) policy in order for it to impact output performance since it currently could not significantly impact output performance.

Consequently, the following policy measures are required among the SSA countries:

(i) Trade openness (TO): The urgent need to encourage trade liberation among member countries on products with comparative advantage. The region must establish policies that will enhance export promotion and import substitution. This policy should be aimed at strengthening home industries. Taxes could be levied to change the people's taste in imported goods but must be moderated on imported raw materials for local production. Since most industries in SSA are at the infant stage and mostly lacks basic technological skill to produce goods of international quality.

(ii) Capital productivity (CAPP): The study derived capital productivity from the ratio of gross capital formation over GDP. Gross capital formations incorporate physical capital with other forms of capital. Policies aimed at building infrastructure must be promoted in each of the SSA member nation. Worn-out capital should be replaced. Modern equipment to develop each country's capital base should be prioritised. Human capital development through skill acquisition is required urgently.

(iii) Real interest rate (RIR): Interest on capital should be structured to enhance output performance. Interest should be to attract Investment into the system. Home technology should be encouraged and tax holidays such as patent rights must be given to new industries to encourage research-based products.

(iv) Foreign capital inflows (FPI and FDI): The study recommends that the central banks in SSA countries should develop better strategies to enhance the benefits of capital flows. This can be done by establishing and improving financial institutions which are still developing.

CHAPTER 7

SUMMARY, CONCLUSION AND RECOMMENDATIONS

7.1 Summary

This study investigated Foreign Capital Inflows and Trade Openness Nexus: The Case of Selected Sub-Saharan African Countries. The direction of Inflows of Foreign Capital, the degree of openness to trade and the corresponding effect on the output performance among the SSA countries remain unknown in the literature. This study contributes to the literature by assessing the relationship between foreign capital inflows and trade openness in SSA countries. The study investigated the socioeconomic determinants of foreign capital inflows in SSA countries by examining the impact of each determinant on foreign direct investment and foreign portfolio investment separately. Finally, the study established the impact of foreign capital inflows and trade openness on output performance in SSA countries. The hypotheses from the three objectives are **H_0:** There is no relationship between foreign capital inflows and trade openness in the Sub-Saharan Countries of Africa. **H_A:** There is a relationship between foreign capital inflows and trade openness in the Sub-Saharan Countries of Africa; **H_0:** Socioeconomic factors do not determine foreign capital inflows in SSA countries; **H_A:** Socioeconomic factors do determine foreign capital inflows in SSA countries; **H_0=** foreign capital inflows and trade openness do not impact output performance in SSA countries. **H_A**= foreign capital inflows and trade openness impact output performance in SSA countries. The African Development Bank (AfDB), among many other global financial bodies, has made various efforts to attract foreign capital to the continent. For example, AfDB has tried to remove barriers that hinder the flow of investment finance in the region by bringing together multilateral financial institutions, private funds, pension funds and sovereign wealth funds to create a mechanism to improve output performance. This implies that external financial resources are greatly needed to finance

investment in the SSA region because income levels in SSA are too low to generate enough domestic resources to finance its investment (Chorn & Siek, 2017). However, the poor design of the macroeconomic policies, distorted investment and trade policies, and the inability to identify relevant factors that determine capital flows into the region are among the factors that led to the ineffectiveness of the efforts made so far (Rodrik, 1998).

Consequently, the study investigates the determinants of capital inflows in the SSA region and its effects on output performance. The relevance of capital inflow in promoting output performance has been addressed by Yaoxing (2010); Awad (2011); Orji *et al.,* (2014); Sakyi *et al.,* (2015); Ayodele *et al.,* (2019); Asamoah *et al.,* (201 9) among others. These studies' findings agreed that a policy framework seeking to promote foreign capital inflow would facilitate output performance in the SSA countries. However, the efficiency of such a policy framework capable of stimulating output performance depends on the effectiveness of the transmission mechanism impacted by the structure, vulnerability, interplay and composition of the explanatory variables. Most studies concur that nations with high levels of capital inflow with a corresponding policy on trade openness are likely to be susceptible to low output performance, particularly as the economy tends to a steady state. Consequently, the study's first primary objective was to examine the relationship between foreign capital inflows and trade openness in selected Sub-Saharan African countries within the framework of the foreign capital inflow enhancing policy mechanism transmission. The factors that determine foreign capital inflows in the SSA region have been identified through panel data analysis. Following the adoption of a nonlinear panel approach called panel smooth transition regression (PSTR) by Gonzalez *et al.,* (2005) and Omay and Kan (2010), this study considers modelling logistic transition function for the time series STARs. The study specifies the PSTRVEC models to examine the regime-wise interactions between foreign capital inflow and trade openness among 31 SSA countries.

The study proposed the use of a nonlinear smooth transition regression framework, which is a panel co-integration test and further estimated a nonlinear panel vector error correction model. The findings revealed a strong co-integration of variables, which implies that the adjustment of capital and trade flows to the long-run equilibrium level was essentially nonlinear. The study further used a nonlinear smooth transition panel vector error correction model to estimate possible regime-dependent dynamics between trade and capital flows. The nonlinear estimated model suggested that the dynamic interrelationship between the two variables depended on the phases of the economy. To assess whether the causal link between foreign capital and trade openness varies across phases of the business cycle, the study further conducted regime-dependent granger causality tests.

The summary of the findings of the Granger causality tests showed that, in the short run, trade openness increased foreign capital inflows only in the high-growth regime, while foreign capital inflows increased trade in the low-growth regime only.

This result was expected and supported by the a priori expectation as this result supports the findings of Saibu (2014), who observed that capital inflow, when interacted with trade openness, had a significant impact on growth. This result is also consistent with the argument of Adusah-Poku (2016) and Chorn and Siek (2017) in their findings. The implication from the finding showed that trade openness increased foreign capital inflows in both high and low growth regimes in the long run. Consequently, policies that improve trade openness are required as this will considerably influence foreign capital inflow. In terms of the second primary objective, the study examined the socio-economic determinants of foreign capital inflows in the SSA countries using a panel data analysis with annual data from 1985 to 2018. Debate continues in the literature on the link between foreign capital inflows and the corresponding socioeconomic determinants. While certain schools of thought emphasise direct impact, others believe that the impacts are transitory. For instance, while the idea for this study

has been rooted in the neoclassical growth theory, evolutionary and institutional economics maintain that capital flows are important for output performance and its socioeconomic determinants are essential in determining its attractiveness (Prasad *et al.,* 2006). The model for the second objective was rooted in the neoclassical growth model of the Cobb-Douglas production function. Through capital stock, international capital enters the model directly. Therefore, a simple neoclassical growth theory is modelled in the form of the Cobb-Douglas production function as proposed by (Mankiv *et al.,* 1991; Fuente (2011). The model expresses foreign capital inflow with respect to FDI and FPI as a dynamic function of human capital investment, life expectancy, inflation, real exchange rate, GDP growth rate and food security. Due to limited access to data for certain countries, data was adopted for 31 of the 54 SSA countries. The study explored both the static panel models of random and fixed effects within the regression, with preferences on random effects as suggested by the Hausman test and dynamic panel models of the systemic generalised method of moments. The focus of the study was on 31 SSA countries with a total of seven variables, including foreign direct investment and foreign portfolio investment as dependent variables to proxy foreign capital inflows. The outcome indicates that the effects of socioeconomic determinants on foreign direct investment and foreign portfolio investment appeared to be mixed for both the static and dynamic models for foreign direct investment and foreign portfolio investment. For instance, taking FDI as the dependent variable in the reported random effects model, RIR, LEX and food security variables were statistically significant. In the dynamic model with a similar FDI as the dependent variable, in addition to food security and RIR, REXC, INF and GDPgrowth, are also statistically significant. However, life expectancy failed to statistically impact FDI against the static model. In the reported random effects on FPI, it was discovered that no variable had a significant impact on FPI except for food security which remained significant in the dynamic model but was not in the static model.

Since the dynamic panel SYSGMM provides a more robust and consistent outcome to corroborate the study's other findings, much attention was devoted to explaining areas of variations and differences from what was obtainable under the random panel models. Post-estimation tests were conducted on the results' validity which included a test for the presence of serial correlation and over-identification. The outcome showed that the aggregate number of instruments adopted by the SYSGMM analysis failed to impact the SYSGMM estimators. The closer the P-value is to one, the better; consequently, the outcome was robust, which confirmed no over-identification of restriction. Further, the number of instruments did not exceed the number of (groups) countries. Model diagnostics also indicated that the estimator of Arellano-Bond SYSGMM produced the preferred estimates at AR (2). The initial level of AR (1) estimation indicated that a degree of serial correlation may be expected at the initial level of AR (1) estimation but must be corrected at the level of AR (2) estimation.

Consequently, a significance level may be expected at AR (1), which must be at AR(2). Finally, the overall P-value was significant. The third broad objective of the study was to establish the impact of foreign capital inflows and trade openness on output performance in SSA countries. This research kickstarted with the dual gap theory. Developing nations, such as countries in the SSA region, rely heavily on the inflow of capital to augment the investment-savings gap resulting in the dual-gap model operating at equilibrium. Again, debate continues in the literature on the possible linking effects of foreign capital inflows and trade openness on output performance and the exact impacts of each macroeconomic variable under investigation on output performance. Some schools of thought posit direct impacts, while others assume inverse and neutrality effects. The theory of the International Financial Puzzle presented five views on the finance-growth nexus as identified by Levine (1997). The first part perspective of this model was attributed to Hamilton, Bagehot and Schumpeter, with the justification that finance ignites growth. The second perspective was credited to Adam Smith with an opposing view

that finance hurts growth. The third perspective emanated from Robinson, who argued that finance is growth-led. The fourth perspective, as postulated by Lucas, indicates that growth is finance-neutral, while the fifth perspective originated from the World Bank and IMF with the conclusion that finance matters because there is a financial crisis. Finally, the study assumes a theoretical foundation by deducing that if finance matters in investment promotion, then Foreign Capital Inflows (FCI), being a part of the financial flows needed to finance investments, equally matter.

The model expressed output performance (Y) as a function of trade openness, real exchange rate, capital productivity, foreign portfolio investment, foreign direct investment, real interest rate, and labour force. Due to insufficient data in certain countries, data was adopted for 31 countries in the SSA region. The study engaged the static panel models of random and fixed effects and dynamic panel models of SYS-GMM, and where the outcome was uncertain, further diagnostic tests were conducted. The study focused on 31 countries in the SSA region with a total of seven variables, output inclusive. The SYSGMM result indicated that capital productivity (CAPP), foreign direct investment (FDI), foreign portfolio investment, real interest rate, labour force and real exchange rate were all statistically significant, whereas trade openness (TO) and inflation were not statistically significant to impact output performance.

A further investigation revealed that while capital productivity (CAPP), real interest rate (RIR), labour force (LabF) and foreign portfolio investment (FPI) all inversely impacted output performance, only real exchange rate (REXC) and foreign direct investment (FDI), had a direct relationship. Again, as capital productivity increased by 1 unit, output performance decreased only marginally, according to the results. Capital productivity is the ratio of gross capital formation over GDP. This is a case where locally-made products are consumed by the nation more than imported goods. More of these occur when there is no control over capital flight and brain drain in the SSA region. In addition, a 1% increase in real interest rate would cause output

performance to decrease by 16%. This result is expected as interest rate increases, the cost of imported raw materials and other capital required to develop home industries could become more expensive for output performance. A positive relationship between output performance and foreign direct investment was also established. It simply means that a 1% increase in foreign direct investment would cause output performance to increase by 56.3 units. This follows a priori expectation as multiple economies of scale could emerge to enhance output performance as foreign direct investment increases, all things being equal.

The diagnostic test on over-identification restriction and the possible presence of serial correlation was carried out. The findings indicated that the null hypothesis could be rejected; consequently, restrictions on over-identification were rendered invalid. By implication, the adopted number of instruments in the SYSGMM analysis model did not negatively impact the SYSGMM estimators. A better performance model is expected as the P-value was close to one. Consequently, the findings are sufficient to establish no restriction on over-identification. In addition, the number of instruments was less than the number of countries (group). Information from the model diagnostics indicated that the Arellano-Bond SYSGMM estimator produced the preferred estimates at AR (2). A degree of serial correlation could be expected at the initial level of AR (1) estimation but must be corrected at the level of AR (2) estimate. Consequently, a significance level may be expected at AR(1), which must be at AR(2). Finally, the overall P-value was significant. From the study's findings, it is evident that the following hypotheses have been achieved: **H_A:** There is a relationship between foreign capital inflows and trade openness in the Sub-Saharan Countries of Africa; **H_A:** Socioeconomic factors do determine foreign capital inflows for foreign direct investment but not on foreign portfolio investment in SSA countries; **H_A**: Foreign capital inflows and trade openness do impact output performance in SSA countries. Therefore, the objectives of the study were met.

7.2 Policy Implications

The summary result of the Granger causality tests in objective one showed that, in the short run, trade openness increased foreign capital inflows only in the high-growth regime, while foreign capital inflows increased trade in the low-growth regime only. The fact that trade openness increased foreign capital inflow only in the high-growth regime and not in the low-growth regime calls for profound policy implications. Most SSA countries operate in a low growth regime and factors responsible for such economic downturn are still unknown. These unknown variables are what researchers are struggling to discover in order to recommend appropriate policy suggestions. A priori expectation of the relationship under investigation would expect an increase in foreign capital inflows to impact trade in the low-growth regime as finding the right outcome in the nexus could justify a smooth transition from a low to a high regime.

Again, in identifying the dynamic relationship between foreign direct investment and foreign portfolio investment and the series of factors that determine them in the SSA countries, some variables in the model, especially inflation, life expectancy and human capital investment, failed to significantly impact foreign direct investment. Infact, all variables were not statistically significant under foreign portfolio investment in the static model. Also, only food security was found significant in the dynamic model with FPI as the dependent variable.

This strongly indicates that foreign capital inflows made up of foreign direct investment and foreign portfolio investment in these SSA countries could not compete favourably with regional economies in other parts of the world where significant results were found. Again, the study supports the findings of other studies that concluded that foreign capital inflow (foreign direct investment and foreign portfolio investment) are positively linked to certain favourable socioeconomic conditions, thereby stimulating GDP growth rate in their exhibition of direct

relationship (Simionescu and Naroş 2019). This implies that SSA governments could ensure the equitable flow of these macroeconomic variables as their effect could increase foreign capital inflows in favour of all citizens. Real exchange rate and inflation inclusive exhibited an inverse relationship with foreign direct investment in the dynamic model. The literature notes that the region has poor performance in terms of exchanges of the currency relative to the US dollar alongside inflation than most other regions in the world. Infact, allowing further increase according to results from the second objective under the dynamic model would decrease FDI. The region has been bedeviled with currency devaluation with accompanying low output performance, which consistently results in inflation in the region. The SSA government has continued to implement weak policies impacting real exchange rate and inflation in the region.

Having recognised the challenges confronting foreign capital inflows in the SSA region, this study seeks to establish the impact of foreign capital inflows and trade openness on output performance in SSA countries. The aim was to assess ways in which foreign capital inflows and trade openness could be adopted to revamp the real output performance sector in SSA countries. The study's findings have drawn much for policy implications. Previous studies by Ayodele *et al.,* (2019); Saibu (2014); Yaoxing (2010); Kandiero and Chitiga (2006) all confirmed the positive nexus between foreign capital inflows/trade openness on real output performance. However, the current study found trade openness (To), capital productivity (CAPP), real interest rate (RIR) to negatively impact output performance among SSA countries. This study confirmed Trade openness and inflation not to be statistically significant on output performance in the dynamic panel model. A further investigation indicates that while capital productivity (CAPP), real interest rate (RIR), labour force (LabF) and foreign portfolio investment (FPI) all inversely impacted output performance, only real exchange rate (REXC) and foreign direct investment (FDI) had a direct relationship. The study's result is supported by Gyamfi *et al.,* (2019); Nketiah et al. (2019), Orji *et al.,* (2014) and Awad (2011), that

concluded that capital productivity has adverse effects on output performance. The study shows that output performance could decline in the region with increasing activities of capital productivity, real interest rate (RIR), labour force (LabF) (perhaps unskilled or illegal activity) and foreign portfolio investment (FPI). The implication is that no adequate policies are in place to engage these macroeconomic variables to stimulate productive activities of output performance. The lack of effective policy measures causes these variables to end up in unproductive activities, thus inhibiting output performance in the region.

7.3 Policy Recommendations

Sequel to the failure of the SSA government on policy measures as identified from the study's findings, it is clear that urgent policy measures are imperative to improve the current state of (i) trade openness and foreign capital inflows in the SSA region. (ii) capital inflows and output performance to salvage the region from utter collapse. The following recommendations are hereby suggested for implementation:

A priori expectation of the relationship between trade openness and foreign capital inflows under investigation would expect an increase in foreign capital inflows to impact trade in the low-growth regime. In the short run, trade openness increased foreign capital inflows only in the high-growth regime, while foreign capital inflows increased trade in the low-growth regime only.

(1) Policies to reposition growth are urgently required, as findings have suggested that a low-growth regime would not cause foreign capital inflow to impact trade. Factors determining growth in the SSA countries vary across countries. Some countries are based on the production of primary and agro-based products. To such countries, mechanised production and modern seedling should be provided through agricultural banks to provide loan facilities to farmers. The policy should classify

trading organisations into high, medium and low, based on the investible fund capacity sourced from local sources. Those with a strong financial base should be made to support the low trading partners until such weak organisations can withstand competition.

(2) An ideal bank for regional capital flow must be established in the region subsequent to other banks, such as agricultural banks and banks of industries. This bank should, by white paper policy, be allowed in countries of SSA, saddled with the responsibility of managing these investible funds and capital flow and channelling them to the appropriate sector for output performance monitoring.

(3) SSA countries must consider the relevant result that indicates that capital productivity (CAPP), foreign direct investment (FDI), foreign portfolio investment (FPI), real interest rate (RIR), labour force (LabF) and real exchange rate (REXC) are all statistically significant to output performance. Capital productivity (CAPP), real interest rate (RIR), labour force (LabF) and foreign portfolio investment (FPI) all inversely impact output performance. Only real exchange rate (REXC) and foreign direct investment (FDI) have a direct relationship. For foreign portfolio investment (FPI), a unit increase in foreign portfolio investment (FPI) would decrease output performance by three units.

Consequently, the following policy measures are required among the SSA countries:

(i) Trade openness (To): An urgent need to establish a policy that will enhance export promotion and import substitution since SSA policies are not getting things right with trade. The region should avoid being at the receiving end from the developed counties. These policies should be aimed at strengthening home industries. Various taxes could be levied to change the taste of the people on imported goods but must be moderated

on imported raw materials for local production. This is important because most industries in SSA are at the infant stage and mostly lack essential technological skill to produce goods of international quality.

(ii) Capital productivity (CAPP): The study derived capital productivity from the ratio of gross capital formation over GDP. Gross capital formations incorporate physical capital with other forms of capital policy aimed at building infrastructure. Worn-out capital should be replaced. Modern equipment to develop each country's capital base should be prioritized. Human capital development through skill acquisition is required urgently.

(iii) Real interest rate (RIR): Interest on capital should be structured to enhance output performance. Interest should be to attract investment into the system. Home technology should be encouraged, tax holiday should be granted and patent rights must be given to new industries to encourage research-based products.

(iv) Health welfare is a significant variable that impacts life expectancy. With good welfare package the productive capacity in the SSA region increases. Consequently, the governments of SSA nations could enact policies and measures to enhance a good health environment throughout a person’s lifespan. Home-based medical facilities should be exchanged with health tourism to advanced countries. Better health services and a homegrown pattern will empower citizens to be productive enough to render foreign capital inflows needless to the economy. Improved health condition is an engine for effective national productivity.

(v) Lastly, the study recommends that the central banks in SSA countries should develop better strategies to enhance the full benefits of capital flows. This can be done by establishing and improving financial institutions which are still developing.

7.4 Further Studies

From the results of this study, it is challenging to separate trading within African countries from the rest of the world. It is high time that African countries begin looking inwards to capital inflow from within African countries rather than depending on foreign capital inflows from the developed countries. The details of this new study thinking requires further data gathering for future studies.

7.5 Limitations of the Study

(i) The study could have behaved better if better access to a more reliable data source had been made available for this study.

(ii) Adding more variables and more SSA countries could have made the study more robust; however, the non-availability of data meant that this was not possible.

(iii) Data on foreign portfolio investment is scanty, and it obviously affected the performance outcome.

7.6 Delimitation of the Study

Specifically, the delimitations of a study refer to the scope of the research aims and questions. The study covers three broad objectives on thirty one SSA countries. All aims and objectives of the study were achieved during the investigation of the study. The following research questions were addressed in relation to the study. Is there a relationship between foreign capital inflows and trade openness in SSA countries? Do socioeconomic factors determine foreign capital inflows in SSA countries? Do foreign capital inflows and trade openness impact output performance in SSA countries? These research questions have helped in designing the study's research hypotheses. The results submitted in the study clearly showed that the objectives of the study have been achieved.

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APPENDIX

APPENDIX A: ETHICAL CLEARANCE LETTER

25-01-2022
Mr Noel Damson Nthangu (218032374)
School Of Acc Economics&Fin
Westville

Dear Mr Noel Damson Nthangu,

Original application number: 00015518
Project title: Foreign capital inflows and trade openness nexus: The case of selected Sub-Saharan africa countries

Exemption from Ethics Review

In response to your application received on 17 Jan 2022, your school has indicated that the protocol has been granted **EXEMPTION FROM ETHICS REVIEW.**

Any alteration/s to the exempted research protocol, e.g., Title of the Project, Location of the Study, Research Approach and Methods must be reviewed and approved through an amendment/modification prior to its implementation. The original exemption number must be cited.

For any changes that could result in potential risk, an ethics application including the proposed amendments must be submitted to the relevant UKZN Research Ethics Committee. The original exemption number must be cited.

In case you have further queries, please quote the above reference number.

PLEASE NOTE:
Research data should be securely stored in the discipline/department for a period of 5 years.

I take this opportunity of wishing you everything of the best with your study.

Yours sincerely,

[redacted]

Prof Josue Mbonigaba
Academic Leader Research
School Of Acc Economics&Fin