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An Empirical Analysis of Growth and FDI in the sub-Saharan African Countries.

Abstract

The positive role of Foreign Direct Investment on host country's economic growth is well established. FDI provides a vehicle for technological transfer by providing resources to finance investment projects. However, FDI as a Financial asset is sensitive to unfavourable business environment and it is subject to sudden reversal if the host country's investment climate is inherently unfriendly. The poor performance of inward FDI in Africa is troubling. The state of the African business environment plays a significant role in determining the patterns of FDI flows in the region. This dissertation consists of Four empirical essays which seeks to examine the determinants of FDI and its impact on SSA countries.

The first empirical chapter studies the mediating role of financial development in the FDI growth nexus. The novelty of this paper is that unlike previous studies where a single variable is used to measure financial development, this study develops an aggregate measure of financial development indicator. This indicator is developed from several individual financial development measures normally used in the literature. To mitigate the impact of endogeneity, I use the Generalized Methods of Moments estimator. The results reveal that there is a financial development threshold point. Countries only benefit from FDI when their financial sector develops above this threshold point. However, Finance plays a positive role in the FDI growth nexus in Africa's high-income countries.

The second empirical chapter uses fixed effect panel quantile regression model to investigate the impact of FDI on economic growth. The results are summarised as follows: First, the impact of FDI on growth is heterogeneous across the conditional distribution of income; and so FDI plays a significant impact on growth at the higher quantiles of income. The significant impact is only observed from the 75th quantile upwards. Financial sector development only mediates FDI led growth at the higher quantile.

The third empirical chapter studies the impact of Sub-Sahara Africa's Business environment on FDI flow into the region. The chapter uses a panel dataset on 43 African countries over 2003-2019. Using the world Bank ease of Doing Business and the Heritage foundation Business Freedom index, the Least square Dummy variable and the Poisson Pseudo Maximum likelihood estimation methods suggest FDI flows are sensitive to the host country's investment condition. FDI flows more to country where the Ease of doing business is high. The results are robust when individual measures of Ease of doing business in used.

The Fourth Empirical chapter studies the determinants of Chinese investment in Africa. By using FDI data at a country and sectorial level, the study reveals that the determinants of Chinese investment vary according to sector the investment is taking place. However, the role of natural resource endowment in attracting Chinese investment to Africa is ubiquitous in the analysis.

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A special thanks goes to my beloved wife, Mrs Faustina Owusu Ansah, for all the sacrifices she has made for me to complete this thesis. I count it a privilege to have you as my wife. Pristine and Keziah, your existence always strengthens me. To my family and friends thanks to you all for the support.

Declaration

I declare that this thesis is solely done by myself and that it has not been submitted, for any previous application for a degree at Nottingham Trent University or any other institution except where otherwise stated by reference or acknowledgment.

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List of Abbreviations

FDI	Foreign Direct Investment
GDP	Gross Domestic Product
UNCTAD	United Nations Conference on Trade and Development
MDGs	Millennium Development Goals
NEPAD	New Partnership for Africa's Development
OECD	Organization for Economic Cooperation and Development
SSA	Sub-Saharan Africa
IMF	International Monetary Fund
PCA	Principal Component Analysis
PPML	Poison Pseudo Maximum Likelihood
PMG	Pool Mean Group
ARDL	Auto regressive Distributed Lag
BoP	Balance of Payment
OLS	Ordinary Least Squares
GMM	Generalized Method of Moments
WDI	World Development Indicators
MNCs	Multinational Corporations
ATMs	Automated Teller Machines

Chapter 1 Introduction

1.1 Motivation

Despite Africa's efforts to promote Foreign direct investment (FDI) inflows, it remains the continent with the lowest share of the total global FDI. According to the World investment report (2022), FDI inflows to Africa rose to $83 billion, a significant level from $39 billion in 2020. The value seems substantial, but this accounts for only 5.2 per cent of global FDI. The low level of FDI is worrying. Policymakers and academics have jointly sought to identify the reasons for the low level of FDI in Africa despite major policies to attract FDI. The state of the African business environment plays a significant role in determining the patterns of FDI flows in the region. FDI is a financial asset which responses quickly to unfavourable business environment. There is enough evidence to support the argument that unfavourable country-level characteristics do not favour investment activities. Over the years, FDI inflow to Africa has been consistently low hovering between 2% and 3% of GDP, never crossing 4% of the global FDI inflow in 35 years (UNCTAD, 2020). Some of the reasons cited for such low level of FDI are poor business environment, poor infrastructure, absence of macroeconomic stability, political instability, inadequate human capital, and systematic uncertainties affecting Business environment.

The investment gap of Africa continues to widen and has been emphasised in the frameworks of the Millennium Development Goals (MDGs) and the New Partnership for Africa's Development (NEPAD). Since the 1980s, African countries view FDI as the mechanism for mobilizing capital to fill their investment gap and not only in this role is FDI promoted by Africa but also in its efficacy of boosting employment, encouraging technological transfer, and closing foreign exchange gap. Several attempts have been made by African countries to present Africa attractive for foreign direct investment. Macroeconomic reforms, incentive programs and economic liberalization programs were greatly pursued by many African countries with the aid of development agencies in the mid-1980s with the aim of making the African economy attractive to investments and global activities.

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African countries continue to offer significant number of incentives to attract foreign direct investments into their economies. In the late 1990s, about 103 developing countries provided tax incentives to multinational firms that established production facilities in their country (Hanson, 2001). In Africa alone, about 70% of countries in 2004 used tax holidays as an incentive to attract FDI compared to only 20% of OECD countries (Cleeve, 2008). Notable countries such as Nigeria, South Africa, Tunisia, and Morocco are committed to offering various incentives ranging from tax holidays to cash grants from central government to foreign companies for investing in a government prioritised sectors like agriculture, manufacturing, oil & gas, tourism, and financial services.

The continent has also made great improvement in areas relating to ease of doing business. Consequently, SSA has made several attempts over the years to improve its business and investment climate to attract FDI in the region through liberalization reforms, regulations, and several incentives (Cleeve, 2008). Though some of these tax incentives and economic reforms worked well to improve aggregate performance of Africa, the region has still not benefited much from the global share of FDI as it continues to receive a marginal portion of the global share as compared with other continents. Nonetheless, Africa's strategy to attract more foreign direct investment to boost its economy and sustain development remains unavoidable especially in the wake of more recent events such as the Covid-19 pandemic and the Russia-Ukraine war which have worsened the global economy.

Figure 1.1 compares the flow of FDI as a share of gross capital formation among Africa, Developed countries and the rest of the world. The gap between total FDI flow to Africa and other continents suggests failures of national economic policies geared towards attracting FDI. It is an indication to Africa on the need to revisit its policies to gain a more attractive image in the global economy. The surge in FDI inflows in the late 1990s up to 2000 is because most African countries participated in the structural adjustment program, which opened Africa to the rest of the world. During the structural adjustment program, most African countries became open for the first time to the rest of the world, contributing to the surge in FDI inflows. The recent increase in FDI inflows is due to Sub-Sahara Africa's

effort to make their business environment friendly. China's role in Africa substantially impacts the increasing FDI inflows in SSA.

Figure 1. 1 Inflows of FDI as a share of Gross capital formation
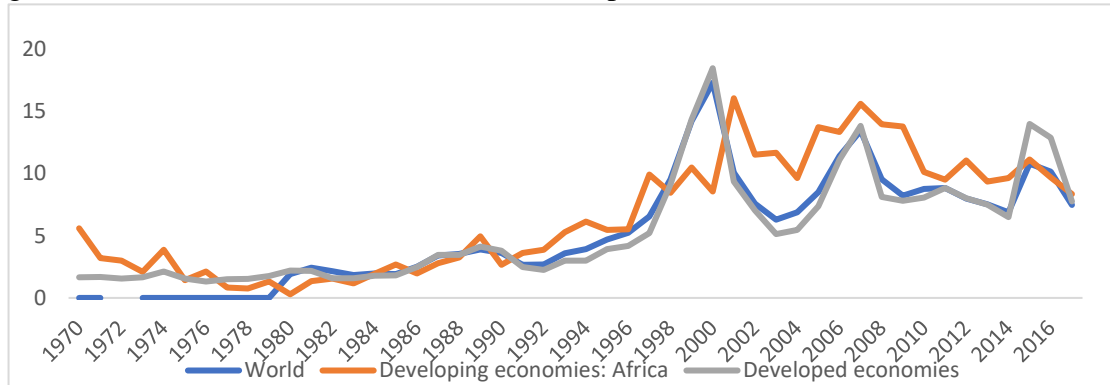
FDI in Africa has high concentration in the extractive sector. Africa is endowed with natural resources which makes it attractive to investors, especially to countries with less resource endowment. It is perceived that such FDI in Africa is only an attempt to exploit its natural resource endowment. Besides, the weak institutions and other systemic failure of Africa are loopholes which foreign investors seem to take advantage of to pursue their exploitation motives. But the manufacturing and service sectors have also received massive contribution from FDI which suggest that other factors attract FDI to Africa. Most of these manufacturing FDI flows from China and other emerging countries like India.

The rise in FDI inflows and its growing importance, has invigorated policymakers and academic to debate about FDI and its possible growth effects on host countries. FDI is important in developing countries because Africa lacks the investment to undertake long-term developmental projects. Therefore, FDI bridges Africa's savings and investment gap with quality and stable capital stock. As a result, Sub-Sahara Africa has progressively identified FDI as a source of economic development, modernization, investment, and employment. Moreover, due to the relative stability in FDI flows compared to other capital flows, Sub-Sahara Africa has recently relied on it as the primary source of capital (Adams 2009). FDI inflows have the potential to create jobs, increase productivity, transfer skills and technology, boost exports and contribute to the long-term economic growth and development of developing countries (UNCTAD,2008). The belief is that FDI can spur technology

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transfer within the same sector (horizontal spillovers) or between different sectors (vertical spillovers), which will further increase productivity (Buckley, Clegg, and Wang 2007a: Dunning and Lundan 2008).

Africa is a continent first known for the depth of its poverty and characterized by relatively low development, largely because of its structural and contingent economic failures. Sovereign risks of political instability, unsustainable economic policies, institutional weakness, low level of human capital accumulation and reliance on primary production due to low level of technological advancement are perceived to stymie the development of Africa. After the attainment of independence, national and regional policymakers have sought means to surmount the development stagnation. The adoption of Millennium Development Goals (MDG) geared towards poverty alleviation and New Partnership for Africa's Development (NEPAD) for instance are initiatives for rectifying the development deficiency of Africa. Both initiatives and several other initiatives highlight foreign direct investment as the vehicle for implementing and attaining the intended aims. FDI seems to appeal to Africa as a stimulating mechanism and a strategy to pursue for economic growth. Economic liberalization reforms taking the form of tariff incentives, Ease of restrictions on capital flow and other incentives have been the bait of Africa to open the economy to attracting more FDI.

SSA countries are subject to similar economic challenges even though different in intensity. Pre-pandemic economic recovery in sub-Saharan Africa looks positive, however there is a divergent growth performance and prospects among the regions in Africa. Figure 1.2 below illustrates the patterns of GDP growth in the various subregions. This illustration is deemed important to show how homogenous the regions are in terms of their growth prospects. The volatility in growth appears to be similar in the various regions even though intense in the oil exporting countries due to frequent fluctuation in oil prices. The recent globalisation policies (FDI attraction, and large trade values) taken by the region have exposed the region to external shocks and hence the region's growth prospect is determined by some external exogenous factors. As shown in the figure 1.2 below, volatility in growth becomes more intense after the 2008 financial crises. Globalisation policies are good for developing countries technological advancement; however, the more countries

become integrated in the world, the more they become susceptible to both idiosyncratic and systematic rise.

Figure 1. 2 Sub-Saharan Africa (SSA): Real GDP Growth
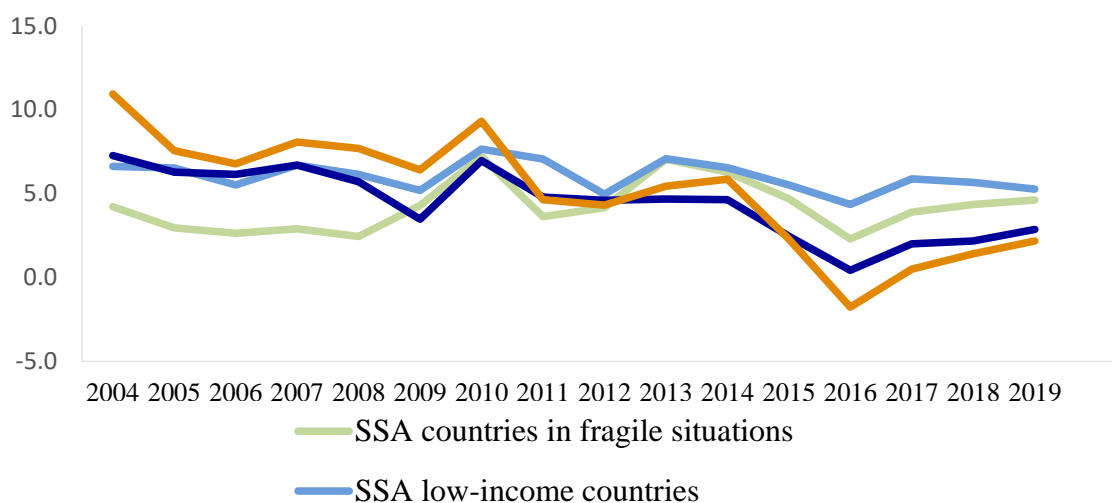
Source: IMF (2019), World Economic Outlook Database

The role of financial development in the FDI growth literature has recently taken the centre stage in the FDI growth and finance nexus. The argument is that countries only benefit from FDI after their financial sector reaches a certain level of financial development. Findings in these studies indicate that a country's capacity to take advantage of FDI externalities might be limited by local conditions, such as the development of the local financial markets. At the macro level, the development of the financial sector is crucial for a nation to benefit from FDI. Over the period 1980 to 2005, there has been a great variation in private credit among different countries, ranging from less than 5% in some parts of Africa to more than 120% in Japan, Hongkong and Switzerland (See, Beck, Demirgüç-Kunt and Levine, 2007). The variation in private credit could potentially obstruct firms from benefiting from FDI.

According to Schumpeter and Opie (1934), the financial sector plays significant role in funding major productive investments, encouraging technological innovation that can lead to economic growth. They argue that the financial sector plays the role of supply leading, which implies that the sector acts as a production input. The transmission mechanism through which financial deepening proxied by the system size affects growth in middle and low-income countries is mainly by

facilitating production in middle-income countries and through capital accumulation in low-income countries (see Rioja and Valev (2004a, 2004b). Financial deepening may also promote growth through capital accumulations, especially productivity growth.

Among the existing literature, the role of finance or the financial system has not been researched extensively, perhaps, due to its intricate composition: money supply, financial market and financial institution. Accordingly, little empirical evidence exists on the domestic financial system's mediating effect on FDI and SSA growth. Several authors suggest that on the one hand, a good financial system allows investors to access local funds for investment, reducing foreign capital influx and limiting the credit accessibility of domestic investors (Alfaro and Chauvin, 2020). On the other hand, other theorists such as Harrison et al. (2004) and Adeniyi et al. (2015) find that domestic firms' access to credit increases in line with the rise in FDI. Similarly, Sghaier and Abida (2013) opine that a good financial system eases financial constraints and extends foreign firms' innovative activities, which tend to expand the spillover effect. A robust financial market increases liquidity and promotes trading of multiple financial instruments to facilitate capital mobilization and accessibility by domestic firms and multinational companies for superior operations (Levine, 1997). Such accessibility is made effective by the intermediary function of financial institutions through capital rationing, reduced transaction cost, diffusion of information and financial contract enforcement. Conversely, a weak financial market compels multinational companies to depend on foreign parents for reinvestment capital which stifles their operation capacity in the host country. Again, competition and innovation are stifled in countries with weak financial systems.

Equally, because SSA has many countries with unfledged financial system, its capacity to translate FDI into economic growth through the financial system has caught the attention of empirics. Adeniyi et al (2015) employed pooled mean and fixed effects techniques to examine the financial development influence on FDI and economic growth in SSA. They found that the financial system positively influences the impact of FDI on economic growth. Cattaneo and Ezeoha (2012) also contribute further from their findings that the positive moderating effect of the financial system is contingent on quality communication infrastructure and governance structures.

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Likewise, Olagbaju and Akinlo (2018) find that the impact of FDI on economic growth is positive at a certain threshold of financial development.

1.2 General Overview of FDI in SSA

Foreign direct investment has over the years been a major source of growth for Africa despite the general low level of FDI that flows to Africa. In regional terms, FDI inflow to Africa over the past two decades shows yearly average inflow of less than 5% of GDP, accounting to about 1% of the global FDI in 2000 and increasing marginally to 3% by 2018. Despite various FDI policies by Africa to attract more FDI, the region has received minimal FDI inflows even though there is global surge in FDI. Although FDI into Africa has increased notably in the past two decades, its global share remains small. FDI in the African region has been hovering between 2% and 3% of GDP, never crossing 4% of the global FDI inflow in 35 years (UNCTAD, 2020).

The surge in FDI inflows from 1998 is partly because most countries embraced economic liberalisation as prescribed by the Economic Recovery Program (ERPs). Most countries in Africa became open for the first time to the rest of the world, contributing to the surge in FDI inflows. The recent increase in FDI inflows is likely to be partly explained by Sub-Sahara Africa's effort in practicing more economic liberalisation policies and these policies are opening the Africa to the rest of the world. The role of China in Africa has substantial impact on the increasing amount of FDI inflows in SSA.

Figure:1.3. Regional FDI stocks in SSA (2004-2018)
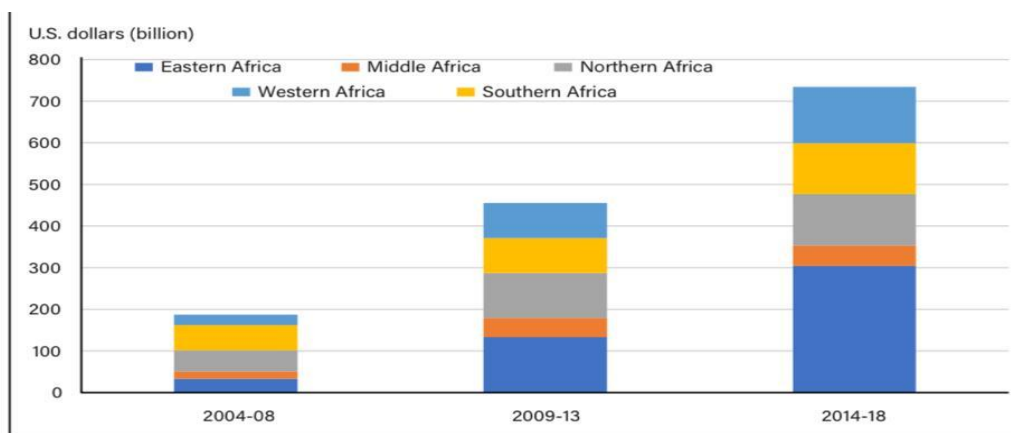
Source: USDA. Economic Research Calculations.

FDI inflows to subregions before the pandemic has witnessed increasing patterns for all five subregions in Africa. Eastern Africa for the past decade has witnessed greater portion of FDI and such increase is expected due to trade liberalisation reforms, specifically double taxation agreement with about 51 countries in 2018, making it a preferred destination for investment (Morgan et al, 2022). Middle East region on the other hand receives the lowest share. However, Southern Africa as at 2021 is the leading recipient of Africa inward FDI (See figure 3) amounting to USSD 42 billion in 2021 as compared with USSD 8 billion in 2020.The surge in FDI in Southern Africa resulted from a major share exchange between two large firms in South Africa (UNCTAD 2022). At the same time, Mozambique's share of FDI also improved by 68% following a rise in greenfield investment.   West Africa increased its FDI inflow by 48% and the same increment pattern was seen in East Africa 35%; meanwhile, North Africa saw a decline by 5% whilst Central Africa FDI inflows remained same over the two years period.

Figure: 1.4. FDI inflows to Africa and Subregions, 2020-2021.
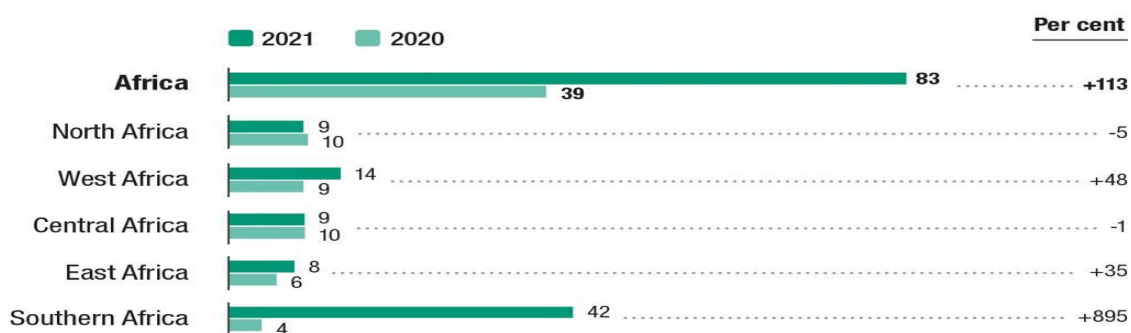
Source: UNCTAD World Investment Report 2022

Figure 1.5: Top Recipient Countries of Africa Inward stock of FDI, 2004-2018
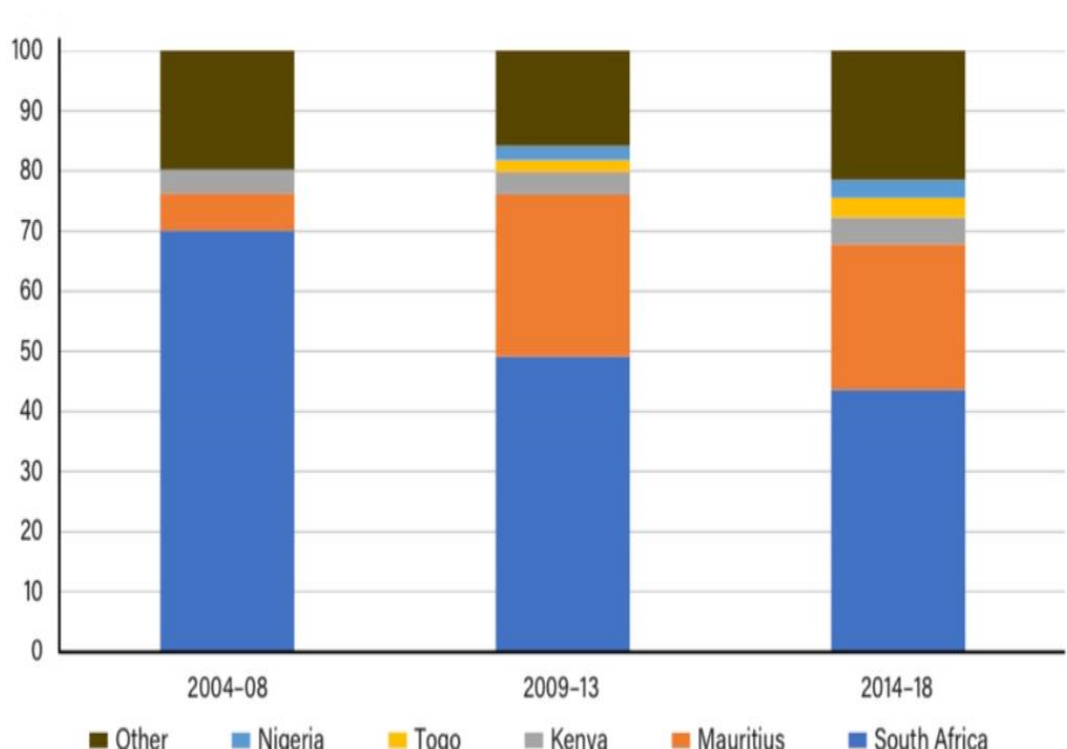
Source: USDA. Economic Research Calculations.

From figure 1.5 South Africa is the top receiver of Africa's FDI, reaching almost half of the total FDI flowing to Africa. Mauritius is the second largest receiver of FDI. The country has a vibrant tourism sector which contributes around 20 percent to the economy growth. Tourism is one of the major destinations of Mauritius FDI.   In the World Bank's Ease of Doing Business Index 2020 report, Mauritius ranked first in Africa and 13th worldwide out of 190 countries as the best place to do business. Ease of doing business in Mauritius has improved over the years and this contributes to the higher inflows of FDI into the country.

Figure 1.6: Sources of foreign direct investment stock in Africa, 2014-2018 (U.S. billion dollars)
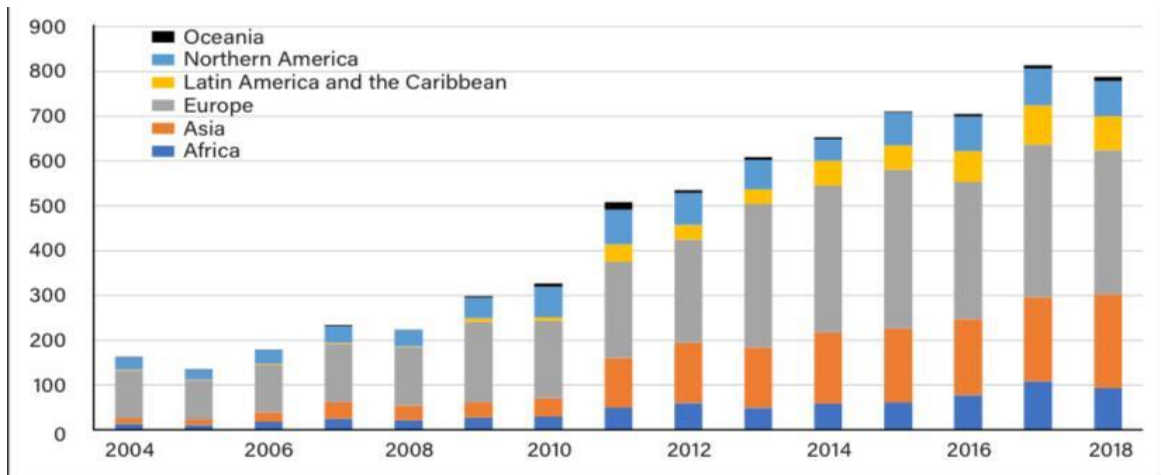
Source: USDA. Economic Research Calculations.

Europe remains the highest source of Africa's FDI, increasing significantly from $ 106 billion in 2014 to $320 billion in 2018. Europe's investment interest in Africa has been linked to its colonial linkages with Africa, establishing such investment relationship (Mhlanga et al, 2010). Meanwhile Asia's investment in Africa has seen a rising pattern over the years with gradual increment from below $50 billion in 2014 to almost $300 billion by 2018. Asia's investment in Africa remains the second highest source of FDI in Africa, followed by Northern America which has over time increased significantly.

1.3 Contributions of the thesis

This thesis contributes to knowledge in the following ways: It is already established in the literature that a well-functioning and developed financial system is one of the key preconditions for FDI to impact host country's growth (Hermes and Lensink, 2003; Alfaro et al., 2004). Empirical evidence has therefore concluded that, a country with a developed financial system stands the chance to benefit from FDI. In determining the role of financial development in the FDI growth nexus, researchers have resort to using single indicators to measure financial development. By using individual indicators like private credit and liquid liabilities as proxies of financial development, economic literature has basically likened financialization to mean financial development. Most of these studies have also concentrated on financial depth without giving attention to financial stability, accessibility, and efficiency.

I contribute to knowledge in the first empirical chapter by developing an aggregate financial development indicator to measure financial depth, efficiency, stability, and accessibility. These indicators have a wider scope of measuring financial development than the existing ones. The indicators are used as mediators in the FDI growth link. To the best of my knowledge, this is the first paper to use aggregate measures of financial development to study the effect of FDI on economic growth contingent on financial development. The findings suggest that the growth effects of FDI depend on some level of financial development in the host country.

Moreover, in the second empirical chapter, I extend the conditional mean regression model in the first empirical chapter by using the quantile regression model. I contribute to knowledge by examining how the role of FDI on economic growth varies along the conditional distribution of host country GDP growth rate. In fact, the effects of FDI on Ethiopia the fastest growing economy in Africa may not be the same as the Democratic Republic of Congo. It is therefore imperative to adopt an estimating technique that segregate countries according to their level of growth and see how FDI impacts their growth. In this chapter, I use the Quantile fixed effects model to investigate the role of FDI on growth. By using a panel quantile regression approach, I can analyse the role play by FDI at different stage of development.

I find that, FDI impacts growth for countries in the higher quantile of GDP growth. I argue that countries in the higher quantile are set of countries with some developed institutions which form major components of FDI absorptive capacities. With such absorptive capacities available, FDI can translate into growth of host countries.

Furthermore, I analyse the impact of Sub-Sahara Africa's Business environment on the flows of FDI in the third empirical chapter. By using the World Bank ease of Doing Business indicators and the Heritage foundation Business Freedom index, the chapter contributes to the ongoing debate on the factors deterring FDI inflows in Africa by using an up-to-date data. By using the Poisson Pseudo Maximum likelihood estimation to correct for missing FDI flows, the chapter suggest FDI flows are sensitive to the host country's Business environment. FDI flows more to countries where the Ease of doing business index is high. The results are robust when individual measures of Ease of doing business are used.

Finally, by using recent data on Chinese FDI to Africa, the fourth empirical chapter contributes to the ongoing debate on the factors Chinese investors consider in choosing an African country as an investment destination. By using the binary choice model, I conclude that, the factors influencing Chinese investors are heterogenous across sectors. The factors influencing Chinese investors to invest in the Manufacturing sector are not the same for the service sector. The Chinese investment decision is more sensitive to the resource intensity of the host country. Countries with more deposits of natural resources are likely to receive more Chinese investment.

1.4 Structure of the thesis

The positive role of Foreign Direct Investment on host country economic growth is well established. FDI provides a vehicle for technological transfer by providing resources to finance investment projects. However, FDI as a Financial asset is sensitive to unfavourable business environment and it is subject to sudden reversal if the host country's investment climate is inherently not friendly. The poor performance of inward FDI in Africa is troubling. The state of the African business environment plays a significant role in determining the patterns of FDI flows in the region. This dissertation consists of four empirical essays that seek to examine the determinants of FDI and its impact on SSA countries. The first two empirical chapters analyse the impact of FDI on SSA economies and the last two chapters access the determinants of FDI into Africa.

The first chapter gives a general introduction and overview of the thesis. The chapter covers areas such as motivation for the thesis, broad overview of FDI performance in SSA, and general GDP growth trend in Africa. In the second chapter, I synthesised some of the theoretical frameworks guiding my studies. The chapter elaborates on the theoretical models linking FDI, finance and economic growth. I also elaborate on some of the recent developments in growth theories.

In the third chapter, the thesis explores the effect of FDI on economic growth conditioned on financial development. In this section, I create a financial development indicator to capture different dimensions of the financial system. This indicator helps avoid using multiple but closely related yet other variables to measure financial development. The resulting variable combines various financial development indicators by using principal components analysis (PCA) to form a single financial development index.

Chapter four is an extension of the growth chpater. In this chapter, the heterogeneous nature of GDP growth across Africa is well-thought-out. The purpose of the chapter is to analyse the heterogenous role of FDI when countries are grouped according to their growth stages. To explore the impact of FDI along different growth stages, I adopt the quantile fixed effects regression, a methodology capable of studying the conditional distribution of the dependent variable. The argument of this chapter is that countries with a sustained growth stand the chance to benefit from FDI.

By using the PPML model to mitigate the impact of zero FDI inflows found in most FDI research in Africa, chapter Five focuses on the role of African business environment in determining the flows of FDI in Africa. The business environment or Ease of Doing Business in Africa plays significant role from starting a business to reaping profit. The business environment in Africa is historically known to be unfriendly due to the poor institutional setup in the region. It is therefore argued that an unfavourable business environment will drive away FDI.

Moreover, the presence of Chinese investors in Africa recently has triggered policy makers to analyse the determining factors of Chinese investment in Africa. The chapter uses 262 projects from China to Africa from the period of 2013-2021. In this final chapter, (Chapter six), I empirically explore the patterns of Chinese investment in Africa. The chapter aims to model the locational and sectorial choice of Chinese investment against some country-level variables in Africa. In doing so, I utilize binary choice regressions to model the flow of FDI in Africa.

Chapter 7 concludes the thesis by highlighting summarily the key findings, policy implications, study limitations, and recommendations for further study.

Chapter 2: Theoretical framework on the FDI-growth-finance link, FDI and economic growth

2.1 Introduction

The questions which create fundamental challenge for growth theorists are what Diebolt and Perrin (2016) summarize as; What structures of technology and behavior are the basics that synchronically expound the different phases of development? What implications do they suggest to developed and underdeveloped countries in relation to their growth process? In this regard, theories and models have evolved over time to offer better understanding of the economic growth process. This chapter presents some of the recent growth theories used to explain the differences in growth between countries. I also present an illustrative theoretical framework, linking finance, FDI and growth.

2.3. Eclectic (OLI) Paradigm of International Production

Dunning (1973) championed the study on activities of foreign firms by combining industrial and locational determinants of international production to explain why foreign firms do not supply their markets from a domestic base but from a foreign base. Dunning developed the OLI paradigm to explain three (sets of) determinants of MNEs activities, ~~as~~ namely the competitive advantages firms possess over other nationals in supplying a market, the extent by which firms find internalisation in their best interest to add value and the extent of locating these value adding activities beyond their jurisdiction.

Dunning explains that certain conditions must be met to optimise the benefits from inbound FDI by host countries. Dunning uses the investment development path (IDP) to explain the conditions for each stage of a country's development. In the first stage of pre-industrialisation, where the country is perceived unattractive to investment because it has unattractive locational advantages with few or no ownership advantages by firms, the extent of FDI will depend on a good legal system, infrastructure, communication and transport facilities, human resources, and government policy. Reconfiguring OLI advantages while the country is in the development process helps indigenous firms to build their own competitive advantage. In the second stage both inward and outward investment changes along

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the development path such that L advantages begin to attract more investment while indigenous firms build their own O advantages. As countries attain some degree of economic maturity, there is a tendency for the county to engage in more outward investment, but it is dependent on firms' strategies and government policies to develop locational advantages to attract more foreign investment. At the final stage, both outward and inward FDI fluctuates because firms exploit their existing O advantages in foreign locations and acquire new markets. Linking the eclectic paradigm to the FDI motive of MNEs, Dunning explains that O-specific advantages of MNEs depend on those specific advantages they create internally and their competence in influencing innovation, assets quality and price with institutions in which they have strategic technological and market alliance with.

The eclectic paradigm asserts that the extent of foreign production by MNEs depends on three interactive factors: ownership specific, locational advantages and internationalisation. MNEs engage in FDI when they have the tendency to increase their production more than other firms which relates to ownership specific advantages. Dunning refers to one of the three O advantages as those mentioned by Bain (1956) and Hymer (1960) as having monopoly power which prevents other firms from entry to the market. The second of O advantages relate to ownership of unique capabilities and resources while the third relates to the competencies of managers. However, Dunning explains that these O advantages have changed due to abundance of knowledge. MNEs engage in FDI when the immobile or created natural resources of the host country requires the presence of MNEs which will help the MNE exploit their O advantages. The L advantages include new variables such as political risk, exchange rate, regulations, and policies. MNEs also engage in FDI when it benefits MNEs more to internalize its production across borders rather than licensing the right to foreign firm. In this regard, the internationalisation underpins the MNEs foreign based activities which are seen in four main types: market seeking FDI, resource seeking FDI, efficiency seeking FDI and strategic asset seeking FDI.

2.4 Theoretical framework on the role of financial sector development in the FDI-growth link

Following the theoretical models of technological change developed by Hermes and Lensink (2003) adopted from Barro and Sala-i-Martin (1995 and 2004), it is convenient to express a theoretical model that shows how the growth effects of FDI depend on the level of financial development of the host country. In this model, Hermes, and Lensink (2003) assumes technical progress to be represented through the total stock of capital goods available. From the host nation's production function below.

$$y_{it} = AL^{\alpha}K^{1-\alpha} \qquad\qquad [2.1]$$

where L represents the stock of labour in the host country, A is the productivity coefficient, which is influenced by the host nation's production environment, and K is the stock of capital accumulation given by,

$$K_t = \{\int_0^N x(j)^{1-\alpha} ds \int \left(\frac{1}{1-\alpha}\right) \qquad\qquad [2.2]$$

From equation (2.2), N refers to the number of varieties of capital goods produced in the economy. These capital goods are delivered by two firms so that the total variety of capital is: $N = n^f + n^d$

Where n^f refers to the number of capital goods produced by foreign firms and n^d refers to the number of capital goods produced by domestic firms. These firms are assumed to specialise in the production of these capital goods and then rent it out to the final goods producer at a price of $P(j)$. The producers of capital goods operate in a perfect competitive market, implying that they take the cost of inputs, W (wage rate) and the prices of intermediate goods as given and satisfy the optimality condition by equating the price of the capital goods to the marginal productivity of capital. This generates the demand equation for each capital good which yields the usual equality between the factor prices and marginal products. Hence, the marginal product of the jth intermediate good is equal to its factor price, Pj resulting in the following equation and the price of output is set to unity.

$$P(j) = A(1-\alpha)H^{\alpha}x(j)^{-\alpha} \qquad\qquad [2.3]$$

In equation 2.3 the price of capital is now equal to the marginal product of capital. To increase the number of capital varieties, countries need to adopt this technology from foreign firms in the advanced countries. Adopting this new technology is expensive and requires an initial fixed cost (F). The fixed set up cost (F) depends on the number of capital goods produced by foreign firms. Therefore, this fixed cost is inversely related with the portion of capital goods produced by these foreign firms, hence

$$F = \frac{n^f}{N} \qquad\qquad [2.4]$$

Equation 4 illustrates the idea that FDI brings advanced technology or knowledge in the form of new capital goods found in other countries. FDI makes it cheaper to adapt a new technology; an idea commonly referred to as a channel of technological progress. More foreign participation in the local economy in the form of FDI reduces the cost of innovation, thereby increasing the possibility of imitation (Hermes and Lensik, 2003; Boresnztein et al. 1998).

The total fixed cost of producing each capital good is given by $F = \left(\frac{n^f}{N}, \frac{N}{N^f}\right)$

So that, $\frac{\partial F}{\partial \frac{n^f}{N}} > 0$ and $\frac{\partial F}{\partial \frac{N}{N^f}} < 0$

This first derivative of the set-up cost satisfies this condition due the fact that an increase in the number of firms producing capital goods reduces the cost of producing capital goods per unit in the host nation $\frac{\partial F}{\partial \frac{n^f}{N}} > 0$. The second component of the derivative, $\partial \frac{\frac{\partial F}{N}}{N^f} < 0$, implies that the presence of FDI in the form of capital goods makes the cost of capital goods cheaper, speeding up the process of technology adaptation. In the production of capital goods, there is a maintenance cost and a fixed set-up cost. In the works of Boreisztein (1998), the marginal cost is assumed constant given by $x(j)$. The second assumption is that capital goods depreciate fully. By assuming a steady state, the interest rate (r) is pegged constant hence the profit of the firm is as follows: given equation 2.5.

$$\pi(j_{i,t}) = \int_t^\infty [x(j)P(j) - (F) - P(j)e^{-r(s-t)}ds \qquad [2.5]$$

where (F) is the fixed set up cost given in equation (2.4).

To arrive at the optimum quantity of capital goods produced to maximise profit, equation 5 is maximised, subject to the budget constraint in equation 4 to arrive at the maximum capital goods function.

$$x(j) = HA^{1/\alpha(1-\alpha)2/\alpha} \qquad [2.6]$$

By substituting equation (2.6) into (7), the rental rate of capital is

$$P(j) = 1/1 - \alpha \qquad [2.7]$$

From equation 2.7 the price of the capital goods is the mark-up cost over the marginal cost. By assuming free entry in the production of capital goods, the rate of return (r) will behave so that profits will be equal to zero. This rate of returns is given in equation 10 below:

$$r = A^{\frac{1}{\alpha}} \emptyset F\left(\frac{nf}{N}, \frac{N}{Nf}\right)^{-1} H \qquad [2.8]$$

Where $\emptyset = \alpha(1-\alpha)^{(2-\alpha)/\alpha}$

The model is closed by describing the process of capital accumulation, which is affected by the savings rate. The standard intertemporal choice utility function is maximised individually by the agents.

$$U_t = \int_t^\infty \frac{C^{1-\sigma}}{1-\sigma} e^{-\rho(s-t)} ds \qquad [2.9]$$

where c is the units consumed of the final goods. The optimal consumption is,

$$\frac{\dot{C_t}}{C_t} = \frac{1}{\sigma}(r - \rho) \qquad 2.9.1$$

Substituting equation 2.8 into 2.9.1 will give rise to the consumption growth rate below

$$\dot{C_t} = \frac{1}{\sigma}\left(A^{\frac{1}{\alpha}} \emptyset F\left(\frac{nf}{N}, \frac{N}{Nf}\right)^{-1} H - \rho\right) \qquad [2.9.2]$$

$$g = \frac{1}{\sigma}\left(A^{\frac{1}{\alpha}}\emptyset \ F\left(\frac{n^f}{N}, \frac{N}{N^f}\right)^{-1} H - \rho\right)$$ [2.9.3]

The role of the financial sector enters the model through the productivity augmenting parameter A. The parameter A in the model is interpreted as the state of technology in the host country. The argument is that a well-developed financial sector acts as a production augmenting variable leading to economic growth. It is now convenient to write the technology augmenting variable as a function of financial sector development where AFD is the aggregate financial development indicator derived in section 3.5.1 from the principal component analysis.

$$A = f(AFD)$$ [2.9.4]

By substituting eq. 2.9.4 into 2.9.3, gives

$$g = \frac{1}{\sigma}\left(f(AFD)^{\frac{1}{\alpha}}\emptyset \ F\left(\frac{n^f}{N}, \frac{N}{N^f}\right)^{-1} H - \rho\right)$$ [2.9.5]

Equation 2.9.5 can be rearranged to arrive at eq. 2.9.6 which clearly expresses the growth impact of FDI depends on the level of financial development.

$$g = \frac{1}{\sigma}\left(\frac{H}{FDI}.f(AFD)^{\frac{1}{\alpha}}.\ \emptyset - \rho\right)$$ [2.9.6].

From equation 2.9.6, an increase in FDI inflows increases the growth rate (g) and the positive effect of FDI inflows now depends on the level of the financial sector. The argument is that higher FDI inflows reduce the set-up cost for adopting new technology. This increases the rate of returns on the asset, thereby increasing the rate of savings and consumption. A well-developed financial sector will be able to mobilise savings to exert corporate responsibility and monitor investment projects, leading to improved economic growth.

Chapter 3 FDI and growth: The role of financial development

3.1 Introduction

A widespread debate in the economic literature is the impact of Foreign direct investment (FDI) on growth. In developing countries, the flow of FDI has increased because it is perceived to be the most stable source of foreign capital inflows (Adams, 2009). For instance, among the various capital flows to developing countries, FDI took the highest value compared to portfolio investment (Calvo et al., 1996). However, with numerous attempts over the decades on offering incentives to attract FDI into Sub Sahara Africa (SSA), the question remains: what has been the effect of FDI on development in Sub Sahara Africa? Many policymakers and academicians contend that FDI can positively affect a host country's development effort due to the direct capital financing it supplies. While fostering linkages with local firms, FDI can help kickstart an economy (Alfaro, 2004). FDI may also promote economic growth by stimulating technological diffusion from the developed world to the less developed world as postulated by the endogenous growth model.

Theoretically, the role of FDI in the neoclassical growth model is to promote economic growth through increments in the volume of investment and improved efficiency. FDI has become one of the additional sources of capital that can augment the existing capital for economic growth and development. Based on these arguments, industrialised, and developing countries have offered incentives to attract foreign direct investments into their economies. In 1999, about 103 countries provided tax incentives to multinational firms that established production facilities in their country (Hanson, 2001). In Africa, about 70% of the countries in 2004 used tax holidays as an incentive to attract FDI with the belief that technology transfer within the same sector or between different sectors could happen to increase the productivity of domestic firms in the host country (Buckley, Clegg, and Wang 2007a). The adoption of the Millennium Development Goals (MDG) and New Partnership for Africa's Development (NEPAD geared toward poverty alleviation are initiatives for rectifying the development deficiency of Africa. Like others, both initiatives highlight foreign direct investment as the vehicle for implementing and attaining the intended aims.

As FDI embodies technology, know-how and foreign capital, foreign direct investment may need a vibrant financial sector to accomplish its purpose. The ability of host countries to benefit from this foreign technology depends on the amount of credit available to finance these investment projects (Alfaro et al., 2004 and Hermes and Lensik,2003). Moreover, it is already established that firms which depend more on external finance grow faster in countries where the financial system is developed (Rajan and Zingales, 1998, Demirguc-Kunt and Maksimovic (1998). The role of financial development on the rate of the firm's establishment has also been emphasised in previous works (Rajan and Zingales,1998).

According to Schumpeter and Opie (1934), the significant role which financial sector plays is seen in making funds available to finance productive investments and facilitating technological innovation to boost economic growth. They argue that the supply leading role of financial sector supplies inputs for production. The mechanism through which the financial sector proxied by system size affects growth in middle-income and low-income is mainly through capital accumulation for production (See Rioja and Valev (2003a, 2004b). Deepening the financial sector may also facilitate capital accumulation for productive growth and promote economic growth.

The ambiguous role of FDI on economic growth has paved the way for a new strand of studies. These studies indicate that a country's chance of gaining from FDI externalities might be limited by local conditions such as financial sector growth of the host country and human development level. The financial market's role in the FDI literature, as championed by Alfaro et al. (2004, 2009, 2010) and Lee and Chang (2009) is argued along the line that in the absence of a sound financial system capable of supplying credit to host nation, the known growth effects of FDI remain unfulfilled. (Take, for example, an indicator of financial development). Over the period 1980 to 2005, there has been a significant variation in private credit among different countries, ranging from less than 5% in some parts of Africa to more than 120% in Japan, Hongkong and Switzerland (See, Beck, Demirgüç-Kunt and Levine, 2007). The low level of private credit, typical of low-income countries could potentially obstruct firms from benefiting from FDI, affecting the overall economy.

Figure 3.1 Compares FDI activities in Europe with Africa. FDI activities have been intense in Europe since the 1970s compared to Africa, which began to

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experience significant FDI inflows in the early 1990s. Europe received its highest FDI in the 2000s and fell sharply in mid-2003 due to the adverse shocks that had held down economic activity in the Euro area and the rest of the advanced world for almost three consecutive years. Economic downtown caused by the bursting of the ICT bubble and the fall in equity prices; the surge in oil price; the sharp deceleration in global trade, and the 2008 financial crises also affected the amount of FDI received in the Euro area. On the other hand, Africa received its highest FDI in 2001 when Multinational activities were falling from their peak in Europe. Even though the 2008 financial crisis affected financial inflow globally, Africa got significant FDI. This signifies how sensitive investors are to economic shocks and their tendency to redirect investment projects to stable economies.

Figure 3. 1 FDI inflows in Europe and Africa.
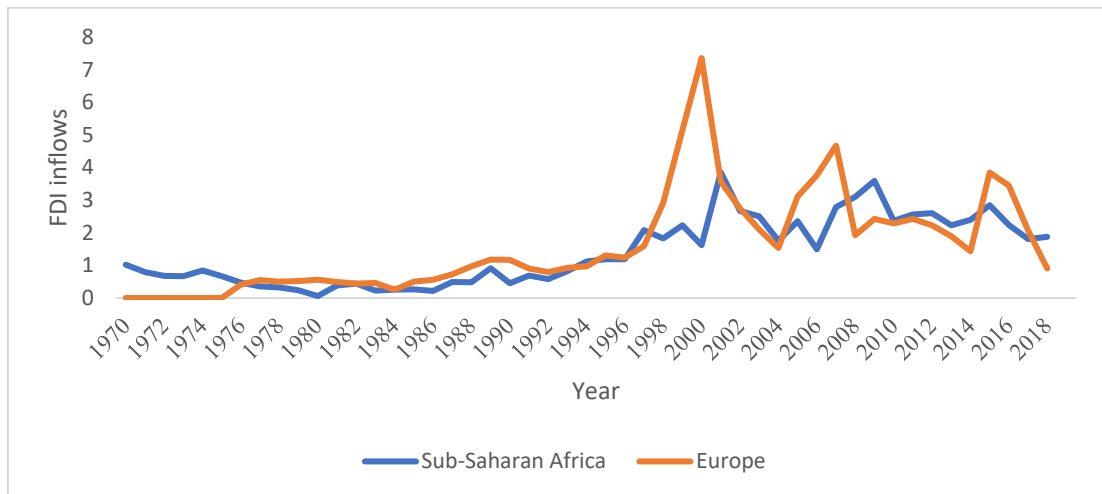
Studies on FDI, Finance and growth nexus have resorted to using private sector credit as the measure of financial sector development (See Alfaro,2004,2006, & 2007; Hermes & Lensik,2003). Given that private credit is a bank-based indicator, the financial sector may be under measured in countries where substantial financial services occur outside the banking system. With this caveat in mind, it is important to develop an indicator broader enough to cover various aspects of the financial sector. In this section, I create four financial development indicators that capture different aspect of the financial system. These indicators help avoid using multiple closely related yet different variables to measure financial development. The resulting indicators combine different individual financial development indicators widely used to measure financial development. The variables used to develop the

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indicators are described in the table below. I combine these variables into a single indicator by using principal components analysis (PCA). The indicators developed contain information about the ability of the financial system to channel funds from savers to investors, as indicated by (Ang and McKibbin, 2007).

3.2 Disaggregated components of Financial Development
The bar chart below shows the mean distribution of financial development indicators as used in the literature. The average value of liquid liabilities (Mean_LLY) in SSA is above 25% of GDP and this is the highest among all the various indicators in the region. Central bank asset (cbay) as a share of GDP is the lowest among the indicators. Domestic credit to the private sector (Mean_dcp) is about 15% in the region and this is one of the lowest in the world as compared to 120% in Japan, Hongkong and Switzerland (See, Beck, Demirgüç-Kunt and Levine, 2007). There is a sharp difference among the various measures of financial development. Against this limitation is the reason for developing an aggregate measure of financial development indicator broad enough to measure different dimension of the financial sector.

Figure 3. 2 Bar chart of Disaggregated components of finance
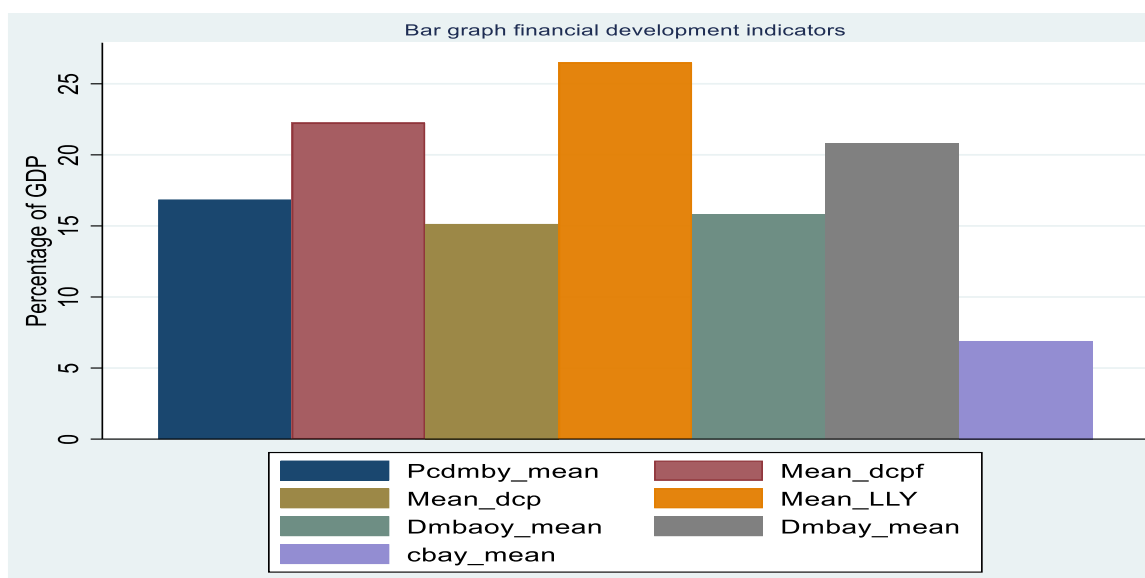
Against this background, the chapter aims to investigate the role of the financial sector in the FDI growth nexus. The novelty of this work is that, unlike the results of (Alfaro,2004&2006; Hermes and Lensink,2003; Yeboua, 2019; Acquah and Ibrahim, 2019), where individual financial development ratios are used to capture the depth of the financial sector, this study develops an aggregate financial development indicator broad enough to capture several dimensions of the financial sector in Africa. I create four indicators to proxy for the depth, efficiency, stability, and accessibility of the financial sector in Africa. In using different measures of financial development, I am avoiding the assumption that, a single measure can adequately capture efficient, stable, accessible and a deep financial sector. The existing literature has failed to recognise that, in developing countries like SSA, a single measure of financial development is not the best to capture the multi-dimensional nature of the financial sector. In developing countries like those in Sub Sahara Africa, it is evident that a single financial development indicator like private credit, as used in existing studies, may be a weak indicator of financial development.

In SSA substantial number of financial services occur outside the banking system. Therefore, it is imperative to design an indicator broad enough to capture the multidimensionality of financial sector development variables. The resulting variable combines six indicators widely used to measure financial development i.e., the ratio of liquid liabilities (or M3) to nominal GDP; the percentage of central bank assets to GD; the ratio of bank credit to the private sector to GDP, the ratio of domestic credit to the private sector as a share of GDP; domestic money bank assets to GDP and private credit to domestic money banks as a share of GDP. To achieve the objective of this study, I use panel data to investigate the role of financial development on FDI growth-FDI nexus in Africa. I fill the FDI-growth and finance nexus gap by including an index for financial market accessibility into the model.

I arrange the rest of the chapter as follows: Section 3.3 offers an in-depth review of existing literature on FDI and host country GDP growth. Section 3.4 outlines the empirical framework, Section 3.5 describes the datasets used in the study, Section 3.5 discusses the estimation results, and Section 3.6 summarises the findings and presents policy implications.

3.3. Empirical Literature review

A vast body of literature recognises the importance of FDI in economic growth. Although most macro empirical literature finds weak support for an exogenous positive effect of FDI on economic growth, ample amount of economic literature supports the idea that FDI promotes growth in the host country. In a seminal work by Borensztein, De Gregorio, and Lee (1998), the three test the impact of FDI on domestic economic performance in a cross-country framework, using bilateral data on FDI flows from industrial countries to 69 developing countries over the last two decades. They conclude that FDI promotes growth in the host country. Similar works also found that FDI impacts host countries' growth performance significantly (Baldwin et al., 2005; Chong et al., 2010; Gui-Diby, 2014; Zghidi et al., 2016 and Zhang, 2001). The main weakness in FDI growth-growth literature lies in the heterogeneity that exists due to the sample of countries in cross country regression. Most of this cross-country analysis combines both SSA and more developed regions.

However, recent studies on the exogenous effects of FDI on growth have dealt with such limitation of big sample heterogeneity by considering only SSA African sample. Ayenew (2021) specifically examines the impact of FDI on SSA economies by utilising the Pool Mean Group and Auto regressive Distributed Lag models (PMG/ADRL) to test for foreign direct investment effect on economic growth in the short and long run. The study gives conclusive results that foreign direct investment boosts economic growth in the long run in Sub-Saharan Africa. FDI is statistically significant with economic growth in the long run, but in the short run, FDI effect on economic growth in SSA is statistically insignificant. In a similar study, Udi et al (2021) utilises the autoregressive distributed lag (ARDL) approach to analyse the extent of economic expansion by foreign direct investment in SSA. The study reveals that FDI plays a significant role in economic expansion. Jurgurnath et al (2016) employs a panel regression and dynamic panel estimates techniques to analyse the effect of FDI among 32 SSA countries between 2008-2014. The analysis concludes that aggregate FDI has both a positive and significant effect on economic growth in SSA.

In contrast to earlier findings where the exogenous role of FDI is examined, Ibhagui (2018) examines the effect of FDI on growth in SSA based on large panel data comprising 45 SSA countries between 1985-2013 using threshold regression analysis while considering six (6) threshold variables, inflation, initial income, population growth, trade openness, financial development, and human capital. The results showed that FDI impact on economic growth in SSA is inconsistent and ambiguous. He argues that FDI promotes economic growth when inflation, population growth and financial development of SSA attain threshold levels. His results coincide with Carkovic and Levine (2002) and Hanson (2001) who find that local conditions can limit a country's capacity to take advantage of FDI externalities. Adams (2009) expounds that FDI contributes to economic development in SSA by boosting domestic capital and efficiency, but FDI does not impact economic growth, substantiating the assertion with Lesotho's increase in FDI flows in the 1990s and yet with declining economic growth across the same period.

The unsettled effects of FDI on economic growth has paved the way for a new strand of studies. These studies indicate that a country's chance of gaining from FDI externalities might be limited by local conditions such as financial sector growth of the host country. In the absence of a sound financial system the effects of FDI on domestic economies may not be realised. A strong financial sector in domestic economy increases liquidity. It promotes trading of multiple financial instruments to facilitate capital mobilization and accessibility by domestic firms and multinational companies for superior operations (Levine, 1997). Financial accessibility is made effective by the intermediary function of financial institutions through capital rationing, reduced transaction cost, diffusion of information and financial contracts enforcement. Conversely, a weak financial market compels multinational companies to depend on foreign parents to reinvest capital, which stifles their operation capacity in the host country.

Moreover, competition and innovation are stifled in countries with weak financial system. Growth literature postulates that a good financial system allows investors to access local funds for investment, reducing foreign capital influx and limits the credit accessibility of domestic investors (Alfaro and Chauvin, 2020). Harrison et al (2004) and Adeniyi et al (2015) find that domestic firms' access to

credit increases in line with increase in FDI. The argument is that a good financial system eases financial constraints and extends foreign firms' innovative activities, which tend to expand the spillover effect. A strong financial market increases liquidity and promotes trading of multiple financial instruments to facilitate capital mobilization and accessibility by both domestic firms and multinational companies for superior operations (Levine, 1997). Such accessibility is made effective by the intermediary function of financial institutions through capital rationing, reduced transaction cost, diffusion of information and financial contracts enforcement. Conversely, a weak financial market compels multinational companies to depend on foreign parents for reinvestment capital which stifles their operation capacity in the host country.

While existing literature claims that countries with developed financial markets benefit significantly from the activities of FDI on economic growth, it is argued that countries with less developed financial system attracts more foreign capital to enhance economic growth as the local market may not attract foreign investors and this fosters the substitution of the capital market with FDI (Hubbard, 1998: Alfaro and Chauvin, 2020). But due to the volatility of such substitution, the benefit thereof remains a doubt (Alfaro and Chauvin, 2020). The underdeveloped financial system in SSA raises the question of whether the financial sector in SSA can translate FDI into economic growth. Likewise, Olagbaju and Akinlo (2018) find that FDI's impact on economic growth is positive at a certain threshold of financial development. Cattaneo and Ezeoha (2012) also contribute to the subject through their findings that the positive moderating effect of the financial system is contingent on the quality of communication infrastructure and governance structures. The extant research focuses on the threshold of financial development which must be attained by SSA to fully translate FDI to economic growth but neglects the role the current financial system plays in economic growth.

The growing literature on the moderating effects of finance in the FDI growth link has failed to clarify whether financial sector growth means host firms are liquid giving the extent of imperfection in the SSA financial markets. Imperfection rises from higher interest rates and high government interferences. Banks may also diversify their loans between firms to mitigate portfolio risk. Therefore, the growth of the

financial sector may not mean domestic firms are liquid enough to fund a technology introduced by a foreign firm.

Most empirical works find the absorption capacity of human capital in the host country as an economic growth-enhancing variable on the role of human capital in the FDI growth link. Human capital constitutes the deliberate acquisition and application of all useful knowledge and skills (Schultz, 1961). Sherin (2003) defines it further as a" stock of skills and knowledge embodied in the ability for labour to produce an economic value". Since human capital is a determinant of economic growth, the attention of researchers has been drawn towards the interactive effect of FDI and human capital in influencing economic growth in SSA. Anetor (2020) researched the mediating impact of FDI and human capital on economic growth in 28 SSA countries using dynamic panel threshold regression. The study concludes that Human Capital and FDI have insignificant impact on development; however, the introduction of an interactive term in the model demonstrated that SSA has insufficient human capital level to transform spillover effects of FDI into economic growth. The finding suggests that human capital mediates the impact of FDI on development. Sghaier (2021) adopts panel data from 2008-2018 to examine the mediating role of human capital in the FDI growth nexus using GMM estimator. The results confirmed that human capital complements FDI to positively impact economic growth in 4 North African countries. The findings stand practically true for several reasons.

First, FDI enhances human capital and increases the productivity of the host country. A trained labour force is a carrier of knowledge transfer that affects the economies of the host countries. Bodman and Le (2013) attempt to examine whether FDI leads to a trained labour force in Kenya. Their findings suggested that FDI leads to transferring and sharing of technology, management knowledge, and skills. The labour force of the host county benefits from the spillover effects through training (Osano and koine, 2016). Moreover, FDI indirectly forces domestic firms to compete with MNCs by training their workforce to engage in advanced technology, boosting their efficiency to reflect high GDP (Mutenyo et al, 2017). Again, through FDI, multinational corporations employ the labour force of the host country, where they acquire knowledge and skills, which later is transferred to local firms as the labor

force joins the domestic firms (Mutenyo et al, 2017). This presupposes that SSA must have the absorption capacity in the form of a higher level of education to benefit from the impact of FDI on economic growth. Bassanini and Scarpetta (2002) confirm the effect of higher education on economic growth from their analysis of OCED data from 1971-1998. They conclude that GDP per capita increases by 6% when the duration of schooling increases, depicting the importance of a higher level of education on SSA. However, Tapuw et al. (2020) points that SSA has a weak human capital base due to high school dropouts and low school enrollment rate. They substantiated their analysis with statistics on average primary, secondary and tertiary enrollment rates from 2007-2017. They show that SSA has the lowest average enrollment rates of 76%, 38% and 8%, respectively, purporting that SSA does not have the absorption capacity to fully exploit the spillover effect of technology transfer to have a greater positive impact of FDI on SSA's economic growth.

The role of trade on economic growth remains debatable in literature. Despite some existing results pointing to negative impact of trade on economic growth, there are considerable literature confirming the positive effects of trade openness on economic growth (Brueckner and Lederman 2015; Zahonogo, 2016; Hailu, 2010 Were, 2015). Arguments favoring the positive impact of trade on economic growth assert that trade enhances efficient resource allocation in the short run and causes technological transfer in the long run (Zahonogo, 2016). But the effect of trade can be harmful in the long run when trade is more import-oriented than export-oriented in the host country. Zahonogo (2016) contributes that the positive impact of trade vanishes above a certain threshold. He argues that the effects of trade become negative above certain threshold level.

The exogenous impact of trade on economic growth in SSA still remains debatable in the literature. Udi et al. (2021) finds a significant and negative impact of trade openness in Eastern and Western regions of Africa but a positive impact on growth in central Africa. Trade openness interacts positively with economic growth when considered solely and when it interacts with FDI, it remains positive towards economic development. The channels through which FDI interacts with trade openness are their complementarity and substitutability relationships. According to Hailu (2010), FDI and trade complement each other when a comparative advantage exists between both

economies. Factor prices equalized when efficiency-seeking MNCs engage in cross-border vertical production. However, such market-seeking trade is more import-oriented than export-oriented. It leads to the repatriation of profits and higher dividends, which negatively impacts the balance of payment and, consequently, the GDP of the host. On the other hand, FDI interplays with trade through the balance of payment of SSA to influence economic growth. Resource-seeking MNCs undertaking cross-border horizontal production positively fosters export and backward linkages to impact the host country's BoP. On the other hand, FDI substitutes trade when trade is based on absolute advantage (Hailu, 2010). Fortunately, SSA is attractive to resource-seeking MNCs, positively affecting its GDP. SSA trade openness policies must therefore center on trade via export than import.

A growing number of studies seek to examine the relationship between population and economic growth. Stylised facts which have been identified vary from no relationship to negative, positive, and insignificant (Headey and Hodge, 2009). According to Headey and Hodge (2009), the different results from observations of the relationship between population growth and economic growth can be associated with the different methodologies, the variables proxied for population growth and controlled for economic growth, the geographical area considered and period of the analysis. Peterson (2017) observes from his review that most of the existing literature contributing to knowledge on the relationship between population and economic growth support the idea that population growth is an important determinant of economic growth and may contribute to output per capita. One of the arguments in line with this emphasis follow that the younger population metamorphosises into productive adults which in turn boosts production and economic growth (Peterson, 2017). Simon (1990) opines that population growth accumulate human capital through stock of knowledge for economic growth. Bucci (2015) recognises higher specialisation along population growth for economic growth. Empirical evidence from examination of countries with dense population such as India and Africa corroborate the positive effect of population growth on economic growth from previous studies (Sethy and Sahoo, 2015: Tumwebaze and Ijjo, 2015).

Equally, other authors such as Huang and Xie (2013) find that population growth and economic growth have a negative correlation. Generally, theorists and authors making negative relationship analysis argue that population growth demotivates capital formation, increases pressure on natural resource dependency and diverts additions to capital resources (Easterlin, 1967) or diminishes labour returns. Linden (2017) for instance postulates that population growth increases dependency on resources and inhibit growth in the long term. Some authors conclude that economic growth is negatively impacted by population growth resulting from fertility because such growth does not encourage savings (Kelley and Schmidt, 2001: Mierau and Turnovsky, 2014). Becker et al (1999) contributes to knowledge with similar suggestion on negative effect of population growth on economic growth in low-income countries with agriculture because diminishing returns is experienced along population growth. Extant literature expressing the relationship for developing countries include Sachs (2008) and Headey and Hodge (2009). They agree that population growth has negative effect on economic growth in developing countries. Their consensus is exemplified in a study by Dao (2012) where GDP per capita was proxied for economic growth. A linear and negative relationship between population growth and economic growth was found for developing countries. Population growth favours the economic growth of economies with high income (Becker et al, 1999), however, the speed of the favourable effect on economic growth is also dependent on the velocity of population growth. Hence, existing predictions in literature suggest a slow economic growth in economies with high income as their population growth is expected to slow in the coming years (Baker et al, 2005).

The precise effect of interest rate on economic growth is still controversial within literature. Inconsistencies in theories and findings on the relationship between interest rate and economic growth exist in explaining the relationship. According to Drobyshevsky et al (2017), investment and consumption depict the channels through which interest rate takes effect on economic growth. Thus, theories and investigations on the relationship between interest rate and economic growth give prominence to these channels to make conclusions. Both Neo-classical theory of investment and Neo-Keynesian theory suggest that economic growth would be affected positively or negatively by interest rate depending on whether creditors or borrowers dominate the

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economy (Wickens, 2008: Acemoglu, 2008). Perhaps, since either a rise or fall in interest rate at any point posits simultaneous favourable and unfavourable conditions to both parties which also affect economic growth, effect of change in interest rate on economic growth would be determined by the dominancy of either of the parties. Both theories hold the view that revenues of creditors increase along with increase in interest rate, boosting their consumption for economic growth. However, the relationship is otherwise when borrowers dominate the economy because a rise in interest rate declines their revenues and consumption which is unfavourable to economic growth. The two theories therefore associate a direct inverse relationship between cost of capital or borrowing cost and output of firms to propose that output of firms declines as interest rate rises because of increased debt burden from interest payments and it inhibits firms from undertaking additional investments (Drobyshevsky et al, 2017: Tibinyane and Kaulihowa, 2021). Tajudeen et al (2017) expresses that high interest rate boosts domestic savings and low interest rate enables firms to access more loans and invest in productive activities for economic growth. Odhiambo and Akinboade (2009) contribute along similar analysis that economic growth is affected positively when interest rate rises because it encourages savings and investments. Empirical findings from Hansen and Seshadri (2014), Tibinyane and Kaulihowa (2021) and Maiga (2017) considering Nigeria and Gambia indicate different results from previous studies that interest rate and economic growth have insignificant relationship.

In using interest rate as a monetary policy to promote economic growth, Jelilov (2016) finds economic loosening through decrease in interest rate as effective for boosting productive and economic activities with resultant positive effect on economic growth. Foo (2009) also finds negative impact of economic tightening through increase of interest rate on economic growth. But Buteau (2011) finds monetary policy via interest rate insufficient for economic growth in less developed countries. Existing studies in literature which branches to investigate implications of interest rate reforms on economic growth suggest that interest rate liberalisation increases economic growth in Nigeria and Kenya (Nicholas, 2009: Obamuyi and Olorunfemi, 2011).

Thus, findings from examination on the effect of interest rate on economic growth remains mixed. The impact of FDI on economic growth is therefore not automatic. Whether the effect is positive, or negative is contingent on certain moderating factors. This paper thus seeks to establish the moderating relationship between finance and the impact of FDI on growth in SSA.

3.4. Model Specification and Methodology

In the quest for a robust set of variables for modelling economic growth and the degree of economic convergence, researchers like Romer (1990), Levine and Renelt (1992) identified the core explanatory variables to be included in a basic growth model. I include these standard variables and FDI inflow as a percentage of GDP in my baseline model. Following Barro & Sala- i-Martin (1995), I have country-group (West Africa, Southern Africa, Eastern Africa, and Central Africa) and time dummies to absorb unobserved time-invariant heterogeneity. Thus, I estimate the model of the type below.

$$y_{i,t} = \sum_{j=1}^{p} \beta_j\, y_{it-j} + \rho FDI_{it} + \sum_{i=1}^{n} \gamma x_{it} + v_{i,} + \delta_t + \varepsilon_{i,t} \qquad [3.1]$$

The model in [3.1] is a standard dynamic panel growth regression model incorporating country-and time-specific effects where y_{it} is the real GDP per capita growth of country i at time t, $y_{i,t-1}$ represents the lag of the dependent variable considering the transitional convergence effect as postulated by the neoclassical growth theory, and it also characterised the dynamic feature of the model. x_{it} is a vector of contemporaneous explanatory variables excluding the lagged of the dependent variable (See Barro and Sala-i-Martin, 1997; Cooper and Barro, 1997; King and Levine 1993). The variable FDI_{it} measures the total inflow of FDI to the host country at a period. Total FDI inflow is measured in terms of the host country total GDP (i.e., $FDI_{it} = \frac{FDI_{it}}{GDP_{it}} \times 100$. The parameter $v_{i,t}$ denotes country specific effects absorbing unobserved time-invariant heterogeneity and the parameter δ_t control for some set of year effects. To avoid the instruments proliferation problem in dynamic models, I do not control for a complete set of year effects. I, therefore, control for specific years where Africa experience a significant structural break in the flow of FDI and GDP per capita. The conventional practice in econometrics is that, when many variables are considered in the case of this study, it's prudent to

decompose the disturbance term into two parts. Thus, the factors affecting individual units over time and those involving both individuals and time (Anderson and Hsiao 1982). The component x_{it} is a vector of variables that have robust effects on growth Barro and Sala-i-Martin, (1997) and King and Levine (1993).

The model in [3.1] differentiates between the long-run relationship and the short-run dynamics. The ρ, β and γ are vector of parameters to be estimated. In applying OLS to this regression equation, the lag of GDP per capita growth correlates with the fixed effects in the error term, which gives rise to "dynamic panel bias", as indicated in the works of Nickell (1981). In a pure cross-sectional regression, the unobserved country-specific effect is embedded in the error term; therefore, a dynamic panel estimator is needed to control unobserved country-specific effects. The dynamic panel estimator is consistent and efficient even when the country-specific effects are correlated with the lagged contemporaneous explanatory variables. In a typical panel regression like equation [1], the OLS does not control for the endogeneity of all the explanatory variables. However, the dynamic panel estimator controls endogeneity using internal instruments based on past realisation to draw more accurate conclusions.

To answer my primary research question: What is the role of finance in the FDI growth link? I also build on and complement the works of Alfaro (2004; 2006), Hermes and Lensink (2003), Yeboua (2019) and Acquah and Ibrahim (2019) who explore the role of financial development in the FDI growth nexus. Undeniably, they argued that FDI would positively affect growth only in a well-developed financial market. Unlike these studies, which use individual financial development ratios to measure the depth of the financial sector, I develop an aggregate financial development indicator broad enough to capture several dimensions of the African financial sector. In developing countries like those in Sub Sahara Africa, a single financial development indicator may be a weak indicator of financial development in countries where substantial financial services occur outside the banking system. Therefore, in equation (3.2), I interact FDI inflows with aggregate financial development to test for the significance of financial development in enhancing the positive externalities accompanying FDI flows.

$$y_{i,t} = \sum_{j=1}^{p} \beta_j \, y_{it-j} + \rho FDI_{it} + \delta(FDI_{it} \times FIN_{it}) + \psi FIN_{it} + \sum_{i=1}^{n} \gamma x_{it} + v_{i,} +$$

$$\delta_t + \varepsilon_{i,t} \qquad\qquad [3.2]$$

The specification in equation [3.2] allows me to assess the role of financial sector development in the FDI growth link. The variable FIN_{it} is the financial development index derived from principal component analysis.

With the specification in equation [3.2], three possible dynamics can be highlighted: From table 3.1, if the 1st condition holds, then the development of the financial sector has dampened effects on the enhancing growth efforts of FDI. These dampen effects of finance have been attributed to the inefficiencies and underdevelopment of the financial sector in Africa, as highlighted by Acquah and Ibrahim, (2019). They find financial development to have a decreasing effect on the FDI growth nexus. The negative interaction term may not entirely mean financial development per se dampens the growth effects of FDI, but this could be a sign of Africa's financial sector operating below a certain threshold point. As indicated by Yeboua (2019), the financial sector plays a significant role in the FDI growth link above a certain threshold and dampens the growth effects of FDI below a certain point. If the second condition in table 3.2 holds then FDI has an unambiguously positive or negative impact on growth which is enhanced by financial development. Moreover, if the 3rd condition holds then we must find the threshold above which finance may cause FDI to contribute to growth which can conveniently be computed by partial derivative as follows:

$$\frac{\partial y_{it}}{\partial fdi_{it}} = -\rho + \delta FIN_{it} \qquad\qquad 3.3$$

By calculating the financial development threshold, i.e., the exact breakeven point of equation [3.3]. The financial development threshold is computed as:

$$-\rho + \delta FIN_{it} = 0$$

$$[3.31]$$

where the threshold point is therefore given by: $FIN_{it} = \frac{\rho}{\delta}$

Table 3. 1 The implication of parameters signs in equation 3.2.

Condition	Implication
If: 1. $\rho > 0 \ and \ \delta < 0$	The role of FDI on economic growth is positive and this impact is diminishing with improvements in the financial sector
2. $\rho > 0 \ and \ \delta > 0 \ OR \ \rho < 0 \ and \ \delta < 0$	FDI has an unambiguously positive or negative impact on growth which is enhanced by financial development.
3. $\rho < 0 \ and \ \delta > 0$	There is a threshold of financial development beyond which FDI can have a positive impact on economic growth

In the preceding section, I explain the benchmark model in equation 3.2 to investigate the role of finance in the FDI growth nexus (see, Alfaro (2004) and Hermes and Lensik (2003) for a similar empirical strategy. The shortcoming of the static (OLS, random and fixed effects model) as used in the previous literature to study the relationship between finance and growth (Goldsmith, 1969; King and Levine, 1993a, 1993b; Levine and Zervos, 1998) is clear. In these models, all explanatory variables are assumed to be homogeneous with fixed (random) country effects. However, the error term contains country specific effects which does not vary with time and may correlate with some exogeneous variables. The dynamic panel model however utilizes instruments to mitigate such endogeneity (Balgati, 2008). The system GMM by Arellano and Bover (1995) and Blundell and Bond (1998) is popular in modelling dynamic panel models to deal with the problem of endogeneity. The estimator works for conditions whereby there is (1) limited time (T) and large cross-sectional observations (Panels); (2) independent but technically not exogenous variable; (3) fixed individual effects; (4) dependent but dynamic variable (See Roodman, 2006;

Arellano and Bover, 1995; Blundell and Bond, 1998). Considering the dynamic nature of my variables of interest (GDP per capita growth and DI inflows) and the issue of endogeneity, the use of static models like the fixed effects and random-effects model will produce estimates that are inconsistent and biased. For instance, fixed effects result in biased parameter estimates when some of the regressors are endogenous and correlate with the terms of error (Campos &Kinoshita, 2008)

Figure 3. 3 GDP per capita flows with finance over time.
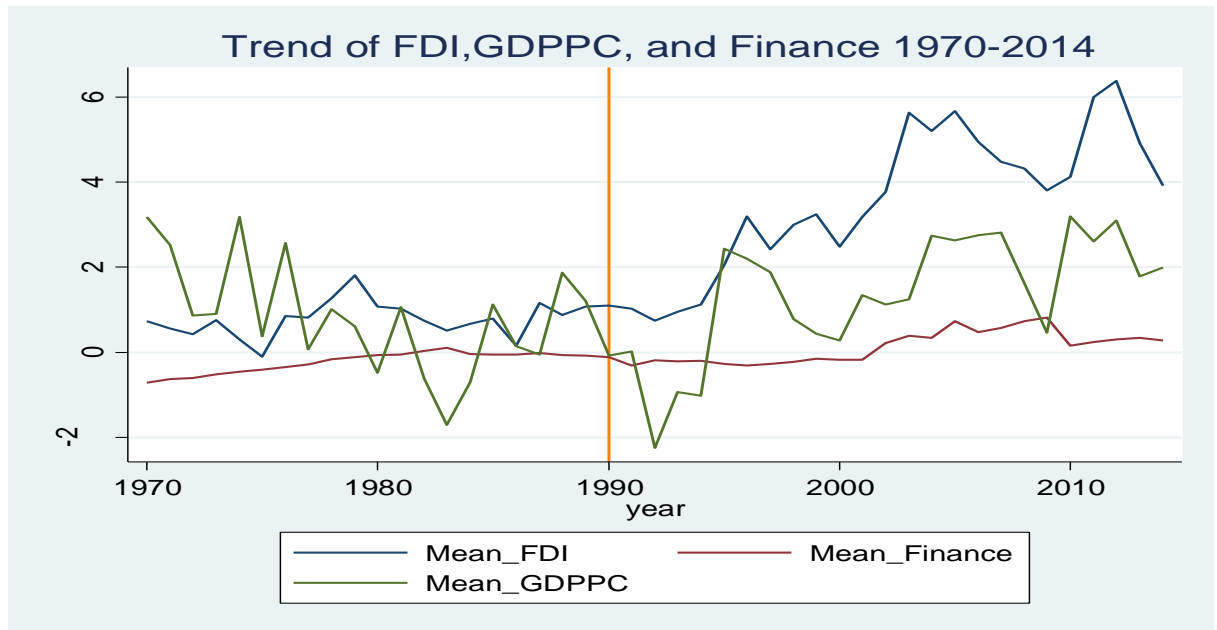
In applying the GMM estimator Arellano and Bond (1991) transformed equation [3.2] by differencing it to arrive at equation [3.4]

$$(y_{i,t} - y_{i,t-1}) = \beta(y_{it-1} - y_{i,t-2}) + \rho(fdi_{it} - fdi_{i,t-1}) + \sum_{i=1}^{n} \gamma(x_{it} - x_{i,t-1})$$

$$+ (\varepsilon_{i,t} - \varepsilon_{i,t-1}) \quad [3.4]$$

By differencing the Eq. (3.2) the country-specific effect is removed however, a new form of bias is introduced into the equation [3.4]. The error term $\varepsilon_{i,t} - \varepsilon_{i,t-1}$ is correlated with the lagged dependent variable $y_{it-1} - y_{i,t-2}$. Assuming there is a negative shock in GDP growth (e.g., the drastic decline in GDP in the early 1990s see figure1.1.1) this can be ostensibly captured in the error term, which implies that the dependent variable will be correlated with the error term. It is also likely that any predetermined variables captured by x_{it} that are strictly not exogenous will be

potentially endogenous because they too may be related to $(y_{it-1} - y_{i,t-2})$ (Roodman,2006)

In other to solve the bias, Arellano and Bond proposed the following moments conditions, based on the assumption that there is no serial correlation in error, and the explanatory variables are technically weakly exogenous. The following are the moments' conditions proposed.

$$E[y_{i,t-n}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \, for \quad n \geq 2; t = 3 \dots, T[\,] \qquad [3.5]$$

$$E[X_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \, for \, n \geq 2 \,; t = 3 \dots \dots, T \qquad [3.6]$$

With the aid of the above moment conditions illustrated in (6&7), I employ the two-step GMM estimator as proposed by (Arellano and Bond,1991; Roodman,2006; Beck and Levine,2002). The assumption made in the first step is that the error term is homoscedastic and independent across countries. The GMM estimator obtained from this process is called the difference estimator (Rousseau and Wachtel 2000). Given the scope of this work, whereby the cross-country relationship between FDI and growth is more critical under investigation, an estimating technique that eliminates the cross-country effects like the difference estimator is statistically insufficient. Secondly, given the persistent nature of the explanatory variables, using lagged values of these variables as instruments are weak. (See, Blundell and Bond 1998 and Alonso-Borrego and Arellano 1999).

Monte Carlo experiments demonstrates that false estimates and weakened asymptotic variance can be produced with this method because of the presence of weak instruments in the method. It is therefore advisable to make use of estimator that captures the regression in difference and levels to curb potential biases and imprecision characterized by the difference estimator (Arellano and Bover, 1995; Blundell and Bond, 1998). The lagged differences of the corresponding variables represent the instruments of regression in levels. These levels of instruments are appropriate under the following additional assumption.

In levels, the right- hand side variables may correlate with country-specific effect in equation (1), however, the correlation between the differences of these variables and the country-specific effect must be minimal or zero. It is important to

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note that, only the most recent difference is used as instrument in the regression in levels because the lagged levels are used as the instruments in regression in differences. The use of additional lagged difference would result in superfluous moment conditions (Arellano and Bover, 1995). The following stationarity property underlies the assumption by which the system GMM functions.

$$E[y_{i,t} + p^{\eta_i}] = [y_{i,t} + q^{\eta_i} \text{ and, } [X_{i,t} + p^{\eta_i}] = [X_{i,t} + q^{\eta_i}] \qquad [3.7]$$

Equation 4&5 provides the additional moment conditions for the second part of the system in levels.

$$E[y_{i,t-n} - y_{i,t-n-1}](v_{it} + \varepsilon_{i,t})] = 0 \ for \ \ n = 1 \qquad [3.8]$$

$$E[X_{i,t-s} - y_{i,t-n-1}](v_{it} + \varepsilon_{i,t})] = 0 \ for \ s = 1 \qquad [3.9]$$

Thus, I use the moment conditions presented in equations (3.5) – (3.6) and employ the system panel estimator to generate consistent and efficient parameter estimates. Given these moments, conditions are not a guarantee of finding a consistent estimate; however, the validity of the instruments influences the consistency of the estimator (Levine, Loayza and Beck, 2000). I chose two specification tests for the validity of my instruments (See Arellano and Bond 1991; Arellano and Bover, 1995; and Blundell and Bond, 1997). In the first test, the Sargan test of over-identifying restrictions is used to analyse the overall validity of the instruments. In my second assumption, the error term $\varepsilon_{i,t}$ is not serially correlated i.e., current errors are uncorrelated with future realisations.

3.5 Data

I construct a panel dataset on 42 SSA countries from 1990 to 2020. These countries' choices and the time are based entirely on data availability for a sufficiently long period. Annual data for all the variables were collected from the World Development Indicators (WDI) of the World Bank, Pen World table 9.0, African Development Indicators, IMF and UNCTAD; see table 3.2 and 3.3 for a detailed description and sources of data. Following the standard growth literature (see Ibrahim and Alagidede 2018a, 2018b; Opoku, Ibrahim, and Sare 2019b; Pandya and Sisombat 2017). I use GDP per capita growth to measure economic growth. FDI inflow is a percentage of GDP, and it entails the net inflows of direct investment. The balance of payments statistics shows the sum of equity capital, reinvestment of earnings, other long-term capital, and short-term capital. Financial sector development is measured by an index derived from different financial development measures. The FDI-growth and financial sector development literature, I interact an aggregate financial development indicator with FDI. Inflation is proxied by the percentage of annual consumer prices measured as consumer price index (2010 = 100); Human capital is measured by Primary school enrolment. The rest of the variables are summarised in the table below.

Table 3. 2 Variable definitions and sources

Variable	Definitions	Sources
GDPPC	**GDP per capita** growth (Constant 2010 US$)	WDI
FDI	Foreign direct investment, net inflows (% of GDP)	UNCTAD
Population	Population growth (%)	PWT 9.0
School Enrolment	School enrolment, primary (% net)	World Bank
Trade	Merchandise trade (% of GDP)	World Bank
Lending rate	Lending interest rate (%)	World Bank
Real effective exchange rate	Real effective exchange rate	World Bank
Inflation rate	Inflation, GDP deflator (annual %)	World Bank

3.5.1 Measuring financial development.

The construction of a variable to capture the level of financial development has been a difficult task due to the wide-ranging services provided by modern financial institutions. The empirical literature on finance and growth has been one area with divergent views on the best indicator to measure financial development. Most of the literature has resorted to liquid liabilities and private credit as a share of GDP to measure the overall development of the financial sector (See Beck, Levine, Loayza, 2000; Favara, 2003; Deidda and Fattouh, 2002). However, according to Khan and Senhadji (2003), high monetisation can be associated with an underdeveloped financial sector. They also argue that liquid liabilities primarily measure the financial sector's ability to provide transaction products rather than its ability to bring together savers and investors.

Table 3. 3 Financial index and constituent variables

Index	Indicator		Data coverage
Financial Institution depth index	I.	Private-sector credit to GDP	1960-2020
	II.	Private credit by deposit money banks and other financial institutions to GDP (%)	1960-2020
	III.	Deposit money banks assets to gdp	1960-2020
	IV.	Liquid liabilities to GDP	1960-2020
	V.	Central bank assets to GDP	1960-2020
	VI.	Financial system deposits to GDP	1960-2020
	VII.	Deposit money bank assets to deposit money bank assets and central bank assets (%)	1960-2020
Financial institution Access index	I.	Bank branches per 100,000 adults	2004-2019
	II.	ATMs per 100,000 adults	2004-2019
	III.	bankaccountsper1000adults	2004-2019
	IV.	borrowers from commercial banks per	2004-2019

Financial stability index	V.	Bank Z Score	2000-2020
	VI.	Bank credit to bank deposits (%)	2000-2020
	VII.	Liquid assets to deposits and short-term funding (%)	2000-2020
Financial Efficiency index	I.	Bank net interest margin	2000-2020
	II.	bank lending deposit spread	1980-2019
	III.	bank non-interest income to total income	2000-2020
	IV.	bank overhead costs to total assets	2000-2020
	V.	bank return on assets after tax	2000-2020
	VI.	bank return on equity after tax	2000-2020

Own calculations (based on World Bank Global financial development database)

Possibility of expressing prejudgment of importance on one indicator in measuring financial development is minimized when aggregate indicators are used. The proxying of financial development with separate financial sector ratios as observed in previous studies does not entail the real state of financial system (Alfaro, 2004, 2006 &2007). Studies which have made attempts to examine the nexus between financial development and growth do not use a common indicator to depict which proxies are most appropriate to capture the linkage.; they however use different measures which explain the difference in results (Chuah & Thai, 2004; Khan & Senghani,2003; King and Levine, 1993a; Savvides, 1995; among others). Using principal component analysis is appropriate because a highly correlated indicators are grouped to form a composite index which captures almost all information on individual indicators. The idea is to use smallest possible number of factors to account for highest possible variation among the indicators. As a result, the composite index no longer depends on the dimensionality of the data set but rather based on the statistical dimensions of the data. The table below outlines the variables used to develop the prospective financial development index. The second column contains variables used to develop the index and the final column contains the data coverage.

Table 3.4 shows the correlation coefficients between financial development indexes and their constituents. High correlation exists between each index and its constituents. For example, Finance depth and its constituent liquid liabilities have a higher correlation coefficient of 0. 978.This is shows that the indicator is measuring the depth of the financial sector well as captured by individual indicators. The correlation between financial depth and financial efficiency index is high and negative. The negative correlation signifies a possible trade-off existing between deepening of African financial institution and working efficiently. It also means that a deep financial system may not guarantee efficient allocation of funds to savers. Financial stability index also has a moderate correlation with one of its constituents, Bank Z scores. Financial stability has no high correlation with other financial development index. This means that financial depth, financial accessibility, and efficiency cannot be equated to financial stability. Financial accessibility index has a high correlation with three of its constituent's variables. This can be seen from the correlation coefficients between bank Accounts per 1000, ATMS per 100,000 and bank branches per 1000 and finance access variable. The high correlation between aggregate financial development indicators and their constituents is expected because the index created contains all the characteristics of these individual indicators. The measures of financial development indicators are highly correlated with each other, and this is the theoretical basis for using the principal component analysis for deriving the aggregate financial development indicator from these variable

Table 3. 4 Correlation matrix for financial development index and constituents.

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1) Finance depth index	1.000											
(2) Finance stability index	0.141	1.000										
(3) Finance efficiency index	-0.650	-0.299	1.000									
(4) Finance accessibility index	0.712	0.113	-0.526	1.000								
(5) Bank net interest Margin	-0.655	-0.205	0.856	-0.574	1.000							
(6) liquid liabilities	0.978	0.055	-0.617	0.720	-0.648	1.000						
(7) bank accounts per 1000	0.775	0.081	-0.587	0.955	-0.586	0.776	1.000					
(8) ATMs Per 100,000	0.667	0.166	-0.489	0.957	-0.564	0.648	0.880	1.000				
(9) bank branches per 1000	0.596	0.071	-0.428	0.938	-0.489	0.643	0.845	0.851	1.000			
(10) Central Bank asset	0.414	0.021	-0.203	-0.031	-0.226	0.481	-0.039	-0.040	0.066	1.000		
(11) Bank returns on asset	-0.333	-0.364	0.699	-0.149	0.298	-0.256	-0.273	-0.101	-0.057	-0.048	1.000	
(12) bank z score	0.418	0.477	-0.276	0.560	-0.423	0.405	0.452	0.575	0.536	0.048	0.035	1.000

Table 3.4 in Appendix A presents the results of the principal component analysis. The first component in each table is the highest eigenvalue, and it explains about most of the standardised variance. The first principal component has the maximum explanatory power hence this is chosen over

the others. Therefore, we use it as the aggregate financial development indicator. The diagrams in Appendix A plots the eigenvalues against the various components developed.

In choosing the aggregate index, the rule of thumb is to retain the components associated with the high part of the scree plot and drop the (explain)

Figure 3. 4 Scree plots of Eigenvalues financial Access index
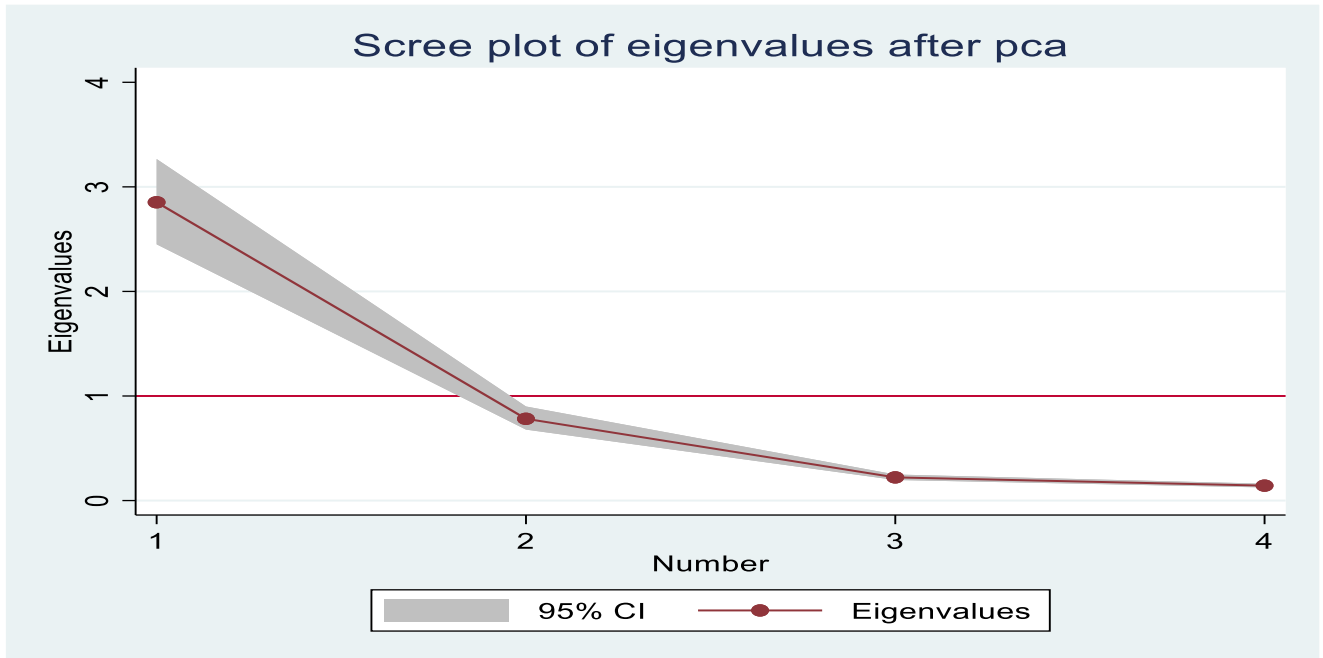
Figure 3. 5 Scree plots of Eigenvalues Finance depth
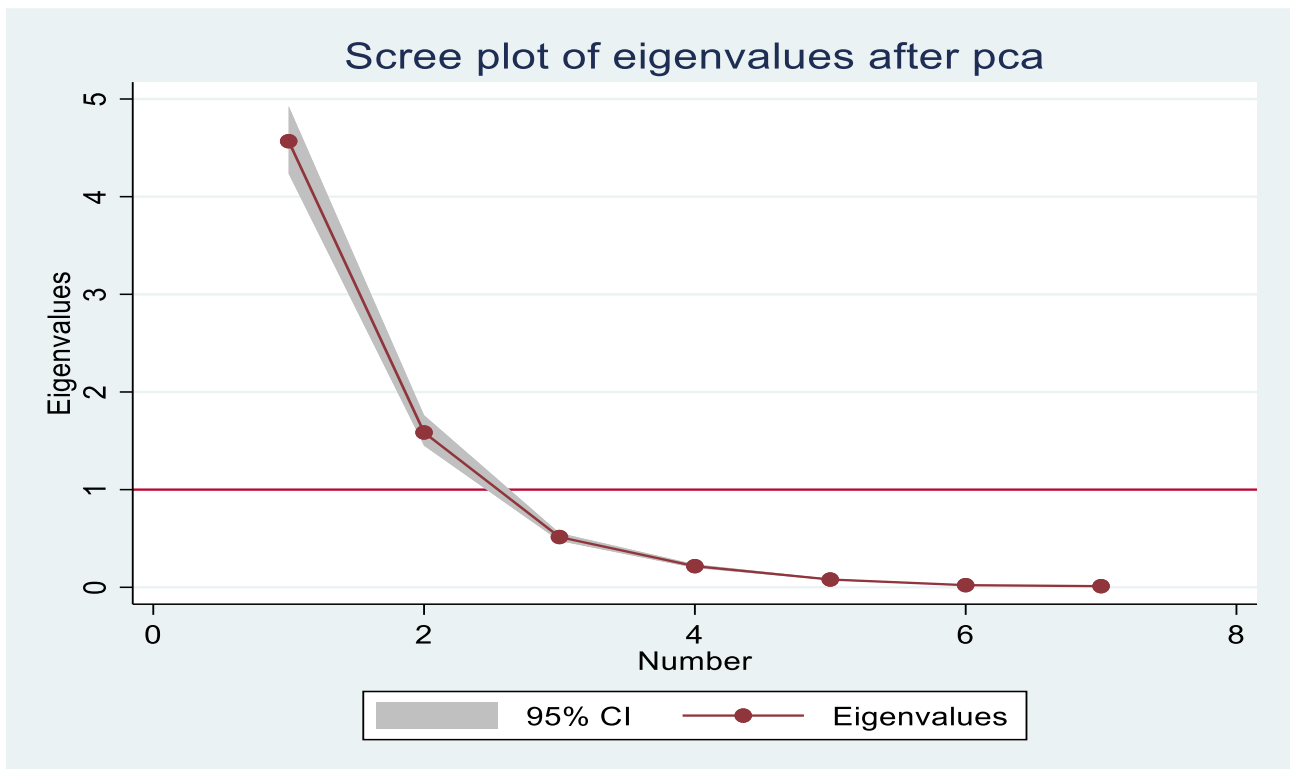
Figure 3. 6 Scree plots of Eigenvalues Finance Efficiency index
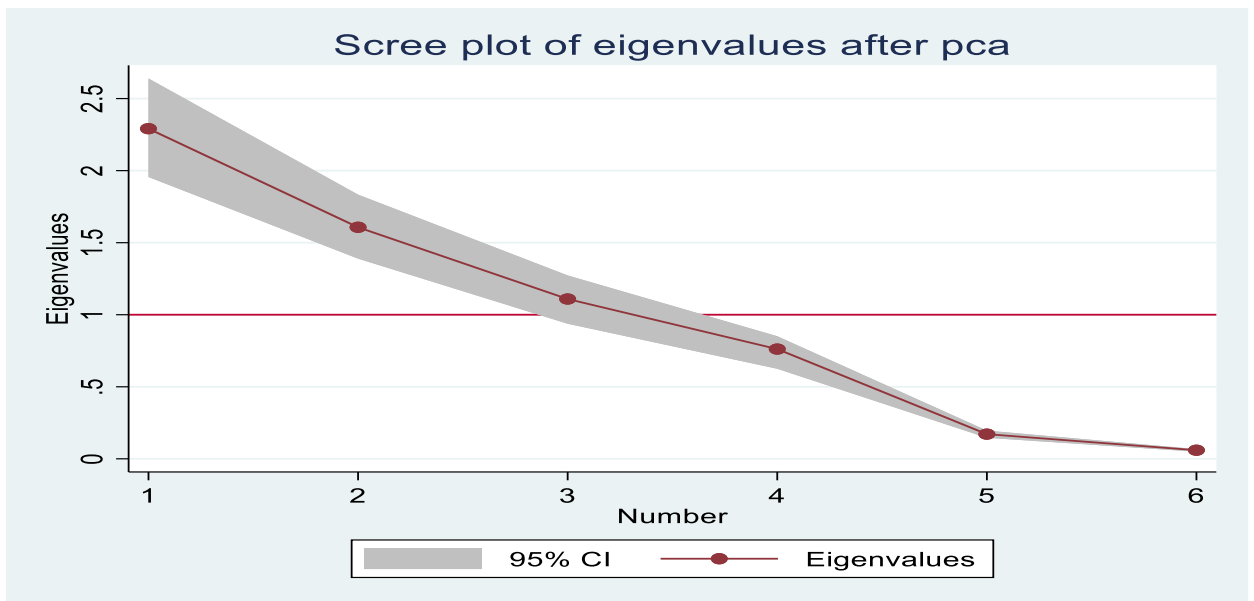
Figure 3. 7 Scree plots of Eigenvalues Financial stability index
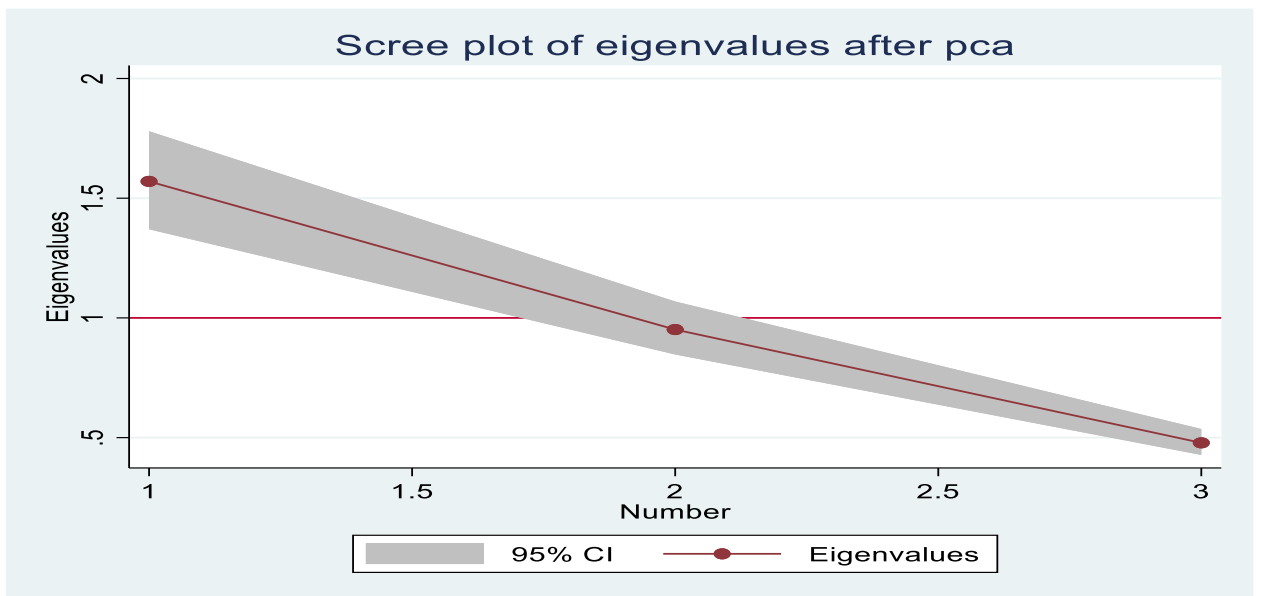
Table 3.5 provides descriptive statistics for the variables used in the study. Average FDI inflows has remained low, with a significant variation among countries as indicated by the large standard deviation of 6.8. FDI inflows have a mean value of 3.3 % GDP. Average FDI inflows can range from -11.2% of GDP to about 103%. There is a low variation in the sample's GDP growth rate, as indicated by the lower standard deviation of 1.43% and a mean value of 29.7%. The mean value of trade to-GDP ratio is about 52%, with a standard deviation of 30%. There is a considerable difference among the countries in terms of trade openness. The extent of trade size among the countries is not surprising given that most of the countries in Africa import more than half of their products. The cost of credit is pervasive in SSA. Average lending interest rate stands at 18.9% which could vary from 4.7% to as high as 217% in countries. Population growth rate continues to soar in SSA.

Table 3. 5.Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Log GDP per capita	1336	29.702	1.432	26.383	33.851
Initial GDP Per capita	1271	29.256	1.405	26.383	32.852
Primary schenrole	1095	93.067	26.811	21.708	156.404
FDI inflows (Net)	1351	3.433	6.807	-11.199	103.337
Population growth	1417	2.411	1.102	-6.766	8.118
Lending interest rate	851	18.878	15.991	4.737	217.875
Finance stability (index)	613	-.533	10.732	-78.535	184.614
Finance Depth (index)	1083	0	2.137	-2.421	14.833
Finance Efficiency	340	0	1.515	-3.034	8.314
Finance Access (Index)	390	0	1.689	-2.612	8.04
Trade % of GDP	1348	52.266	29.886	4.909	244.889

The correlation matrix in table 3.5 gives an initial but crude approximation of the relationship between my variables of interest. Regarding the correlation matrix in table 3.5, there is a high correlation between some pairs of variables. The correlation matrix shows a high correlation coefficient between GDPs per capita and initial level of GDP per capita. Such a high correlation gives justification for using GMM estimator to deal with endogeneity. There is some high correlation between measures

of financial development. The rest of the variables show no high correlations.

Table 3. 6 Correlation matrix and descriptive statistics

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
(1) log GDP per capita	1.000										
(2) Initial GDP1960	0.963	1.000									
(3) school enrollment	-0.325	-0.201	1.000								
(4) FDI inflows	-0.283	-0.254	-0.080	1.000							
(5) Population growth	0.594	0.575	0.033	-0.051	1.000						
(6) Lending interest rate	0.183	0.278	0.527	0.056	0.428	1.000					
(7) Trade	-0.556	-0.472	-0.087	0.275	-0.640	-0.310	1.000				
(8) Financial depth	-0.320	-0.437	-0.320	0.167	-0.442	-0.353	0.107	1.000			
(9) Finance stability	-0.058	-0.100	-0.014	-0.017	0.073	-0.125	-0.024	0.090	1.000		
(10) Finance efficiency	0.083	0.186	0.444	-0.060	0.238	0.351	0.025	-0.674	-0.290	1.000	
(11) Finance access	-0.457	-0.569	-0.315	0.236	-0.535	-0.383	0.288	0.698	0.051	-0.530	1.000

The line of best fit in figure 3.6 shows the relationship between GDP growth rate and FDI inflows. The fitted line indicates a negative relationship between economic growth and FDI inflows. The gently sloping line of best fit gives the first and crude insight into the nature of the relationship between economic growth and FDI in Africa. The weak correlation between FDI and economic growth presupposes that the exogenous role of FDI on economic growth may depends on other mediating factors in the host country. In this thesis, I study the mediating role of financial development in the FDI growth nexus.

Figure 3. 8 Scatter plot of FDI and economic growth.
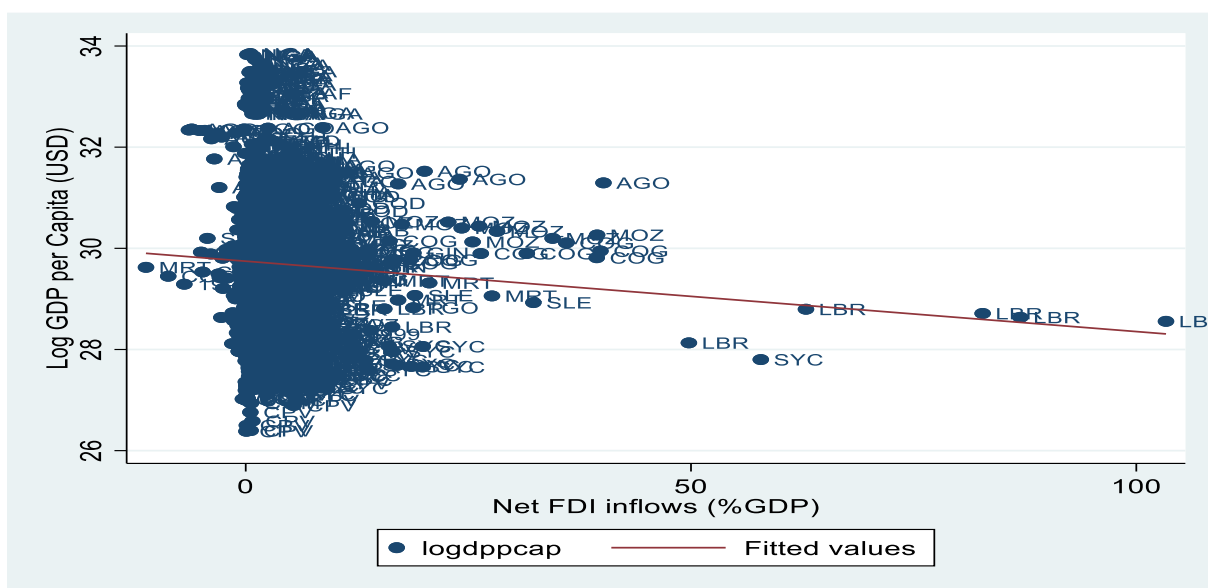
3.6 Empirical results

In this section, I organise my results into three subsections. First, I present the results for the exogenous impact of FDI on growth in the first subsection. I use both the one step and two step system GMM to estimate the exogenous impact of FDI on growth without controlling for financial development. To check the stability of my results I include financial development independently into my baseline model to check how the impact of FDI on growth changes when we account for financial development. In the second subsection, I present the results for the full model by incorporating various financial development indicators developed by PCA and their interaction with FDI inflows in into the analysis. The motive is to test the mediating role of financial development on the FDI growth nexus. In the final subsection, I estimate my results on single measures of financial development. The selection of the individual measures is based on the availability of data for a long period.

3.6.1 Direct impact of FDI on growth: GMM estimates.

In this section, I provide the results for the GMM estimators. In the first part of the analysis, I employ one-step and two-step system GMM to examine the exogenous effects of FDI on economic growth. The aim of the analysis is to examine the direct impact of FDI on economic growth without controlling for financial development. I present results for both One-step system GMM even though the two-step GMM estimator is preferred due to its ability to correct small sample bias with Windmeijer corrected standard errors. Column one of table 3.7 presents the results for the one step system GMM and the column 2 presents the results for the Two step system GMM.

From table 3.7, the initial level of GDP per capita, a measure of catching up effects, is consistently significant and positive throughout the two estimators. The results are consistent with the findings of Gui-Diby (2014). In Pritchett's (1997), he noted that most African countries do not converge but rather diverge. The results support the idea of economic divergence, a phenomenon common in developing countries. Instead of converging with the developed world, these countries are rather diverging. The gap between the developing countries in Africa and the rich keeps widening due to poor economic policies in developing countries. African countries can be said to belong to a poorer convergence club with no sign of economic convergence.

Using primary school enrolment as a measure of human capital development, I find a positive relationship between primary school enrolment and economic growth. The positive role of human capita development is well documented in the economic literature. The findings

are consistent with recent study by Fayissa and Nsiah, (2013) who find school enrolment to have a positive association with economic growth in Africa.

FDI has positive impact on the growth rate of host countries when we do not account for financial development. In column 2 and 3 of both the one-step and two step GMM, FDI plays a significant role in the growth rate of African countries; a percentage increase in FDI inflows increases GDP growth rate of the host country by 1.368% in the two-step system GMM. The results are consistent with the works of (Baldwin et al., 2005; Chong et al., 2010; Gui-Diby, 2014; Zghidi et al., 2016) who found a positive impact of FDI on growth in Africa. The results also confirm a recent study by Ayenew (2021) who employed PMG/ARL model to test for foreign direct investment effect on economic growth in the short and long run, considering 22 SSA countries. They conclude that foreign direct investment boosts economic growth in the long run in Sub-Saharan Africa. Similar results are documented in a study conducted on 33 SSA country countries by Jurgurnath et al (2016). The results however contradict the findings of Blomstrom and Kokko (2003), who argue that the positive impact of FDI is only realised when Countries financial sector developed to some level. In a study by Ibhagui (2018), the researcher examines the effect of FDI on growth in SSA based on large panel data comprising 45 SSA countries with period between 1985-2013 using threshold regression analysis while considering six (6) threshold variables, inflation, initial income, population growth, trade openness, financial development, and human capital. The results from the study showed that FDI impact on economic growth in SSA is inconsistent and ambiguous, drawing emphasis from the results that FDI promotes economic growth when inflation, population growth and financial development of SSA attain threshold levels.

Population growth has a negative impact on GDP growth. The results are consistent with economic theory which associate high population growth with slow economic progress. A percentage increase in population growth decreases economic growth rate by 0.514% in the preferred two-Step system GMM. The results are consistent in terms of level of significant when the one step system GMM is used. Higher interest rate impedes investment, and this leads to slow economic growth. The negative impact of lending interest on economic growth is not surprising due to the higher cost of borrowing in Africa. I find a negative relationship between economic growth and lending interest rate.

Traditionally, economic theory postulates growth gains from trade openness at the country level through economic specialisation. However, reliance on trade can lead to the destructions of local industries especially industries which are new and need some level of protection (citation). The overreliance of African countries on imports is overwhelming. Trade in Africa always tend to be towards a zero-sum game due to the structure of goods the continent trade in on the international market (citation). Africa import manufactured goods and export raw materials. I find a negative and significant impact of trade openness on economic growth in SSA. The results are consistent with the works of Shafaeddih (2005) and Rigobon and Rodrik (2005) who conclude that trade openness as measured by total trade as a share of GDP has a significant negative impact on the economic growth. In Africa trade is more import-oriented than export-oriented in host countries hence the negative impact emanating from trade. A percent increase in trade openness decreases economic growth by 0.026% in the two-step system GMM.

Table 3. 7 Effects of FDI on growth

Variables	One-Step Sys GMM	Two Step Sys GMM
Log GDP Per capita1990	1.241* (0.687)	1.368** (0.618)
Primary school enrolment	0.014*** (0.005)	0.014*** (0.005)
FDI inflows	0.102** (0.048)	0.091** (0.045)
Population growth	-0.581** (0.249)	-0.514** (0.217)
Lending interest rate	-0.046 (0.030)	-0.048* (0.024)
Trade	-0.037** (0.015)	-0.026** (0.011)
Constant	-3.627 (20.223)	-7.824 (18.045)
Observarsions	694.0	694.0
No. of instruments	13.000	13.0
AR2 (p-value)	0.398	0.357
Hansen-J (p-value)	0.827	0.827

Note. In all specifications, I control for country-specific effects to mitigate the impact of country heterogeneity. Robust Standard errors against heteroskedasticity and serial correlation are reported in parentheses. The models are estimated with Two-step system GMM. The dependent variable is log GDP per capita(constant) * $p < .10$, ** $p < .05$, *** $p < .0$ t statistics in parentheses. Finance and FDI are treated endogenous.

3.6.2 Direct impact of FDI on growth controlling for finance.

Table 3.8 reports the GMM estimates for the direct effect of FDI on economic growth, controlling for aggregate financial development indicators. In this table, I report the results for all four measures of financial development. Column 1 controls for aggregate financial development as measured by the depth of the financial system. In column 2, I controlled for the aggregate financial stability index. Columns 3, and 4 control for financial efficiency and accessibility respectively.

The positive impact of FDI on SSA economies remain positive and significant when the financial depth is incorporated into the model. The aggregate impact of financial development as captured by the depth of the financial sector plays no significant impact on growth. FDI impact on growth becomes insignificant when financial stability is controlled for in column [2]. This testifies to the mixed results that exist in the FDI growth literature. In column [3] the impact of FDI on growth turns negative but insignificant when financial efficiency enters the model. FDI however plays no significant impact on growth when financial efficiency enters the model. Finally in column [4] I add financial accessibility index into the model and the effects of FDI on growth remains insignificant. The exogenous impact of financial accessibility has a positive impact on growth. The results therefore demonstrate that, the impact of FDI on growth can depend on the specific measure of finance included in the model. This may be because of the poor nature of African financial sector. The financial sector in Africa is not sufficiently well-developed to support the idea of technological innovation.

Table 3. 8 Effects of FDI on growth adding finance.

	1	2	3	4
Innitial GDP1990	1.090***	1.073***	0.585	1.030***
	(0.163)	(0.090)	(0.508)	(0.082)
Primary School enrollment	0.009*	0.022*	0.004	-0.003
	(0.005)	(0.012)	(0.011)	(0.013)
FDI netinflows	0.032**	0.084	-0.024	0.000
	(0.014)	(0.060)	(0.018)	(0.013)
Population growth	0.050	-0.344	0.185	-0.039
	(0.082)	(0.496)	(0.320)	(0.106)
Lending interest rate	-0.055***	-0.083*	-0.007	-0.002
	(0.018)	(0.045)	(0.015)	(0.038)
Trade	-0.001	-0.031	-0.003	-0.009
	(0.006)	(0.031)	(0.020)	(0.005)
Financial_Depth	0.018			
	(0.024)			
Financial Statbility		0.226		
		(0.437)		
Financial Efficiency			-0.314	
			(0.187)	
Financial Access				0.164*
				(0.081)
Constant	-2.152	0.000	12.013	0.746
	(5.288)	(.)	(16.603)	(2.359)
Observarsions	594.000	417.000	287.000	250.000
No. of instruments	34.000	8.000	23.000	19.000
AR2 (p-value)[1]	0.449	0.303	0.303	0.636
Hansen-J (p-value)	0.216	.	0.436	0.108

[1] AR (2) test for second-order serial correlation, and the null hypothesis is that there is no serial correlation. The P- values suggests there is no sign of second order serial correlation. Hansen statistic test whether the over-identification restrictions are valid, the null hypothesis that the over-identification restrictions are valid and the P-values suggest the instruments are valid. 2-step GMM estimator Standard errors in parentheses * $p < .10$, ** $p < .05$, *** $p < .01$ Robust Standard errors in parentheses.

3.6.3 Impact of FDI on growth conditioned on finance.

This section presents the preferred two-step system GMM estimation techniques for the entire sample. I used four aggregate financial development indicators derived from the Principal Component Analysis. In columns [1], I include aggregate financial development indicators as measured by the depth of the financial institution and their interaction with FDI into the model to assess the role of finance in the FDI growth link. The coefficient of the interaction term $[FDI \times Finance]$ appears positive and significant. Unlike in table 3.8 where FDI fails to play an important role when various types of financial development enter the model, FDI inflows coefficient turns negative and significant in column 1 after controlling for the interaction between FDI and financial depth. The sign of the coefficient on FDI and the interaction term supports my proposition $\rho < 0\ and\ \delta > 0$ hence there is a financial depth threshold point above which financial development can act as a catalyst for FDI to impact growth. The financial depth threshold above which FDI may impact growth is calculated from the partial derivative below. The results are consistent with the findings Oyinlola's (2013); Oyinlola's 2013; and Yeboua's (2019), who find that the exogenous impact of FDI is not stable when countries financial sector is underdeveloped.

$$\frac{\partial \text{gdppc}}{\partial \text{fdi}} = -\beta + \varphi \text{Findepth}$$

$$0 = -\beta + \varphi \text{Findepth}$$

$$\text{FinDepth} = \frac{\beta}{\varphi}$$

$$0 = -0.03 + 0.002 \text{Findepth}$$

$$\text{Findepth} = \frac{0.03}{0.002}$$

$$\text{Findepth} = 15\%$$

The financial depth threshold is 15% above which FDI may impact growth. Financial depth, approximated by private credit to GDP in the literature measures the ability of the financial sector to channel funds from savers to investors. The results shows that African countries are operating below the financial depth threshold. The more liquid money is available in an economy, the more opportunities exist for continued growth through the funding of investment projects.

In column 2, financial stability component of financial development is interacted with FDI. The coefficient on the interaction between financial stability and FDI is positive and significant. The positive sign of FDI inflows coefficient in column 2, confirms that, financial stability plays and unambiguous role in the FDI growth nexus. Countries with stable financial institutions stand the chance to benefit more from FDI than countries with unstable financial institutions. A stable financial institution can allocate resources efficiently, assessing and managing financial risks. Harrison & McMillan (2003), note that MNCs do not transfer all their funds at the beginning of the investment but finance some of their investment in the domestic credit market. They also found that the significant constraints to investment in developing countries are credit. Therefore, a vibrant and stable financial sector will imply that these additional investments can occur. The role of the financial stability in the FDI growth nexus can also be seen from the angle of technological diffusion which can only take place when the financial sector is stable to offer a long-term credit to the private sector to undertake investment project. Therefore, countries with more stable financial institution will have the chance to benefit more from FDI.

Moreover, in financial intermediation, efficiency is primarily calculated to measure the cost of mediating credit. Individual measures of financial institution efficiency are banks overhead costs to total assets, net interest margin, lending-deposits spread, non-interest income to total income, and cost to income ratio. In column 3, financial institution efficiency index enters the model with its interaction with FDI. The results suggest that there is an efficiency threshold point above which FDI may affects growth. The negative impact of financial efficiency on economic growth confirms that, SSA countries financial sector are operating below financial efficiency threshold.

A developed financial system means domestic firms will have access to credit to finance investment opportunities and technologies introduced by foreign firms. The effect of FDI on economic growth after controlling for financial access indicator is negative and significant. The negative and significant interaction between FDI and financial access implies a financial accessibility threshold. Countries without such strong financials may promote capital flight, adversely affecting the domestic economy. The results also confirm that countries in the sample have not attained that level of financial development sufficient to let FDI exogenously promote growth (See, Cecchetti and Kharroubi 2012; Law, Azman-Saini, and Ibrahim, 2013).

In addition, I analyse the exogenous effects of financial development on growth. Financial development enters each model along its interaction with FDI as recommended by

Brambor, Clark and Golder (2006). The impact of financial depth on growth in column [1] is insignificant. This contradicts the findings of Levine (2002) who empirically uses private credit as a proxy of financial development. He found that the financial sector is an engine of growth. I interpret the insignificant impact of finance in the model as a sign of inefficiencies and the underdeveloped state of the financial sector in Africa. As indicated by (Oyinlola's 2013; Oyinlola's 2013; and Yeboua, 2019) the financial sector plays a significant role in growth above a certain threshold. The result from this estimation corroborates the argument that challenges associated with accessing credit retards investment in innovative activities. The conclusion therefore is that there is a need to develop the financial system to minimize these constraints, facilitate easy access to resources by promising entrepreneurs and encourage innovation in technologies to promote economic growth. Findings from the thesis are consistent with; Brown et al.;2009, 2012, 2013, 2017), Aghion, Van, Reneen, and Zingales (2013), Amore et al. (2013) and Levine et al. (2017).

Financial accessibility plays an important role in economic development (Beck et al. 2008). Financial accessibility connotes the ease regarding economic agents' access to financial products. Financial accessibility enables households invest in human capital development, invest, or start a business and invest in new equipment which contributes to physical capital formation and technological progress. Africa has made progress when it comes to financial accessibility. The introduction of Mobile money in SSA has improved financial accessibility.

Table 3. 9 Effects of FDI on growth via aggregate financial development

	Depth	Stability	Efficiency	Access
Initial GDP per capita	0.413	0.964***	0.296	1.172***
	(0.780)	(0.031)	(0.599)	(0.150)
School enrollment	0.002	0.003**	-0.006	0.003
	(0.006)	(0.001)	(0.007)	(0.004)
FDI_netinflows	-0.030*	0.017***	-0.017**	-0.011*
	(0.015)	(0.003)	(0.006)	(0.006)
Population growth?	-0.095	0.052**	0.315	0.041
	(0.222)	(0.023)	(0.192)	(0.068)
Finance × FDI inflows	0.002*	0.006**	0.005***	0.003**
	(0.001)	(0.003)	(0.002)	(0.001)
Lending interest rate	-0.018*	-0.016***	-0.020*	-0.005
	(0.009)	(0.002)	(0.010)	(0.006)
Trade	-0.009	0.000	-0.005	-0.001
	(0.012)	(0.001)	(0.011)	(0.003)
Finance	-0.038	-0.094***	-0.142***	0.146***
	(0.049)	(0.023)	(0.026)	(0.041)
Constant	17.895	1.528	21.840	-4.150
	(23.359)	(0.955)	(18.112)	(4.818)
Observations	594	417	287	250
No. of instruments	15	15	15	15
AR2^2 (p-value)	0.252	0.123	0.798	0.062
Hansen-J (p-value)	0.26	0.991	0.27	0.083

Robust Standard errors in parentheses * $p < .10,$ ** $p < .05,$ *** $p < .01$ 2-step GMM estimator.

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[2] AR (2) test for second-order serial correlation, and the null hypothesis is that there is no serial correlation. The P- values suggests there is no sign of second order serial correlation. Hansen statistic test whether the over-identification restrictions are valid, the null hypothesis that the over-identification restrictions are valid and the P-values suggest the instruments are valid.

3.6.4 Robustness checks with single measures of financial development

In this section, I test the mediating role of financial development on the FDI growth nexus by using individual measures of financial development. The individual measures chosen under each category of financial development are Domestic credit to private sector as share of GDP (finance Depth), ATMs per 100,000 people (Financial accessibility) Bank Z-score (financial stability) and Bank returns on asset (Financial efficiency). The choice of choosing these variables is that there is complete dataset available for each country, and these are variables used in the literature to measure financial development.

Table 3.9.1 reports the results for the four chosen individual financial development indicators. All the results from using the individual measures are consistent with the aggregate financial development indicators. The results confirm that, there is a threshold point above which FDI may impact growth (See the threshold value below table 3.9.1). While bank returns on asset remain significant and negative, the remaining financial development indicators have no significant impact on growth. The results from the indicators point in the same direction as those found with the aggregate financial development indicator. There is still an argument for a financial development threshold point above which FDI may contribute positively to African economic growth. Table 3.9.1 shows the individual financial threshold point above which FDI will impact growth. In column [1], the private sector credit threshold point is 22.3%. For countries to benefit from FDI, domestic credit to the private sector must exceed 22.3% of GDP. In column [2], at least 38 ATMs per 100,000 adults are enough for countries to benefit from FDI. Countries meeting the private sector financial threshold point are Cabo Verde, Kenya, Mauritius, Namibia, South Africa, and Togo. These countries have average private sector credit above the threshold point of 22.3% of GDP. A list of countries meeting the financial accessibility threshold are Cabo Verde Congo, Dem. Rep., Mauritius, Namibia, Seychelles, and South Africa. These countries do not meet the financial stability threshold (Botswana, Liberia, Mozambique, Sierra Leone, and Zimbabwe). Finally, only Mauritania does not meet the financial efficiency threshold. It is striking to note that only four countries meet all the financial thresholds, and these are Cabo Verde, Mauritius, Namibia, and South Africa. The results confirm that the aggregate financial development index developed is robust.

Table 3.9. 1 Effects of FDI on growth full model conditioned individual finance development.

	Private credit	ATM per100,000	Bank Z-score	Bank returns
Initial GDP per capita	0.470	0.998***	0.996***	1.307***
	(0.429)	(0.340)	(0.196)	(0.225)
School enrollment	0.00713	0.00762	0.00655	0.00917***
	(0.009)	(0.008)	(0.004)	(0.003)
FDI inflows	-0.0531**	-0.0245***	-0.0344**	-0.0128***
	(0.026)	(0.007)	(0.013)	(0.002)
Population growth	0.0353	0.122	-0.0554	0.203*
	(0.146)	(0.096)	(0.120)	(0.114)
Lending interest rate	-0.0571*	-0.0471*	-0.0378**	-0.0291***
	(0.031)	(0.024)	(0.017)	(0.007)
Trade	-0.0145**	-0.00736	-0.00616	0.0125**
	(0.006)	(0.005)	(0.004)	(0.005)
Finance	0.0104	0.00545	0.0334	-0.0176***
	(0.017)	(0.004)	(0.024)	(0.005)
Finance×FDI inflows	0.00238*	0.001***	0.00139**	0.00198**
	(0.001)	(0.000)	(0.001)	(0.001)
Constant	16.32	0.779	0.687	-9.798
	(12.099)	(10.277)	(5.837)	(6.554)
Observations	608	349	436	426
No. of instruments	17	20	25	20
AR2 (p-value)	0.443	0.583	0.165	0.637
Hansen-J (p-value)	0.314	0.561	0.142	0.129
Financial Threshold point[3]	22.3%	37.6	8.8	6.5%
Countries meeting Threshold.	(6)	(6)	(37)	(41)

Note: parenthesis. Robust Standard errors in parentheses * $p < .10$, ** $p < .05$, *** $p < .01$

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[3] Financial threshold indicates that countries with financial sector development above this threshold will benefit positively from FDI. The number of countries that financial thresholds for each regression is in the

3.7 Summary and Conclusions.

In developing countries, the flow of financial resources (FDI) has increased significantly because it has been the most stable share of foreign capital inflows (Adams 2009). African countries are faced with insufficient savings. Policymakers therefore turn to attracting FDI to address these capital shortages. The neoclassical researchers regard FDI, and international capital flows as closing the savings gap in developing countries (Chenery and Bruno, 1962). De Mello (1999) argues that FDI is a composite of a capital stock and technology bundle that can augment the existing stock of knowledge in the host economy through labour training, skill acquisition and diffusion, and new managerial practices and organisational arrangements. But the role of FDI on growth may depend on the host nation's financial sector. Recently, a large body of studies have come to recognise a well vibrant financial system as a precondition for countries to benefit from FDI. They argue that a well-developed financial system augments the efficient allocation of resources thereby increasing the absorptive capacity of a host country in relation to FDI inflows. However, most of these studies have failed to account for the role of financial development and the few which account for finance have tend to use individual measures of financial development. Such individual measures tend to produce different results due to the nature of financial products. The novel contribution of this study is to develop an aggregate financial development measure capable of measuring the depth, stability, efficiency, and accessibility of the financial sector. In this paper I argue that for SSA countries, using individual measures of financial development ratios may give biased results. An up-to-date dataset covering the period of 1990-2020 is used to conduct the analysis.

This study empirically investigates the possible growth effects of foreign direct investment conditional on financial development for 42 Sub-Sahara African countries from 1990-2020. The results suggest that the mediating role of financial sector on the FDI growth link can be unstable when one uses a single measure of financial development. The overall findings suggest 1. FDI has exogenous effects on growth without controlling for financial development. However, when finance is incorporated into the model, the exogenous effects of FDI becomes unstable. 2. All forms of financial development are precondition for FDI to positively impact the domestic economy. The results are consistent with recent studies by (Oyinlola's 2013; Oyinlola's 2013; and Yeboua, 2019) who conclude that the financial sector plays a significant role in the FDI growth link in SSA above a certain threshold. There are 5 countries which meets the financial threshold point in the sample of countries. The exogenous component of finance accessibility has significant positive impact on growth. However,

financial depth, stability and financial efficiency has no robust impact on growth. The non-robust impact of these measures of financial development does not mean financial development per se does not have a role in the growth of SSA; however, this can be a sign of the SSA financial sector operating below a certain threshold point.

Apart from the academic relevance of my results as they help lessen the mixed evidence regarding the impact of finance on FDI growth nexus, they also have some important policy implications. First, the results suggest that SSA countries should be more concerned about creating vibrant financial institutions before thinking about liberalising their capital account. Host countries must differentiate between financialisaton of the host countries and financial development. What is usually observed in Africa is a mere financialisaton of African economies. There should be a financial system that can cheaply allocate funds to those who need them. This will help firms access external finance to help them adopt technologies introduced by foreign firms thereby creating a strong linkage with host countries. This raises the argument against Ghana's financial sector taxation which seeks to tax every electronic transfers. Such financial taxation impedes financial accessibility, efficiency, and financial innovation.

Secondly, SSA countries must work on strategies to reduce credit cost. Strategies like differential interest rates for different purposes will help companies borrowing purposely to invest in certain needed industries to receive credit at a lower cost. Higher lending rate deteriorates investment and further translate into the real economy. Harrison & McMillan (2003) also note that MNCs do not transfer all their funds at the beginning of their investment but finance some of their investment in the domestic credit market. They also found that the significant constraints to investment in developing countries are credit. Therefore, a vibrant financial sector will imply that these additional investments can occur.

Appendix 3A: Principal component analysis for financial accessibility index.

	PCA1	PCA2	PCA3	PCA4
Eigen Value	2.85	0.71	0.22	0.14
Proportion	0.78	0.20	0.06	0.04
Cumulative	0.71	0.91	0.96	1.00
Variable	Vector 1	Vector 2	Vector 3	Vector 4
bankaccoun~s	0.545	0.168	0.649	0.503
bankbranch~s	0.537	0.215	-0.752	0.315
atmsper100~s	0.555	0.180	0.111	-0.804
borrowersf~1	-0.325	0.945	0.035	-0.008

Appendix 3B: Principal component analysis for financial stability index

	PCA1	PCA2	PCA3
Eigen value	1.57	0.95	0.48
Proportion	0.52	0.32	0.16
Cumulative	0.52	0.84	1.00
Variable	Vector 1	Vector 2	Vector 3
bankzcore	0.398	0.858	-0.324
bankcredit~s	0.691	-0.048	0.722
liquidasse~e	-0.604	0.511	0.612

Appendix 3C: Principal component analysis for financial efficiency index

	PCA1	PCA2	PCA3	PCA4	PCA5	PCA6
Eigen value	2.29	1.61	1.11	0.76	0.17	0.06
Proportion	0.38	0.27	0.19	0.13	0.03	0.01
Cumulative	0.38	0.65	0.84	0.96	0.99	1.00
Variable	Vector 1	Vector 2	Vector 3	Vector 4	Vector 5	Vector 6
banknetint~n	0.561	0.278	-0.333	-0.012	-0.116	0.695
banklendin~d	0.159	0.380	0.483	-0.769	-0.030	-0.067
banknonint~o	-0.125	0.367	0.676	0.556	0.003	0.289
bankoverhe~s	0.361	0.592	-0.223	0.270	0.206	-0.595
ba~saftertax	0.528	-0.337	0.268	0.160	-0.661	-0.271
ba~yaftertax	0.485	-0.424	0.276	0.034	0.712	0.030

Appendix 3D: Principal component analysis for financial depth index

	PCA1	PCA2	PCA3	PCA4	PCA5	PCA6	PCA7
Eigen value	4.57	1.59	0.52	0.22	0.08	0.02	0.01
Proportion	0.65	0.23	0.07	0.03	0.01	0.03	0.00
Cumulative	0.65	0.88	0.95	0.98	1.00	1.00	1.00

Variable	Vector1	Vector 2	Vector 3	Vector 4	Vector 5	Vector 6	Vector 7
Private credit	0.449	-0.037	-0.095	0.377	-0.706	0.306	0.233
Deposit Money	0.462	-0.058	0.021	0.037	-0.139	-0.822	-0.293
depositmon~m	0.199	0.614	0.592	0.405	0.257	0.056	0.005
Liquid liabilities	0.443	-0.137	0.225	-0.415	0.036	0.453	-0.596
Centra Bank A	0.207	-0.678	0.078	0.496	0.482	0.078	0.082
financials~p	0.451	0.007	0.094	-0.505	0.212	-0.051	0.696
Domestic Credit	0.320	0.373	-0.758	0.135	0.371	0.118	-0.115

<center>**Chapter 4**</center>

FDI, Finance and Growth: Quantile Regression with Fixed Effects

The sub-Sahara region is made up of countries with different macroeconomic conditions hence different growth rate. The conditional mean regression will perform well if these countries were reasonably homogenous in terms of countries characteristics and growth trajectory. The quantile regression analysis has become one of the best empirical tools of many researchers when the variable of interest has varying effects on the conditional distribution of the outcome variable. The traditional mean regression has been criticised to ignore the tails of the distribution. Quantile regression, as introduced by Koenker and Bassett (1978), allows for the set of covariates to varies along the distribution of the outcome variable. For example, the estimated impact of FDI on growth for sub-Saharan African sample as reported by Alfaro et al., (2004) and Hermes and Lensik (2003) may not capture the large heterogeneity within the level of GDP growth in the region hence the tendency to over or underestimates the impact. In fact, the effects of FDI on Ethiopia, the fastest growing economy in Africa may not be the same as the Democratic Republic of Congo. It is therefore imperative to adopt an estimating technique that can segregate countries according to their level of growth and see how FDI may impact their growth at every stage of development. In this chapter, I use the dynamic panel data with quantile fixed effects model to investigate the role of FDI on growth. By using a panel quantile regression approach, I can analyse the role play by FDI at different stages of development. Traditional regression techniques focus on the mean effects, which may lead to under- or over-estimating the relevant coefficient or even failing to detect important relationships (Binder and Coad, 2011).

In chapter 3, the empirical strategy used for the analysis is based on the conditional mean. The quantile regression adopted here is an extension of the condition mean strategy. The main difference with the quantile regression is the ability to estimate the regression at the median level rather than the mean level and the ability to access how the enhancing role of Finance in the FDI growth link varies at different stages of development. In summary, by applying the Quantile regression, we may benefit in two main ways: quantile results mitigate the effects of outliers on the results (Buchinsky, 1994) and quantile regression can describe the entire conditional distribution of the dependent variable.

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The quantile regression analysis has become one of the best and effective empirical tools–when the variable of interest has varying effects on the conditional distribution of the outcome variable. The traditional mean regression has been criticised to ignore the tails of the distribution. As introduced by Koenker and Bassett (1978), Quantile regression allows for the set of covariates to vary along the distribution of the outcome variable. For example, the estimated impact of FDI on growth for sub-Saharan African sample as reported by Alfaro et al., (2004) and Hermes and Lensik (2003) may not capture the large heterogeneity within the level of GDP growth in the region hence the tendency to over- or underestimate the growth impact of FDI (Binder and Coad, 2011). Indeed, the effects of FDI on the economy of Ethiopia (one of the fastest growing economies in Africa) may not be the same as the Democratic Republic of Congo, one of the largest economies. It is therefore imperative to adopt an estimating technique that can segregate countries according to their level of growth and in order to determine how FDI may impact their growth at every stage of development. In this chapter, I use the Quantile fixed effects model to investigate the role of FDI on growth. By using a panel quantile regression approach, I can analyse the role played by FDI at different stages of development.

There are good reasons to believe that the role of FDI on host country development will differ according to its level of growth. Since the restructuring of the African economies through the structural adjustment program and the economic recovery program, African countries have come to embrace economic liberalisation as the main engine of growth. Foreign direct investment is viewed as a major contributor in enhancing economic growth, particularly in developing countries where there is insufficient savings. It is recognized in the growth literature that FDI plays a significant role in the growth stages of host countries. Proponents believe that FDI is a vehicle to transfer new way of doing things and know-how from the advanced world to emerging economies.

However, the existing empirical literature on the role of FDI on growth provides contradictory results especially when one applies mean estimators. The conditional mean regression would perform well if African countries were reasonably homogenous in terms of countries characteristics and growth rates. The interpretation of mean estimates can be viewed in such estimation technique on the FDI and growth link. For example, in an influential paper, Hermes and Lensik (2003) empirically examine the role a developed financial system plays in enhancing the positive relationship between FDI and economic growth. They conclude that a sound financial sector acts as a catalyst in the FDI growth relationship. In their analysis, 37 out

of the 66 countries in the sample have a financial system developed enough to let FDI contribute to economic growth. Their results, however, are based on the mean regression, which normally ignores the heterogeneous nature of the dependent variable. A possible deficiency of the conditional mean regression approach is embedded in the assumption of homogeneity of countries within the sample.

The sub-Saharan African region is, however, made up of countries with different macroeconomic conditions and differing growth paths. A country's level of growth has a direct link with its institutional quality. Poor countries are historically associated with poor institutions and hence may not realise their full potential of FDI. FDI embodies high technology assets and the extent of technology transfer from multinational firms to domestic firms partly depends on the level of already available infrastructure development. I therefore postulate that, the impact of FDI on a host country depends on its current growth prospect.

Figure 4.1 shows the distribution of GDP growth in the Sub-Saharan region over the period 1970-2014. The heights of the bars represent GDP growth rates of each country. Assuming each country has the same GDP growth rate, then all countries will be on the red line as shown on the graph. However, according to the observed distribution of the data, the countries at the rightmost will have a GDP growth of about 21% and that will be the highest performing country in the sample. Example of countries within this group includes Ethiopia, Rwanda, Ghana. At the leftmost side are countries with the lowest (negative) GDP growth rates. These countries are characterised with poor or negative growth rates, for example Congo, Liberia, South Sudan. The figure shows the degree of the heterogeneity in the level of GDP growth among the countries in the samples. This parameter heterogeneity necessitates the use of the quantile regression.

Figure 4. 1 GDP per capita growth distribution among African countries

GDP Per capita growth distribution
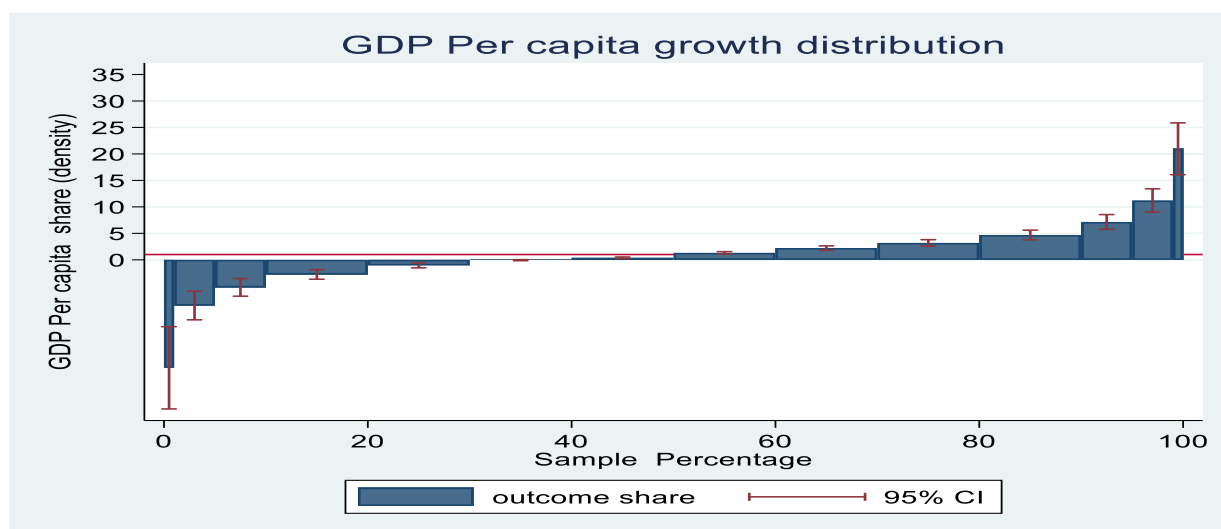
Source: Author calculations using data from World Development Indicators

Against this background, the chapter aims to explore the role of FDI on host country growth. To achieve the objective of this study, I use fixed effects panel quantile regression to model the varying role of FDI on growth at different stages of growth. I arrange the rest of the chapter as follows: Section 4.1 offers an in-depth review of the empirical framework and its application. Section 4.2 describes the dataset used in the study, Section 4.3 discusses the estimation results, and Section 4.4 summarises the findings and presents policy implications.

4.1 Estimation Strategy

In undertaking an empirical study, the distribution of every data point in a sample is important. Given that the researcher has limited control over the data distribution, it is crucial to adopt an empirical strategy that fits the data. The quantile regression model can perform better than conditional mean models since it is less sensitive to the tail behaviour of the underlying random distribution of the variable of interest and, consequently, will be free from the influence of outliers (See, Koenker and Bassett, 1978, Kato et al. 2012). Even though quantile regression methods for growth analyses are still in their early stages relative to conditional mean estimates. However, due to the heterogeneous characteristics of most economic variables, estimation using Quantile regression is becoming all-embracing in applied economics.

In this chapter, I adopt the fixed effects panel quantile regression model as an extension of the conditional mean estimator to model the varying role of FDI on GDP growth. In chapter 3, the empirical strategy used for the analysis is based on the conditional mean estimator. This technique considers the mean effect, which may under- or over-estimate the relevant coefficient or even fail to detect important relationships (Binder and Coad, 2011). The importance of the quantile regression is its ability to estimate the regression at the median level rather than the

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mean level and the ability to access how the effects of FDI varies at different stages of development. From the classical dynamic panel model in equation [1], I estimate a quantile regression model of the form in (eq5.2) to analyse the role of FDI on growth.

$$y_{it} = \alpha_i + \theta y_{it-1} + x_{it}\beta + \varepsilon_{it} \quad wher\ i = 1, \dots.; N; t = 1 \dots, T \tag{4.1}$$

where y_{it} is the response variable, α_i denotes the individual fixed effects, y_{it-1} is the lag of the response variable capturing the dynamic component of the data, x_{it} are exogenous covariates, and ε_{it} is the error term. The quantile regression version of equation [5.1] is given in equation [4.2] below.

$$Q_{yit}(\tau|y_{it-1}, x_{it}) = \alpha_i + \theta(\tau)y_{it-1} + x_{it}\beta(\tau) \tag{4.2}$$

In model [4.2], the effects of the covariates y_{it-1} and x_{it} can depend on the quantile, τ, of interest. The α_i capture individual or specific sources of variability, or "unobserved heterogeneity," that was not adequately controlled for by the covariates. In most applications, the time-series dimension T is relatively small compared to the number of individuals N. Therefore, it can be difficult to estimate a τ dependent distributional individual effect. Estimating the regression in equation [4.2] is tedious because there is no transformation that can eliminate the fixed effects hence estimation requires that $n \rightarrow \infty$ and $T \rightarrow \infty$. However, in a pure panel data, time is short and cross-sectional observation is large. For Fixed level of Time, correlated random variable effects are the recommended model to use (See, Abrevaya and Dahl, 2008).

The general approach for estimating model [4.2] was introduced by Koenker (2004) and extended by Canay (2011). They restricted the estimates of the individual-specific effects to be independent across the quantiles. The restricted model can be implemented by estimating the model for several quantiles simultaneously. The parameters of the model are derived from equation (4.3):

$$(\hat{\alpha}, \hat{\theta}, \widehat{\beta}) = \underset{\underbrace{\hat{\alpha}, \hat{\theta}, \hat{\beta}}}{min} \sum_{k=1}^{K} \sum_{i=1}^{N} \sum_{t=1}^{T} \chi_k\, v_\tau \times (y_{it} - \alpha_i - \theta(\tau)y_{it-1} - x_{it}\beta(\tau)) + \lambda||\alpha|| \tag{4.3}$$

where λ is the penalty parameter which reduces the individual effects to zero to improve the performance of the estimated parameters of interest; if the λ term goes to zero, then the penalty term disappears, and we obtain the usual fixed effects estimator. However, if the λ term goes to infinity, then we obtain an estimate of the model without individual effects. A critical assumption about the individual fixed effects according to Koenker, (2004) and Canay (2011) is that the individual fixed effects are assumed to be independent of the quantiles, $\alpha_i(\tau) = \alpha_i$, and

therefore they are just pure location shifts of the conditional distribution of the dependent variable. However, estimating the model with this assumption goes against the basic idea of quantile regression allowing covariates to affect the entire distribution of the dependent variable (Machado and Santos Silva, 2019).

Kato et al. (2012) studied the asymptotic properties of the fixed effects quantile regression. They added theses fixed effects explicitly into the model as dummies and found that the estimator is consistent and asymptotically normal given that when $n \to \infty$ and $T \to \infty$. They also found that the FE-quantile estimator is consistent under the same assumption as found in the non-linear panel analysis. To arrive at a consistent estimator, they imposed a restrictive assumption as follows $T.(n^2(log_n)^3/T \to 0$ against those found in (Lancaster, 2000).

Following the recent literature (Kato et al., 2012; Galvão and Wang, 2015; Galvão and Kato, 2016; Machado and Santos Silva, 2019), I contribute to the FDI growth nexus by adopting a quantile specification which allows the individual country characteristics to affect the entire distribution rather than causing just a parallel shift of the distribution of the response variable. To deal wholly with the individual fixed effects, equation [4.3] is modified to arrive at equation [4.4] below. Given a panel data on Y_{it} and X_{it}, I estimate the quantile regression $Q_Y(\frac{\tau}{X})$ for a model of the location-scale variant:

$$Y_{it} = \alpha_i + X_{it}\beta + (\sigma_i + Z_{it}\gamma)U_{it} \qquad\qquad 4.4$$

with a probability P $(\sigma_i + Z_{it}\gamma > 0)$. The parameters $\{\alpha_i, \sigma_i\}$ capture the individual fixed effects.

From equation 4.4, the τth Quantile of a random variable Y is given by a quantile function:

$$Q_{yit}\left(\frac{\tau}{X_{it}}\right) = (\alpha_i + \omega_i q(\tau)) + X_{it}\beta + Z_{it}\gamma q(\tau) \qquad 4.5$$

In eq. (5.5), the covariates X_{it} is a vector of independent variables that are of primary importance in the current study. The component $\{X_{it}\}$ is independent and identically distributed for any fixed unit and independent across time. The component $Q_{yit}\left(\frac{\tau}{X_{it}}\right)$ represents the quantile distribution of GDP per capita growth conditional on the location of the independent variable X_{it}. The scalar $\alpha_i = (\alpha_i + \omega_i q(\tau))$ is the coefficient of the quantile fixed effect for individual i. The fixed effects unlike the usual fixed effects do not represent a parallel shift of the intercept. They are time-invariant parameters whose heterogeneous impacts can differ

across the quantiles of the conditional distribution of the dependent variable. $q(\tau)$) represents the τth sample quantile which is estimated by solving the following optimisation problem:

$$Min_q \sum_t \sum_t \rho_\tau(R_{it} - (\delta_i + Z_i\gamma)q) \qquad [4.6]$$

where $\rho_\tau(A) = (\tau - 1)AI\{A \leq 0\} + TAI\{A > 0\}$ is the quantile check function. Equation [4.6] is designed in such a way that the individual fixed effects depend on the quantiles i.e., $\alpha_i(\tau)$. In most empirical studies, it is common to observe models whose parameters increase as the number of observations increase. This phenomenon is often termed as the incidental parameter problem (Lancaster, 2000; Neyman and Scott, 1948). The Quantile fixed effects model adopted is free from the incidental parameters problems and it allows the individual heterogeneity to vary along with the entire distribution of the dependent variable. The quantile fixed effects according to Machado and Santos Silva (2019) is given as a linear function of the distributional effects.

$$\alpha_i(\tau) = \alpha_i + \omega_i q(\tau)$$

$$[4.7]$$

$$\hat{\alpha}_i(\tau) = \frac{1}{T}\sum_{t=1}^T(Y_{it} - \acute{Z}_{it}\hat{\beta}) + \hat{q}\frac{1}{T}\sum_{t=1}^T(|\hat{F}_{it}| - \grave{M}_{it}\hat{\eta}) \qquad [4.8]$$

The implication of equation 4.9 is that the distributional effects are not in general just location shift as found in the works of Koenker (2004) and Canay (2011). However, the distributional effects now represent a time-invariant characteristic that can vary along the conditional distribution of the dependent variable. The technique of Machado and Santos Silva (2019) addressed the incidental parameter problems encounter in the quantile regression of Neyman and Scott (1948); Lancaster (2000); Koenker, (2004) and Canay (2011).

As a starting point, I look at the direct effect of FDI on the τth quantile of growth and estimate the following equation:

$$Q_{yit}\left(\frac{\tau}{FDI_{it}}, X_{it}, \alpha_i\right) = \alpha_i + \beta_1, \tau(FDI_{it}) + \beta_2, \tau\left(\sum_{i=0}^N X_{i,t}\right) + \varepsilon_{it} \qquad [4.9]$$

where the key parameter of interest is β_1. The parameter β_1 measures the impact of FDI on the τth Quantile of GDP growth. This parameter can vary along the distribution of GDP growth. The covariate $X_{i,t}$ contains the set of controls used in the growth literature. The empirical

literature has emphasized the importance of absorptive capacities as the precondition for FDI to have positive effects on growth in the host countries. The covariate $X_{i,t}$ also includes the initial GDP per capita to control for the initial conditions a reflection of absorptive capacities in the host country (see, for example, Nunnenkamp, 2004). I also propose a partially varying-coefficient model that allows the impact of FDI on economic growth to depend on some set of absorptive capacities. Some of the absorptive capacities I consider are financial sector development, human capital, and conflict. Hence, the econometric model [10] can be re-written in the form of equation [5.9.1] to capture the impact of FDI on growth dependent on absorptive capacities.

$$Q_{yit}\left(\frac{\tau}{FDI_{it}}, X_{it}, \alpha_i\right) = \alpha_i + \beta_1, \tau(FDI_{it}) + \beta_3, \tau\left(FDI_{i,t} \times A_{i,t}\right) + \beta_2, \tau\left(\sum_{i=0}^{N} X_{i,t}\right) + \varepsilon_{it} \quad [4.9.1]$$

The interaction term $\beta_3, \tau\left(FDI_{i,t} \times A_{i,t}\right)$ measures the marginal impact of host country absorptive capacity in the FDI growth link. A positive and significant coefficient means countries with good level absorptive stand the chance to benefit more from FDI inflows than countries with poor or no absorptive capacities. The total effects of FDI on growth will now comprise of the exogenous effects of FDI and the absorptive capacity induced growth effects. This is illustrated in equation (4.9.2) with a partial derivative of a marginal change of FDI with respect to GDP per capita growth. By applying the quantile regression, we can observe different total effects i.e., exogenous effects of FDI and the absorptive induced effects across different stages of development.

$$\frac{\partial GDPPC}{\partial FDI} = \beta_1 + \beta_3, \tau\left(A_{i,t}\right) \quad\quad\quad\quad [4.9.2]$$

Equation [4.9.1] shows that the total impact of FDI on the τth of GDP now depends on the state of host country absorptive capacities. Countries with better levels of absorptive capacity will benefit more from FDI inflows. The quantile regression adopted in this study can quantify the impact of FDI and absorptive capacities at different stages of development. Developmental stages of countries may also reflect the level of their institutional growth, the amount of investment inflows and the level of financial resources available to the private sector. These characteristics necessitate the need for an estimating technique that incorporates the individual heterogeneity across the conditional distribution of GDP growth.

The estimates from the pooled quantile regression suffer from the same limitations as those of the OLS estimates. A more prolific modified quantile regression technique is required to control for the time-invariant factors embedded in panel data. Even though the specification derived by Koenker and Xiao (2002), Koenker (2004) and Canay (2011) in equation 3 aptly deals

with the unobserved heterogeneity through the parameter α_i.; however, estimating equation [3] goes against quantile regression's basic premise due to the invariant nature of individual effects along the quantiles.

In short, quantile regression is a viable strategy to model parameter heterogeneity and individual fixed effects. The technique, however, has been strongly criticised on the ground that the presence of a lagged dependent variable can bias the results. This is because the unobserved initial values of the dynamic process can bias the least-squares estimation of dynamic panel models. Unlike the traditional OLS regression where first differences remove the individual fixed effects, the quantile regression does not render itself to such transformations. This problem has been recognised in the works of Abrevaya and Dahl (2008). For very long panels, the bias associated with the initial levels of the dependent variable is trivial given by $O(T-1)$. Monte Carlo simulation shows that the quantile regression with addictive fixed effects estimator suffers from similar bias effects to those seen in the least-squares case when T is short. In view of the length of the dataset used in this study, any potential bias should be trivial. As an additional robustness check, I have done the estimation with and without the lagged dependent variable as a regressor in the model. Having a significant variation in the results would mean finding a technique that can deal with the problem. A little variation in the results suggests that this source of potential bias is not an issue.

4.2 Data

To test the hypothesis that FDI impact on host country depends on its stage of development, I construct a panel dataset on 43 SSA countries for the period 1970–2014. The countries and the time chosen are based on the availability of data and sufficiency of the data for the time frame. To capture the impact of conflict on growth, it is important to start my study period from 1970 when conflict was more popular in most African countries. Annual data for all the variables were collected from the World Development Indicators (WDI) of the World Bank, Pen World table 9.0, African Development Indicators, IMF and UNCTAD see table 4.2 for a detailed description and sources of data. Following the standard growth literature (see Ibrahim and Alagidede 2018a, 2018b; Opoku, Ibrahim, and Sare 2019b; Pandya and Sisombat 2017), I use GDP per capita growth to measure economic growth. The variable for FDI inflows is measured as a percentage of GDP which entails net direct investment inflows. It is the sum of equity capital, reinvestment of earnings, other long-term capital and short-term capital as shown in the balance of payments statistics. Financial sector development is measured by an index derived from seven financial development indicators. Inflation is proxied by the percentage of annual

consumer prices measured as consumer price index (2010 = 100). Instead of using labour as used in growth models, I used the number of people who are actively engaged. Human capital is measured by gross secondary school enrolment.

Table 4.1 provides descriptive statistics for the variables used in the study. FDI inflows have always averaged as low as 2.72% of GDP with a significant variation among countries as confirmed by a large standard deviation of 6.53%. Average FDI inflows can range from -28.6% of GDP to about 103% in some countries. Average GDP per capita growth is 1.21% with a high variation in the sample's GDP growth rate, as indicated by the higher standard deviation of 5.9. The mean value of trade to-GDP ratio is about 59%, with a standard deviation of 38%. There is a considerable difference among the countries in terms of trade openness. The extent of trade size among the countries is not surprising given that most countries in Africa import more than half of their products. Average inflation rate stands at 12.8% which could vary from -13.1% to as high as 541% in in Zimbabwe. Private sector credit averaged around 16.9% of GDP and this could rise as high as 541% of GDP in Mauritius and Seychelles.

Table 4. 1 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
GDP per capita	1659	1.209	5.869	-47.81	36.98
Lag GDP	1626	1.185	5.917	-47.81	36.98
Population	1800	13.718	20.872	.052	177.476
School enrollment	1169	28.925	24.226	1.012	115.957
Conflict	1716	.808	1.766	0	10
FDI inflows	1516	2.72	6.53	-28.62	103.34
Trade	1768	59.25	38.286	0	311.35
Finance	1587	16.919	18.077	.4	160.12
Inflation	1364	12.876	31.013	-13.06	541.91

Table 4. 2 Variable definitions and sources

Variable	Definitions	Source
GDPPC	GDP per capita growth	WDI
FDI	Foreign direct investment, net inflows (% of GDP)	UNCTAD
Population	Population growth (%)	PWT 9.0
School Enrole	School enrolment, primary (% net)	World Bank
Trade	Merchandise trade (% of GDP)	World Bank
Lending rate	Lending interest rate (%)	World Bank
Real effective exchange rate	Real effective exchange rate	World Bank
Inflation rate	Inflation, GDP deflator (annual %)	World Bank
Finance	Domestic Credit to private sector(%GDP)	WorldBank
Conflict	Conflict is the average of internal conflict within the country) and external conflict	INSCR

INSCR: Integrated Network for Societal Conflict Research (INSCR)

4.3 Empirical Results

In this chapter, I argue that the effects of FDI on growth may depend on a host country's stage of development. In section (4.3.1), the analysis seeks to estimate the direct effects of FDI on growth at the various distributions of the dependent variable. I start the analysis by estimating the baseline model using the Quantile fixed effects regression, without including the control variables to show the exogenous role of FDI on growth at different quintiles. The technique is also important when one wants to check the stability of the baseline results when additional controls are added to the model. In section (4.3.2), the results presented additionally include the interaction between FDI and Finance, a term capturing the role of finance in the FDI growth nexus. In subsection 4.3.3, Robustness checks are also conducted to verify the stability of the results with different estimation technique. The final section provides the conclusion and policy implications from the results.

4.3.1 Exogenous effects of FDI on growth at various quantiles

Table 4.3 presents the results for the impact of FDI at multiple stages of development. Each quantile represents a stage of development as measured by GDP growth. Focusing on the main variable of interest, FDI plays a significant effect on growth from the 30th quantile up to the 90th quantile. It is also clear that the magnitude and significance of the impact increase as we move towards the highest quantile of income. For example, at the 30th quantile, a 1% increase in FDI inflows increases recipient growth rate by 0.087%. This effect increases to 0.137% for countries in the highest quantile. In other words, the contribution of FDI to growth dissipates as one moves from the higher quantiles to the lowest quantiles. The heterogeneous nature of the impact of FDI on development can be attributed to countries' disparate nature in terms of growth and institutional structures. Developing countries may lack good institutions and the required absorptive capacities to channel FDI into a growth effect.

This result contrasts with much of the literature that has found no significant impact of FDI on economic growth (Alfaro 2004, 2006; Alfaro and Chalton 2007; Alfaro et al., 2004 and Hermes and Lensik, 2003). In other words, previous studies that use the conditional mean estimator may have obtained a non-significant effect of FDI on growth because this technique estimates the regression at the mean level and ignores the tails of the distribution. Quantile regression helps to overcome the limitations of an estimator based on the conditional mean.

The heterogeneous nature of the coefficient estimates for lag of GDP per capita gives an essential insight into the process of convergence among countries. There is no sign of economies converging or diverging at the higher income level, as indicated by a positive

coefficient on the lag of GDP per capita growth in the 90th quantile. There is a sign of divergence at the lowest quantiles. This contrasts with the theory of convergence hypotheses as pioneered by Barro and Sala-i-Martin (1997), Degaldo et al., (2014) and Zghidi et al., (2016), who found that developing countries to converge with advanced countries.

In terms of the other model variables, for countries located in the lowest quantile of growth, population contributes to growth of about 0.079%. This contribution diminishes in significance and magnitude as countries move to the highest Quantile of GDP growth. This suggests the positive role of population at the early stages of development. Giving that many developing countries depend on labour inputs in the production process, it is not surprising that population has a positive impact on growth at the lowest quantiles of income. Since labour is one of the inputs in the production process, a growing population also suggests growth in the labour supply hence an increase in the productive capacity of the African countries. This finding contradicts mean based estimates that find population negatively affects growth. For example, Huang and Xie (2013) find that population growth and economic growth has a negative correlation. These earlier studies have argued that population growth can demotivate capital formation, increase pressure on natural resource dependency and divert additions to capital resources (Easterlin, 1967) or diminish labour returns. Linden (2017) for instance postulates that population growth increases dependency on resources and inhibit growth in the long term. Some authors conclude that economic growth is negatively impacted by population growth resulting from fertility because such growth does not encourage savings (Kelley and Schmidt, 2001; Mierau and Turnovsky, 2014).

I control for conflicts of various forms. The variable conflict is a derivative of several major episodes of political violence (civil violence, civil warfare, ethnic violence, and ethnic warfare) and the overall extent of interstate and societal violence that occur in a country in a year. The Sub-Saharan African region is one of the most fragile regions in the world. Yet, the literature on growth has tended to ignore such internal frictions on development. I, therefore, include Conflict as a proxy for measuring the extent of conflict in the region. The effects of internal conflicts on growth are apparent, especially in the lowest quantile of development. Civil violence has a significant and negative impact on development, and this effect diminishes as countries grow. The adverse effects of conflict on growth at the lowest quantile reiterate the devasting role civil violence play in growth, as indicated in the works of Polachek and Sevastianova (2012) and Rodrik, (1999). Countries in lower quantile are the most fragile states due to poverty and social injustices. The school enrolment variable measures the level of human

capital development and its role on a country's growth. This variable contrasts with the existing literature which finds education to have a positive impact on growth (Krueger and Lindahl, 2001).

Table 4. 3 Exogenous effects FDI on growth at various deciles

Variables	Q10	Q20	Q30	Q40	Q50	Q60	Q70	Q80	Q90
GDPPC lag	0.212***	0.197***	0.185***	0.174***	0.166***	0.157***	0.148**	0.138**	0.119
	(0.062)	(0.059)	(0.050)	(0.052)	(0.048)	(0.052)	(0.059)	(0.057)	(0.085)
Population	0.079**	0.071**	0.064	0.058	0.054	0.049	0.044	0.038	0.028
	(0.035)	(0.034)	(0.046)	(0.041)	(0.043)	(0.045)	(0.052)	(0.042)	(0.058)
School enrole	-0.090***	-0.080***	-0.072***	-0.065**	-0.060**	-0.053*	-0.047	-0.041	-0.028
	(0.021)	(0.024)	(0.022)	(0.027)	(0.026)	(0.029)	(0.032)	(0.037)	(0.044)
Conflict	-0.649**	-0.567**	-0.500**	-0.444**	-0.398**	-0.348*	-0.298	-0.242	-0.136
	(0.287)	(0.223)	(0.231)	(0.225)	(0.197)	(0.185)	(0.247)	(0.297)	(0.334)
FDI	0.067	0.078	0.087*	0.095*	0.101**	0.108**	0.115**	0.123**	0.137**
	(0.051)	(0.051)	(0.047)	(0.049)	(0.048)	(0.042)	(0.055)	(0.052)	(0.067)
N	948	948	948	948	948	948	948	948	948
Country effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

[1]Note: The results are obtained using quantile regression with (country and year) fixed effects, reported from the 10th to the 90th of GDP growth rates. The dependent variable is the GDP per capita growth. Bootstrap standard errors are in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 4.4 estimates the effects of FDI on growth with additional controls typically included in the growth literature. The aim is to observe the stability of the results when additional controls are included in the model. In table 4.4, the heterogeneity of the effects of FDI on growth among countries based on their GDP per capita growth is clear and stable after adding more controls to the model. The effects of FDI on GDP growth increase as countries move from the lowest quantile to the high quantile. In the higher quantile, a percentage increase in FDI inflows increases growth rates by 0.096% compared with 0.086% at the lowest quantile.

Moreover, there is a high possibility that the maximum impact (0.137%) of FDI is realised at the 90th quantile. This implies that FDI's effects on growth are not a linear relationship but may follow a quadratic form that most studies have ignored. The relation observed in the results is because as countries develop, their institutions also grow, hence the possibility of FDI affecting their growth. This raises the question of whether FDI is good for every country given its stage of development. It may be the case that countries need to develop to some threshold level before

they can attract FDI. This sounds a warning to policy makers   that generalised impacts of FDI for all countries may not be appropriate. The results are also important for countries that use fiscal incentive to attract FDI to realise the positive effects of FDI on growth are not automatic but dependent on the country's stage of development. Even though finance has no significant impact on growth, the sign of the coefficient varies along the stage of development. Human capital has significant and adverse effects on growth at the 75th and 90th quantile of growth. Countries in the lower quantiles stand the chance to lose from financial development and the vice versa.

Table 4. 4 Exogenous effects FDI on growth at various quantiles with control

	Q10	Q20	Q30	Q40	Q50	Q60	Q70	Q80	Q90
Lag GDP	0.132**	0.119**	0.110**	0.103**	0.096*	0.089*	0.082	0.075	0.059
	(0.064)	(0.058)	(0.056)	(0.049)	(0.055)	(0.048)	(0.053)	(0.058)	(0.079)
Population	0.059	0.055	0.052	0.050	0.048	0.045	0.043	0.041	0.036
	(0.092)	(0.076)	(0.074)	(0.052)	(0.049)	(0.047)	(0.041)	(0.065)	(0.085)
Schenrole	-0.117***	-0.104***	-0.095***	-0.088***	-0.081***	-0.074***	-0.067**	-0.060*	-0.044
	(0.041)	(0.031)	(0.027)	(0.021)	(0.023)	(0.027)	(0.029)	(0.035)	(0.041)
Conflict	-0.504*	-0.398	-0.323	-0.267	-0.211	-0.157	-0.099	-0.039	0.091
	(0.270)	(0.254)	(0.258)	(0.257)	(0.287)	(0.319)	(0.356)	(0.386)	(0.508)
FDI	0.046	0.062	0.073	0.081*	0.090*	0.098*	0.107**	0.116**	0.135**
	(0.088)	(0.059)	(0.054)	(0.044)	(0.049)	(0.052)	(0.051)	(0.052)	(0.060)
Trade	-0.003	0.003	0.006	0.009	0.012	0.015	0.018*	0.021*	0.028**
	(0.021)	(0.016)	(0.016)	(0.012)	(0.012)	(0.010)	(0.010)	(0.012)	(0.012)
Finance	-0.072	-0.061*	-0.054*	-0.048*	-0.043*	-0.038	-0.032	-0.026	-0.013
	(0.045)	(0.033)	(0.029)	(0.029)	(0.024)	(0.033)	(0.039)	(0.044)	(0.055)
Inflation	-0.004	-0.004	-0.004	-0.003	-0.003	-0.003	-0.003	-0.003	-0.002
	(0.017)	(0.011)	(0.010)	(0.010)	(0.016)	(0.015)	(0.017)	(0.024)	(0.030)
N	746	746	746	746	746	746	746	746	746

Standard errors in parentheses * $p < .10$, ** $p < .05$, *** $p < .01$

Note. —The table presents estimates of the effect of FDI on growth with some controls. All Columns are estimated with the quantile regression with fixed effects. Each column represents the same specification but with a different sample based on the level of their GDP growth rate. In all specification, I control for country and year fixed effects. The dependent variable is the GDP per capita growth. The variable Finance is the aggregate financial development indicator derived from the PCA. Interest rate is in real terms.

Bootstrapped Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

4.3.2 Effects of FDI on growth conditional on finance

In this section, I examine the mediating role of financial development in the FDI growth relationship at various stages of development. I postulate that countries in the higher quantile of GDP per capita will benefit from FDI with financial sector development amplifying this effect. The empirical literature has emphasised on the importance of absorptive capacities as the precondition for FDI to have effects on growth in the host countries. By using the initial level of financial development as the level of countries progress in the level of financial resources available to domestic firms, I estimate a model of the type adopted in the works of (Cai, Chen and Fang, 2018) to analyse the role of finance in the FDI growth link along the various stages of development. The quantile regression, as adopted in this study can show how the total effects from FDI and Finance may have a different nonlinear role on economic growth at different stages of growth. Even though the conditional mean strategy could partial out this marginal effect by running the regression on sub samples; however, the conditional mean is insufficient in dealing with country level heterogeneity in the level of GDP per capital grow.

Focusing on the interaction between FDI and financial development, this term enters each of the models jointly to identify the mediating role of finance in the FDI growth link. The results suggest that countries with some good level of financial development stand the chance to benefit from FDI. FDI has positive effects on growth albeit significant only for the 95th quartile and this growth effect is augmented by the level of financial development. This confirms the importance of absorptive capacities in the FDI growth literature as indicated in the works of Hansen (2000) and Nunnenkamp (2004). Countries with good level of financial development adds about 0.271% to the growth effects of FDI at the 95th quantile. The total impact of FDI on growth depends on the level of financial development, calculated from the partial derivative below.

$$\frac{\partial GDPPC}{\partial FDI} = 0.302 + 0.271 FIN$$

The positive sign of the interaction term is heterogenous, and this is one of the strengths of the quantile regression over the mean regression. The positive and significant interaction term at the highest quantile suggests the importance of a country's stage of development in benefiting from FDI and finance. The results are consistent with findings which suggest a threshold point above which financial development may affects growth (See, Cecchetti and Kharroubi's 2012; Law, Azman-Saini, and Ibrahim 2013). These studies through the conditional mean estimation strategy ignored the tails of the data distribution and estimate the regression at the centre; however, the estimation technique adopted here is robust to incidences of outliers in the estimation. A positive interaction term and a positive FDI effects on growth confirms that a good financial development adds to the growth effects of FDI. Quantile regressions are more robust to incidences of outliers in the estimation.

In the quantile regression, FDI only plays a significant effect on growth at the higher quantile with a strong level of significance. At the highest quantile i.e., Q95, FDI adds 0.3% to growth for a percentage increase in FDI inflows. The contribution of FDI to growth reduces as one moves from the higher quantiles to the lowest quantiles. This result contrasts the vast literature which has found no significant impact of FDI on economic growth. Given that these studies are based on the conditional mean estimator, they might be underestimating the results. Some of the studies which might be suffering from such under estimating bias are (Alfaro 2004,2006; Alfaro and Chalton 2007; Alfaro et al., 2004 and Hermes and Lensik,2003).

Table 4. 5 Effects FDI on growth via financial development

	Q25	Q50	Q75	Q95
GDPPC lag	0.095*	0.052	0.013	-0.076
	(0.049)	(0.077)	(0.096)	(0.152)
Population	0.070*	0.075*	0.080	0.090
	(0.042)	(0.042)	(0.054)	(0.086)
School enrolment	-1.052	-5.551**	-9.594***	-18.823**
	(2.714)	(2.698)	(3.297)	(7.355)
Real interest rate	0.067**	0.044	0.023	-0.025
	(0.034)	(0.027)	(0.022)	(0.036)
Inflation	-0.004	-0.009	-0.014	-0.025
	(0.020)	(0.017)	(0.023)	(0.039)
Finance	0.000	0.001	0.002	0.003
	(0.001)	(0.001)	(0.001)	(0.002)
FDI	0.072	0.130	0.182	0.302*
	(0.154)	(0.089)	(0.113)	(0.166)
$FDI \times Finance$	-0.043	0.036	0.108	0.271*
	(0.174)	(0.097)	(0.116)	(0.155)
N	1001	1001	1001	1001

[1]Note. —The table presents estimates of the effect of FDI on growth via the level of financial developing with some controls. All Columns are estimated with the quantile regression with fixed effects. Each column represents the same specification but with a different sample based on the level of their GDP growth rate. In all specification, I control for country and year fixed effects. The dependent variable is the GDP per capita growth. The variable $Initial\ Finance$ is the level of financial development in the year 1970. $FDI \times Finance$ is the interaction between FDI and the level of financial development.

Bootstrapped Standard errors in parentheses * p < 0.05, ** p < 0.01, *** p < 0.001

4.3.3 Robustness Checks

As a robustness check, I adopt the pooled quantile regression and the Canay (2011) estimator, which treats the fixed effects invariant with quantiles. From table 4.6, panel A displays the estimates of the parameters of interest using the Pooled quantile regression with a bootstrapped standard error in parenthesis. The results show that FDI only plays a positive and significant role in the higher Quantile of GDP. The effects of FDI on growth increase as countries move to the higher quantiles of income and hence, FDI only plays an essential role in development exclusively for countries in the 50th and 90th quantile. Panel B presents the results from the Machado (2019) quantile via Moments approach. The approach allows the fixed effects to vary

along the quintiles. The results are like that of the pooled quintile regression in panel A. Furthermore, Panel C presents the estimates of the same models in row 1-6 using the methodology proposed by Canay (2011) which treats the fixed effects as a location shifter. The results show that FDI only plays a significant role in growth in the higher Quantile of GDP. This result aligns with the adopted methodology, which treats the fixed effects variable along the quantiles. The results also show that for most variables, all the estimates produce similar results in terms of magnitude and significance. From the robustness checks, I can conclude that, the positive impact of FDI on growth is only realized at the higher quintile of growth when the three methodologies are adopted.

Table 4. 6 FDI and growth with three estimators.

	LGDP	Pop	Schenrole	Conflict	FDI	Trade	Finance	Inflation
Panel A: Pooled Quantile								
τ =0.1	0.159***	0.01	0.009	-0.045	0.083	0.000	-0.019	0.002
	[-0.056]	[-0.009]	[-0.02]	[-0.237]	[-0.093]	[-0.013]	[-0.012]	[-0.005]
τ =0.5	0.265***	0.010*	-0.001	-0.04	0.078***	0.001	-0.004	-0.003
	[-0.079]	[-0.005	[-0.007]	[-0.065]	[-0.018]	[-0.007]	[-0.005]	[-0.003]
τ =0.9	0.202***	0.027	-0.024*	-0.16	0.261*	0.012	-0.009	-0.012***
	[-0.072]	[-0.033]	[-0.012]	[-0.309]	[-0.133]	[-0.011]	[-0.009]	[-0.003]
Panel B: MM-QR								
τ =0.1	0.203***	0.158	0.047	-0.862***	0.093	0.005	-0.122***	-0.01
	(-0.066)	(-0.109)	(-0.035)	(-0.284)	(-0.087)	(-0.029)	(-0.047)	(-0.022)
τ =0.5	0.143***	0.075*	-0.019	-0.394	0.112***	0.019*	-0.056**	-0.005
	(-0.041)	(-0.04)	(-0.013)	(-0.297)	(-0.037)	(-0.011)	(-0.026)	(-0.013)
τ =0.9	0.081	-0.008	-0.086***	0.081	0.130**	0.032**	0.011	0.000
	(-0.061)	(-0.068)	(-0.032)	(-0.484)	(-0.062)	(-0.014)	(-0.053)	(-0.031)
Panel C: Canay (2011)								
τ =0.1	0.076	0.048**	-0.075**	-0.374	-0.030	0.012	-0.039	0.002
	(-0.104)	(-0.024)	(-0.03)	(-0.275)	(-0.087)	(-0.009)	(-0.026)	(-0.02)
τ =0.5	0.082	0.048*	-0.072***	-0.200	0.057	0.013	-0.046*	-0.005
	(-0.069)	(-0.026)	(-0.022)	(-0.316)	(-0.055)	(-0.008)	(-0.024)	(-0.015)
τ =0.9	0.084	0.056	-0.096***	-0.373	0.149**	0.015	-0.039*	-0.012
	(-0.098)	(-0.037)	(-0.026)	(-0.506)	(-0.07)	(-0.014)	(-0.023)	(-0.035)

From table 4.6, the dependent variable is GDP Per capita growth rate; all regressions include country and time fixed effects. This is balanced panel with 40 countries and 1658 observations. Clustered standard errors are in square brackets and standard errors estimated by bootstrap (resampling countries) are in parenthesis. With regards to the bias (Nickell, 1981) associated with the lag GDP, I expect this bias to be minimal given the value of T, (Nickell, 1981). The bias is unlikely to contaminate the estimate of the coefficient of the FDI due to the low correlation between FDI and Lag GDP Machado and Santos Silva (2019)

4.4 Summary and Conclusions

In this chapter, I use the fixed effects panel quantile regression model to investigate the impact of FDI on economic growth. With the panel quantile regression methodology, I have examined the role of FDI on growth throughout the conditional distribution of GDP. The results are summarised as follows. First, the impact of FDI on growth is heterogeneous across the conditional distribution of income; and so FDI plays a significant impact on growth at the higher quantiles of income. This significant impact is only observed from the 75th quantile upwards. The within-group estimator which is based on the mean estimates produce inconclusive results. The quantile regression's superiority is seen in its ability to estimate the regression at different quantiles along the conditional distribution of the dependent variable. Secondly, by adding more controls to the baseline regression, I test the stability of the results. The exogenous role of FDI maintains its significant effects on growth at the highest quantiles even though countries in the lowest quantile this time observe some significant impact from FDI. It is apparent that the role of FDI on growth increases as one moves towards the higher quantile.

Moreover, to analyse the role of Finance in the FDI growth nexus, I multiply financial development by the current levels of FDI and include it in the model. The results show that at the highest level of income, financial development amplifies the growth effects of FDI and so countries with some good level of financial development stand the chance to benefit more from FDI than their counterpart countries with poor levels of financial development. The growth-enhancing role of finance is heterogeneous across the conditional distribution of incomes. The results are expected because countries in the higher quantiles are characterised with good institutions and a financial sector capable of channelling FDI into growth. The phenomenon is not apparent at the lower quantiles of income. This finding is a sign of poor countries lacking absorptive capacities capable of channelling FDI into growth.

I therefore recommend that policy prescription with regards to attracting more foreign investment should not be generalised among countries in Africa due to the heterogenous role of FDI in the continent. Countries must reconsider their stage of development before giving out some incentives to attract more FDI to avoid long run loses from foreign direct investment. Foreign direct investment, as it embodies technology and know-how as well as foreign capital needs countries with good institutions to function. Economic theory postulates that FDI brings technology to the domestic firms and the ability for host countries to benefit from this foreign technology depends on the amount of credit available to finance these investment project (Hermes and Lensik, 2003: Alfaro et al., 2004). Moreover, firms which depend more on external finance grow faster in countries where the financial system is developed (Rajan and Zingales, 1998, Demirgüç-Kunt and Maksimovic (1998). The role of

financial development on the rate of the firm's establishment has also been stressed in the works of (Rajan and Zingales, 1998). I therefore reiterate the importance of financial development in the FDI growth link as stated in the literature, however, this role is not homogenous across countries as found in the literature.

Chapter 5 Determinants of FDI in Africa: The role of the Business Environment

5.1 Introduction

 Foreign Direct Investment (FDI) as a financial asset is sensitive to unfavourable business environment. It is subject to sudden reversal if the host country's investment climate is inherently not friendly. The poor performance of inward FDI in Africa is troubling. The state of the African business environment potentially plays significant role in determining the patterns of FDI flows in the region. The burgeoning literature on FDI determinants has a limited studies on the role of ease of doing Business on the flow of FDI. FDI inflows into Africa will continue to improve over the medium and long term if the investment climate improves (UNCTAD 2020). Recent empirical works on the changing direction of FDI from the advanced world to the developing world have over-emphasised the role of domestic market size and natural resource endowment in determining the patterns of FDI without giving much attention to the Business Environment of the host country. Despite the growing number of incentives to attract Multinational Corporations (MNCs), Sub-Sahara Africa remains the region with the lowest FDI inflows globally. While most literature attributes the low inflow of FDI in sub-Saharan Africa to unstable institutions and broad macro-economic performance, Asiedu 2002; Ayayi, 2006 argue that Africa is different when it comes to factors that affect FDI inflows. They argue that determinants of FDI into Africa go beyond macroeconomic variables as used in the literature. Kayalvizhi and Thenmozhi (2017) argue that better country governance and better macroeconomic environment do not guarantee a larger flow of FDI in emerging economies. They recognise the need to identify distinctive elements to attract and sustain FDI.

There are strong reasons to affirm that the size of FDI flows into a country is dependent on the business climate of the country. Literature documents few of empirical studies on FDI and "doing business". Piwonski (2010) demonstrates the impact of the business environment on FDI by proving that FDI flows to a country augment by over $44 million along one level increase in rank of a country's Ease of Doing Business. Moris and Aziz (2011) also examine the relationship between factors relating to the conduct of business and FDI inflows among 57 countries from Asia and Sub-Saharan Africa. Both studies concentrate on the relationship between doing business indicators and FDI flows in 2000 and 2005. They both conclude that "registration of property'" and "trading across borders" significantly determine FDI inflows.

Sub-Saharan Africa continues to increasingly view FDI as a medium through which economic development can be achieved, foster progressive transformation, create avenues for employment and increase investment activities. FDI is preferred by Africa as a source of capital because FDI flows are more certain than other forms of capital inflows (Adams, 2009). The report of UNCTAD in 2008 suggests similarly that FDI has the potency to create employment opportunities, improve efficiency of production, encourage the sharing of skills and technology, and increase exporting activities for continuous economic development in the long-term of developing countries. Technological transfer can take the form of horizontal spillovers where transfer occur within the same sector or vertical spillover where transfer occurs within different sectors to increase productivity (Buckley, Clegg, and Wang 2007a, Dunning and Lunden, 2008). On the strength of these arguments, African countries have over the years focused on offering incentives to attract more FDI. For instance, in the late 1990s, tax incentives were highly pursued by about 103 developing countries with the aim of attracting multinational firms to establish production facilities in their countries (Hanson, 2001). About 70% of countries in Africa also used tax holidays to attract more FDI in 2004 as compared with 20% OECD countries who also made similar attempt.

Despite various FDI policies by Africa to attract more FDI, the region has received minimal FDI inflows even though there is global surge in FDI. Although FDI into Africa has increased notably in the past two decades, its global share remains small. FDI in the African region has been hovering between 2% and 3% of GDP, never crossing 4% of the global FDI inflow in 35 years (UNCTAD, 2020). Figure 5.1 shows the dynamics of total FDI stock and inflows in Sub Sahara Africa over two broad periods, i.e., pre-and post-structural Adjustment Programmes. Sub-Sahara Africa experienced a drop in FDI inflows in the early 1990s. The figure reveals that the average inflow of FDI ranges below 2% of GDP from the early 1970s through 1998. The level of FDI inflows remained low up until the late 1990. Major structural adjustment programs occurred during the late 1990s. During the structural adjustment programme, most African countries became net exporters of capital. These countries were paying more to the rest of the world in debt repayment than receiving FDI, aid, and new loans (Simon, 2010). The surge in FDI inflows from 1998 is partly because most countries embraced economic liberalisation as prescribed by the Economic Recovery Program (ERPs). Most countries in Africa became open for the first time to the rest of the world, contributing to the surge in FDI inflows. The recent increase in FDI inflows is likely to be partly explained by Sub-Sahara Africa's effort in practicing more economic liberalisation

policies and these policies are opening the Africa to the rest of the world. The role of China in Africa has substantial impact on the increasing amount of FDI inflows in SSA

Figure 5. 1Average FDI inflows 1970-2019
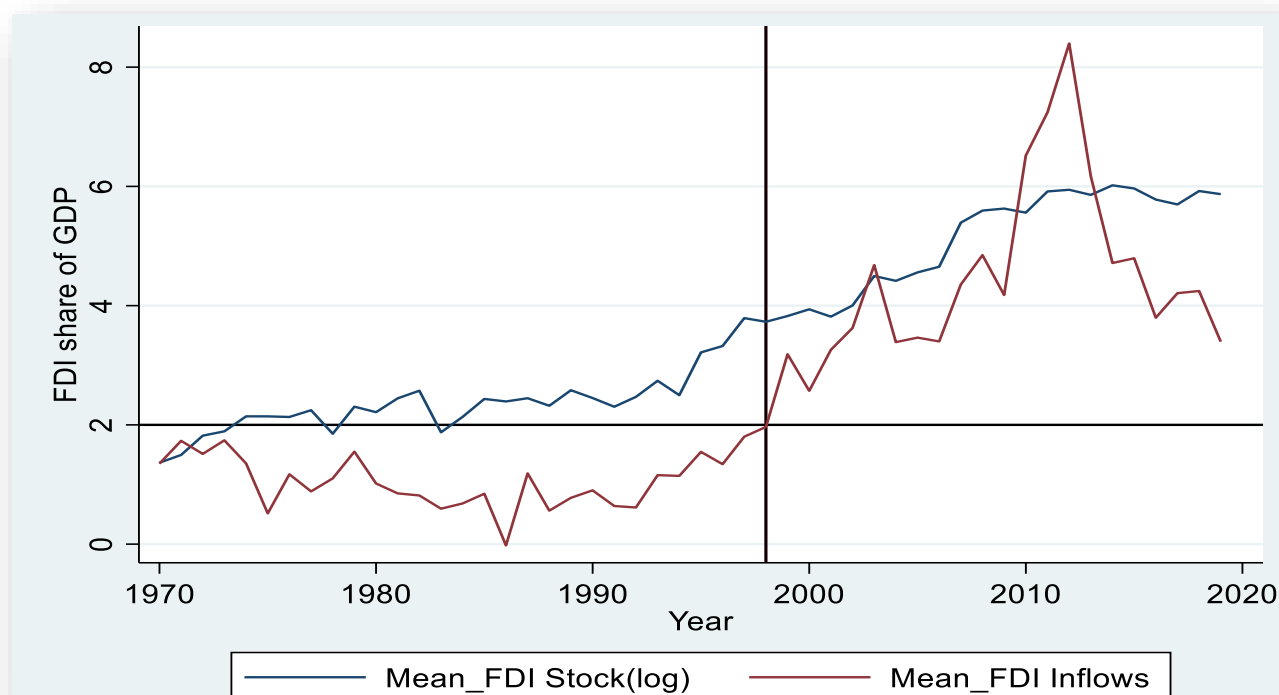
Some of the reasons attributed to this low level of FDI are poor infrastructure, absence of macroeconomic stability, political instability, inadequate human capital, and systematic uncertainties affecting state legal structure. African countries differ significantly across regions, and countries within Southern Africa have been historically the leading destination for FDI, receiving more than 70% of all FDI in Africa in 2004 (UNCTAD, 2019). The recent fall in the total FDI in the southern African region is because FDI inflows have increased significantly in other countries, most notably in Western Africa countries (led by Nigeria), where FDI stock increased from 15% in 2002 to 36% as a share of total FDI in Africa in 2018.

Figure 5.2 compares the flow of FDI as a share of gross capital formation among Africa, Developed countries and the rest of the world. The gap between total FDI flow to Africa and other continents suggests failures of national economic policies. It indicates rewarding opportunities for Africa to revisit its policies to gain a more attractive image in the global economy. FDI inflows to Africa have been consistently lower compared to the developed world. The surge in FDI inflows in the

late 1990s up to 2000 is because most African countries participated in the structural adjustment program, which sought to open Africa to the rest of the world. During the structural adjustment program, most African countries became open for the first time to the rest of the world, contributing to the surge in FDI inflows. The recent increase in FDI inflows is due to Sub-Sahara Africa's effort to make their business environment friendly. China's role in Africa substantially impacts increasing FDI inflows in SSA.

Figure 5. 2 Inflows of FDI as a share of Gross capital formation
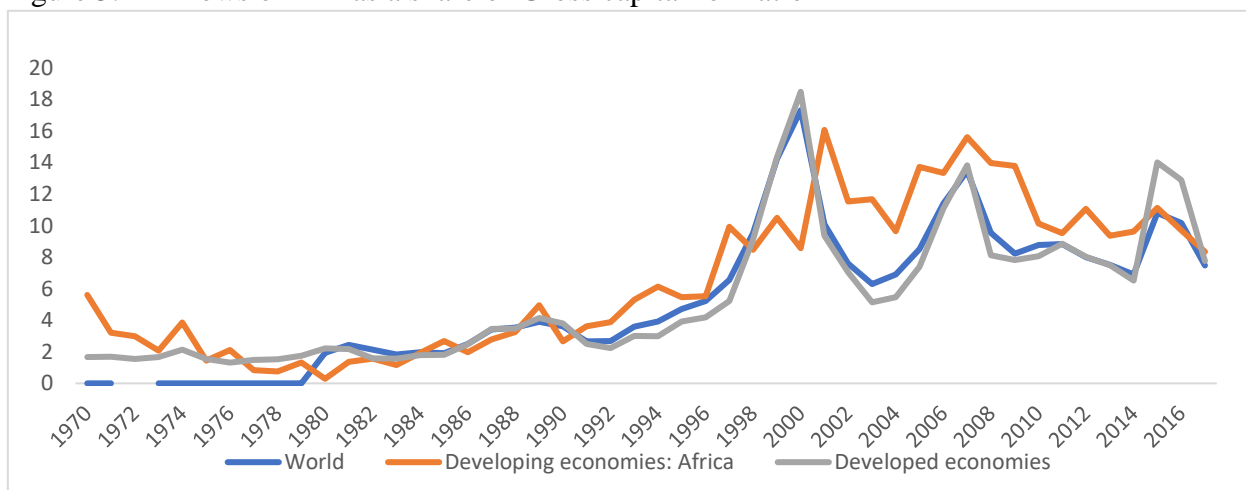
Source: UNCTAD (2016)

Figure 5.3 shows some of the Ease of doing business indicators used in this thesis averaged across all sub-Saharan African countries. The Ease of doing Business in SSA Africa has continued to improve over the past decades. Days to start a business averaged around 70 days in the early 2000s, currently averaging approximately 35 days in 2019. The improvement is partly due to the digitisation of most public service activities in Africa. Recent infrastructural development in Africa has some critical implications for improving the Ease of doing business indicators. Building a warehouse in Sub-Sahara Africa used to be one of the biggest challenges in the region in the early 2000s. It took firms more than 200 days to build a warehouse in the early 2000s in Africa. The average number of days to construct a warehouse in Africa is about 150 days. Registering a property is also another essential indicator worth studying. The time to register a property has also improved over the past decade.

Figure 5. 3 Ease of doing Business averaged over time
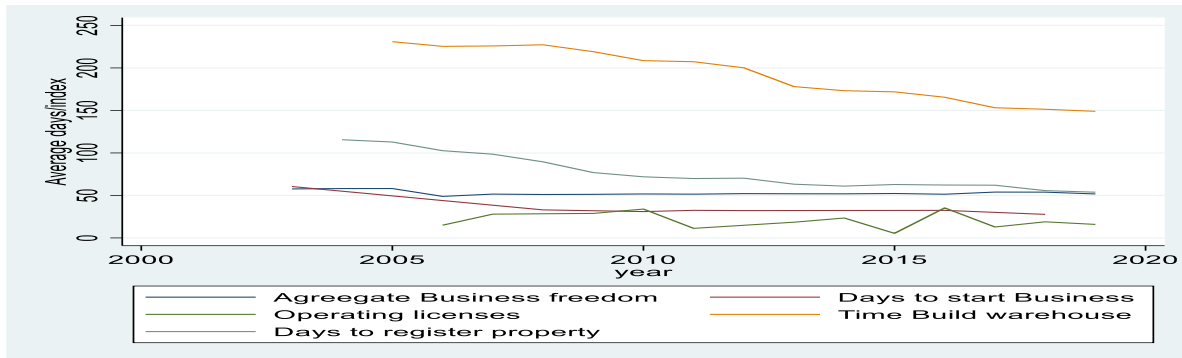
The hypothesis that this chapter presents and empirically examines is, whether ease of doing business in host countries attracts more FDI. In testing this this hypothesis, I contribute to both academic and policy relevance of FDI determinants literature. First, I explore the role of aggregate business freedom index on the flow of FDI. Secondly, by using the various sub-components of Business freedom, I examine the impact of variables relating to ease of doing business on the inflows of FDI in SSA. Against this background, this chapter aims to examine the role of Business environment in determining the location of FDI, tackling some of the shortcomings of the empirical literature. In measuring Business Environment, I consider the institutional and regulatory environment in which Multinational firms operate and, more importantly, factors that affect the investor from starting the business to the period of exiting the host country. I organise the rest of the chapter as follows: Section 5.2 presents a review of recent empirical studies on the role of the investment climate in determining the location of FDI. Section 5.3 offers an in-depth description of the econometric technique. Section 5.4 introduces the data, Section 5.5 discusses the estimation results, and the final Section 5.6 summarises the findings and presents policy implications.

5.2 Literature review

In the first part of the literature review, I consider some traditional determinants of FDI in SSA. African countries attract all forms of FDI. However, Dunning (1998) and Okafor (2015) argue that FDI in Africa is mainly attracted by the traditional factors of market-seeking motives or by exploiting the advantages of lower cost of production and natural resources. On the locational determinants of FDI, Cleeve (2008) finds that USA outwards FDI to Sub Sahara Africa are sensitive to the country's level of natural resources endowment. Dupasquier and Osakwe (2006) and Aseidu (2002) find resource-seeking motive variables such as crude oil, gas endowment, and the overall natural resources endowment positively and significantly related to FDI inflow SSA. The role of natural resources endowment in attracting FDI into Africa is conclusive in the above literature. Asiedu (2006), using panel data for 22 countries in Sub-Saharan Africa (SSA) over the period 1984–2000, found that countries endowed with natural resources attract more FDI. For instance, Nigeria and Angola attract FDI due to their oil resources, despite being characterised by unconducive political system (Ayayi, 2006).

Market growth and size variables are important for market seeking FDI inflows in Africa. Multinational activities with the primary intention to serve local and global needs are positively crucial to FDI inflow in Africa (Jaiblai and Shenai, 2019). Traditionally, FDI will move to countries with more extensive and growing markets where companies can receive higher returns on their investment (Lankes and Venables, 1996; Nunes et al., 2006; Sahoo, 2006). While there are some contrasting views on the role of GDP Per capita as a measure of Market size, most empirical works find FDI to flow into countries with a higher level of GDP per capita. Proponents of higher GDP per capita as a driver of FDI postulate that a higher GDP means a higher purchasing power for host countries (Tintin, 2013). Despite the wide range of literature alluding FDI inflows to large market size, Holland and Pain (1998) and Asiedu (2002) reiterate that the impact of Domestic market size as measured by GDP is insignificant. They argue that a higher GDP per capita means a higher cost of inputs, which drives efficient seeking FDI away. A recent study by Jaiblai and Shenai (2019) on the determinants of FDI in Sub-Saharan Economies: using data from 1990–2017 from 10 SSA countries showed that higher FDI flows expressed as a percentage of GDP have been recorded in markets with low incomes level. The argument is that a higher income level may imply that countries are transitioning from poor states to higher income levels. Hence, the efficient seeking motive of FDI may not hold because the cost of inputs may begin to rise. Bayraktar (2013) reports that FDI has changed in the direction of developed countries towards developing countries, particularly after the financial crisis. The smaller market size of SSA countries is found attractive to investors (Jaiblai and Shenai,2019), especially for resource-

seeking FDI due to better opportunities and prospects a small market size present. Small market size economies maybe characterised with less competition.

Over time, especially in the 1980s and 1990s, SSA countries were often perceived as conflict-prone zones. Ezeoha et al. (2015) attributes the unstable trends of FDI inflows partially to conflict incidences in SSA. But it is interesting that, while UNCTAD reported a loss of 1.33 trillion Naira by Nigeria during the 'Boko Haram' terrorist incident, Liberia instead recorded a moderate increase in FDI during a civil war between 1989- 2002 (Jensen, 2020). Also, the Angolan war favored firms in the diamond extractive sector, a very intriguing occurrence. Guidolin and Ferrara (2007) associate this with poor bargaining arrangements resulting from untransparent dealings, reduced licensing, and transaction costs in the periods of war. This confirms the point Jensen (2020) makes that the effect of Conflict on FDI in the extractive sector is comparatively less than the effect on market-seeking FDI. In addition, the extractive industry may not be seriously affected by their assets as the extractive site are offshore. Thus, one may quickly conclude that since SSA is resource-rich, the impact of conflict is insignificant on FDI. Contrary to this, Ezeoha and Ugwu (2015) applied a dynamic GMM model on 41 African countries to analyze the impact of conflict on FDI inflows. The results proved that war has a higher negative effect on FDI inflows in resource-rich countries. In similar research by Anyanwu (2014), the result showed that conflict negatively impacts countries with natural resource endowment.

A critical review of the literature has laid bare the gap in the FDI determinants literature. So far, little evidence about issues that may facilitate or obstruct the smooth functioning of a commercial or a business organisation in Sub Sahara Africa is available. The existing literature has made us understand FDI's determinants to African countries. However, most of these studies consider macro variables as the critical determinants of FDI, but the companies that invest in SSA countries may base their decisions on potential difficulties operating their subsidiaries. According to the enabling framework, the economic structures that governments create in the long term to make host countries attractive to foreign investors are essential in determining the location of FDI (McMillan, 1993). Few empirical studies have tackled issues that may ease or impede the smooth running of a commercial or a business organisation. This study investigates the relationship between factors that influence conducting Business in African countries and FDI inflow.

There are limited number of empirical studies linking ease of doing business and FDI inflows together. Some studies have focused on the correlation between different measures of Business environment and FDI inflows in the years 2000 and 2005. FDI is related to the Ease of doing business. From the work of Piwonski (2010), a country's government can bring in over $44 million as FDI by

increasing its Ease of Doing Business rank by one level. Nunnenkamp (2002) concludes that multinational corporations are looking more for cost savings than a fresh or larger market to sell a product or service in more recent years. From the OLI paradigm, firms are always searching for countries where they can gain some locational advantage. Therefore, MNCs are likely to move to countries where the time and cost of starting a business are not too high. Johnson (2006) is of the view that governments must focus on creating a business-friendly economy for foreign investors. MNCs are not only interested in favourable incentives they usually get in host countries but a friendly business environment because these incentives can be changed by host country's government especially in SSA where political instability is common. The measures of Ease of doing business examined in this study are considered part of the enabling environment framework MNCs are interested in. They are long-term decisions the government makes to ensure that the domestic business environment is friendly. Agosin and Machado (2005) also argue that the macro-economic variables are not enough.

Morris and Aziz (2011) study the relationship between factors that affect conducting business and the inflow of FDI in 57 Sub-Saharan Africa and Asian countries. They find that two indicators, "registering property" and "trading across borders," are highly related to FDI inflows. Despite their failure to quantify the association between FDI inflows and business environment measures, their paper provides a support to the hypothesis that an unfavourable Business environment deters MNCs. Some African countries (Rwanda, Ghana, Nigeria) have attracted more FDI due to improvements in their investment climate (Worldbank 2019). Nnadozie and Njuguna (2011) investigate the link between investment climate, particularly the prevailing business regulations and FDI in the African region. By estimating regressions that use business regulations as one of the independent variables, they find that business rules and regulations are essential for FDI.

Following this strand of the literature, this study uses a recent data from world bank ease of doing business database to examine the role of ease of doing business in determining the location FDI inflows in SSA.

5.3 Empirical strategy and model

FDI determinants literature traditionally estimate models by transforming the dependent variable as log transformed. The argument for log transformation of the dependent variable includes dealing with outliers or positively skewed data to approximate a normal distribution and giving the researcher the chance to explain coefficients as elasticities (Manning, 1998; Bellemare and Wichman, 2019). One problem with taking the logarithm of a variable is that it does not allow retaining zero-valued observations because the logarithm of zero [ln (0)] is undefined. But FDI data for developing countries often include more zero-valued observations. Consequently, researchers have often resorted to ad hoc methods of accounting for this when taking the natural logarithm of a variable, such as dropping those observations or adding small numbers (for example, 1) to the variable before its transformation (MaCurdy and Pencavel, 1986).

Under heteroscedasticity, the parameter estimates of the log-transformed dependent variable are biased (Santos Silva and Tenreyro, 2003; Siliverstovs and Schumacher, 2008). Furthermore, given the substantial number of the zero values of FDI inflows for most countries in my sample (see Table 3.3 at Appendix) taking the log of the zeros will be inappropriate, i.e., ln(0) is undefined and could lead to the Jensen inequality which implies that $E(lnFDI) \neq lnE(FDI)$.

Consider a model of the form below.

$$y_i = e^{x_i'\theta_i \eta_i} \qquad [5.1]$$

where $\eta_i = 1 + \frac{\varepsilon_i}{e^{x_i'\theta_i}}$ and $E[\eta_i|x_i] = 1$. By assuming that $y_i > 0$, the model above can be made linear in parameters by taking the logarithms of either side of the equation to arrive at the equation.

$$\ln y_i = x_i'\theta_i + \ln\eta_i \qquad [5.2]$$

Estimating equation [5.2] with OLS will lead to inconsistent estimates of θ_i (Santos Silva and Tenreyro, 2003). Given this limitation of the log-linear transformation model, a conceivable way of finding an efficient estimator without turning to non-parametric regression analysis is to estimate regression parameters with the Pseudo-Maximum Likelihood approach (See Manning &Mullahy,2001; Papke & Wooldridge,1996). By maintaining the assumption that $E[y_i|x_i] = e^{x_i'\theta_i} \propto Var(y_i|x_i)$ then θ_i can efficiently be estimated by solving the following set of first-order condition,

$$\sum_{i=1}^{n}[y_i - e^{x_i'\dot\theta}]x_i = 0 \qquad [5.3]$$

The estimator in equation (5.3) is statistically equal to the Poisson Pseudo Maximum likelihood (PPML) estimator. The structure of the equation implies that $E[y_i|x_i] = e^{x_i'\theta_i}$ and therefore, the data do not have to follow a Poisson distribution and the dependent variable y_i do not have to be greater than zero (Gourieroux, Monfort,&Trognon,1984). Where the expected value of the dependent variable y_i given the independent variable x_i is proportional to the variance of dependent variable y_i given the independent variable. $E[y_i|x_i] = e^{x_i'\theta_i} \propto Var(y_i|x_i)$ is not tenable, the estimator fails to account for full heteroscedasticity in the model therefore, the inference is based on Eicker-White (Eicker,1963;White 1980) robust standard errors to mitigate the impact of heteroscedasticity in the model. Against this background, I estimate the benchmark regression below:

$$FDI_{i,t} = \alpha_i + \beta Business\ environment_{i,t} + \delta Z_{i,t} + \mu_{i,t} \qquad [5.4]$$

where $\mu_{i,t} = \delta_t + v_i$, The parameter $\mu_{i,t}$ is an unobserved country-specific effect and δ_t is time-specific effects to control for structural breaks in FDI inflows. FDI_{it} is the response variable measured as net FDI inflows as a percentage of GDP, β measures the impact of host country ease of doing business ($Business\ environment$) on FDI inflow. Ease of doing business contains those covariates which measure the smooth running of a business in the host country see figure 3.3 for list of variables. The Z component of the model captures controls variables, which are grouped into two main thematic areas macro and Socio-political risk. First, the macro element in the model measures the macro-economic performance of the host country. The variables I consider under macro-economic performance are inflation and GDP growth volatility. The use of inflation to proxy the overall macro-economic environment is not new in the literature. The studies by Nnadozie and Osili, 2004; Khair-UZ-Zaman et al., 2006) found a negative relationship between inflation and FDI inflows. GDP volatility is five years rolling standard deviation of GDP growth. Cavallari and d'Addona (2013) argued that Output and exchange rate volatility matter when investors decide where to locate their investment. Second, socio-political risk components capture factors increasing the investor's risk profile. They include conflict and political instability. Such factors deter investors in the absence of political risk insurance to protect the foreign investor from losing capital.

5.4 Data

The analysis covers all sub–Saharan African countries for which data are available. Data on foreign direct investment inflows are gleaned from the UNCTAD statistics. FDI inflows as a percentage of GDP is the dependent variable, and it is preferred to FDI stock as the former has more variability which is important when studying the sensitivity of the flows to domestic business environment.   In the World Bank's Ease of Doing Business (EDB) database (World Bank, 2016), I collect variables relating to the Ease of starting a business in SSA. As far as investment climate is concerned, the World Bank's Doing Business project has offered objective measures of Ease of doing business across SSA. The database provides comprehensive quantitative data on official cost and time for fully complying with business start-up procedures. These data analyse specific obstacles and design specific reforms that policymakers can implement to create a business climate that attracts complementary FDI and promotes economic growth. The official cost of business start-up procedures and the time required to start a business have been used to measure the investment climate.

As depicted in figure 5.4, there is a correlation between the flows of FDI and investment climate variables. The proxies for the individual measures of ease of business can be thought of as constraints of starting a Business. The higher the constraint, the lower the flow of FDI. This phenomenon can be seen in the graphs in figure 5.4 below where FDI flow is negatively correlated with proxies of business environment apart from Business freedom. The various ease of doing business indicators is, plotted against FDI inflows. Spending many days to start a Business is negatively correlated with FDI inflows. Due to poor institutions and corruption, it takes many days for foreign investors to get into a full operation. Low levels of FDI inflows in some countries in Africa could stem from the poor nature of the investment climate in these countries.

Figure 5. 4 correlation between FDI and ease of doing business.
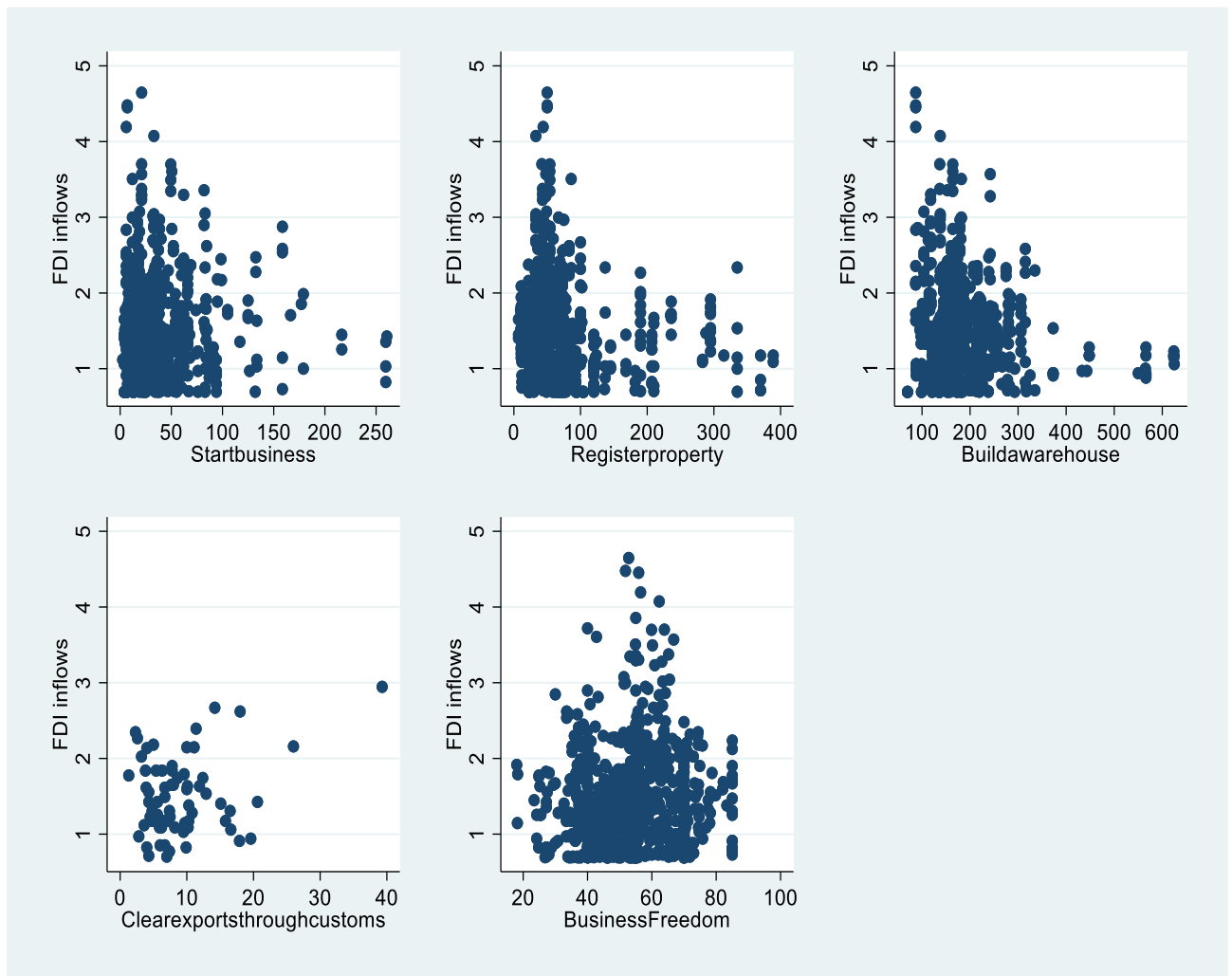
Table 5. 1:Traditional FDI determinants Variables and Source

Variable	Definition	Source
GDP per capita growth	The growth of real per capita GDP	World Bank (2020)
FDI	The net FDI inflows as a share of GDP	UNCTAD (2020)
Schooling	Human capital measured as the average years of secondary schooling for the overall population	WDI (2020)
Inflation	Percentage changes in the consumption price index	IFS
Trade Openness	Trade openness (KOFF index)	KOF index (2007)
Log of population	The logarithm of the total population growth	World Bank (2007)
Institutional quality	The probability that the government may expropriate private property	WGI (Worldbank)
Foreign aid	Total aid received as a share of GNP	WDI (WorldBank)
Resource rent	Total proceeds from natural resources as a share of GDP	WDI(Worldbank)
Polity2	Measure of democracy	CSP(INSCR)
GDP growth volatility	Standard Deviation of GDP growth.	WDI(Worldbank)
Conflict	Magnitude score of episodes of warfare involving state State in that year, Scale 0-10	CSP(INSCR)

Figure 5. 5. Schematic representation of key variables

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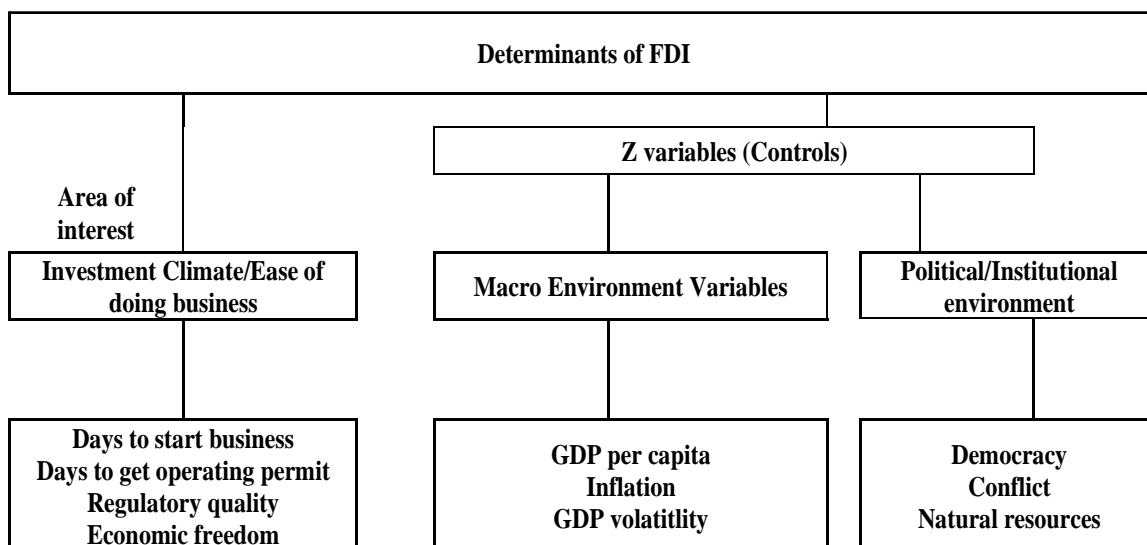
Table 5. 2: Business Environment Measures

Variable	Short Definition	Source
Days to get operating permit	Number of days to get operating permit	World Bank (2021)
Days to start business	The number of days it takes to start a business in Africa	World Bank (2021)
Regulatory Quality	Measures the perception of government to formulate and implement sound policies.	WorldBank(2021)
Economic freedom of the world	Aggregate economic freedom index	Fraser institute (2020)
Government integrity	The absence of bribery and corruption	https://www.heritage.org
Legal and property rights	The ability of private agents to accumulate wealth and enforced contracts.	Fraser institute (2020)
Freedom to trade Internationally.	The probability that the government may expropriate private property	Fraser Institute (2022)
Government effectiveness	The ability of institutions to function without any political interference.	https://www.heritage.org
Business Freedom	An individual's ability to establish and run an enterprise without undue state interference.	https://www.heritage.org

Table 5.3 provides descriptive statistics for the variables used in the study. Average FDI inflows as a share of GDP has remained low, with a significant variation among countries. FDI inflows have a mean value of 4.8 % GDP with a standard deviation of 8.55%. Average FDI inflows can range from -11.1% of GDP to about 103%. There is a wide variation in the sample's GDP growth rate, as indicated by the higher standard deviation of 4.48% and a low mean value of 1.97%. The mean value of the trade to-GDP ratio is about 72%, with a standard deviation of 35%. There is a considerable difference among the countries in terms of trade openness. The extent of trade size among the countries is not surprising given that most of the countries in Africa import more than half of their products. The average natural

resource rent is about 13% of GDP. This value varies hugely among the countries, ranging from 0% to about 56% of GDP in some countries. The average number of days to register a property varies a lot across countries. It averages around 76 days to start a business in Africa, even though it could differ from approximately 2.5 days to about 260 days in some countries. The Ease of doing Business in SSA Africa has continued to improve over the past decades. Days to start a business averaged around 37 with high variability among countries. The average number of days to construct a warehouse in Africa is about 150 days.

Table 5. 3: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Register Property	645	76.067	67.393	7	389
Start Business	676	37.858	35.94	2.5	260.5
Build Warehouse	591	188.598	85.929	70	625
Regulatory quality	711	-.693	.653	-2.645	1.127
FDI inflows	705	4.812	8.55	-11.6	103.3
Finance Openness	689	51.327	15.908	16	99
GDP per capita growth	706	1.973	4.488	-36.56	28.68
Civil conflict	664	.593	1.438	0	6
Inflation	602	6.812	7.323	-8.97	63.29
GDP volatility	708	2.682	3.084	.036	23.445
Resource rent	666	13.08	11.347	0	59.6
Foreign Aid	664	8.691	9.164	-.25	92.14
Trade	614	72.495	33.222	20.175	242.781

Regarding the correlation matrix in table 5.4, there is a moderate and positive correlation between financial Openness and FDI inflows. The correlation between days to start Business and FDI inflows is negative, however low. Trade and financial openness capture the same idea of economic openness, so it is not surprising to observe a high correlation between these two variables. There is no evidence of a high correlation between the rest of the variables.

Table 5. 4: Correlation matrix

Table 5.4 :Correlation Matrix

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) Register Property	1.000															
(2) Start Business	0.117	1.000														
(3) Build warehouse	0.100	0.179	1.000													
(4) Business freedom	-0.184	-0.359	-0.138	1.000												
(5) Economic freedom	-0.101	-0.337	-0.213	0.681	1.000											
(6) Regulatory Quality	-0.167	-0.299	-0.166	0.739	0.759	1.000										
(7) FDI inflows	-0.141	-0.039	-0.109	0.106	-0.125	-0.050	1.000									
(8) Finance Openness	-0.080	0.033	0.080	0.376	0.235	0.307	0.257	1.000								
(9) Trade (KOFF index)	0.104	-0.010	0.111	0.264	0.096	0.250	0.384	0.532	1.000							
(10) GDP Per capita	0.006	0.040	0.129	0.065	0.101	0.114	0.026	0.026	0.015	1.000						
(11) Conflict	-0.086	0.047	-0.161	-0.152	-0.104	-0.256	-0.069	-0.096	-0.218	-0.028	1.000					
(12) Inflation	-0.003	-0.041	-0.163	0.145	0.186	0.088	0.077	-0.189	-0.014	0.066	0.049	1.000				
(13) GDP volatility	-0.107	0.147	0.181	-0.112	-0.227	-0.200	-0.017	-0.037	0.099	-0.003	-0.030	-0.043	1.000			
(14) Resource rent	-0.049	0.248	-0.114	-0.354	-0.519	-0.497	0.233	0.051	0.158	-0.039	0.219	-0.025	0.185	1.000		
(15) Foreign Aid	0.121	-0.048	-0.203	-0.161	-0.140	-0.253	0.048	-0.245	-0.207	-0.011	-0.039	0.305	0.007	0.108	1.000	
(16) Trade	-0.142	0.133	0.026	0.158	-0.020	0.077	0.290	0.507	0.536	0.012	0.043	0.045	0.171	0.248	-0.133	1.000

5.5 Empirical results

This chapter empirically assesses the impact of domestic business environment on foreign direct investment flows. The environment in which MNEs feel safe and comfortable in terms of doing business should be able to attract more FDI (Bayraktar, 2013). However, most existing empirical works on the flow of FDI have concentrated on macroeconomic factors such as inflation rate, exchange rate, GDP per capita income and other institutional variables without considering the immediate investment climate (See Lipsey,1999; Charkrabarti,2001, Asiedu,2002). This section presents the results for the estimates of the business environment indicators. The section is organised into three subsections. In the first subsection, I run the analysis using the traditional determinants of FDI without including the business environment indicators. In the second subsection, I present the aggregate business environment indicator results. In the third subsection, I present results for individual measures of business Environment. Finally, I offer some robustness checks by using individual business environment indicators from different sources to test for the stability of my results.

5.5.1 Traditional determinants of FDI

Table 5.5 shows the results using the preferred model's estimation results from the PPML model alongside the Least Square Dummy variable approach. Column [1-3] is estimated with the LSDV model and the last three columns [3-6] are estimated with the Poisson Pseudo Maximum Likelihood Estimator. I have included country fixed effects to control for country heterogeneity and year fixed effects to control for structural breaks in the flows of FDI over time. The results suggest that financial openness plays a significant role in determining the location of FDI in both PPML and LSDV estimators. In column 3, FDI inflows increase by 0.021% and 0.008% for a unit increase in financial openness with the LSDV and PPML models. When I compare the LSDV model coefficient with my preferred PPML model, there is consistency in the significance level. The LSDV models' financial openness coefficient is slightly higher than the preferred PPML estimator. The differences in the size of the coefficients support the argument that the LSDV with log-linearised FDI inflows overestimates the impact of financial Openness on FDI. The PPML, according to Silva & Tenreyro (2006), produce a robust estimate in the presence of heteroscedasticity. There is evidence that financial openness plays a significant impact in FDI flows. The positive effect of financial Openness on FDI is not undisputed in the literature, Gastanagaet al. (1998), Desai et al. (2002) and Mody and Murshid (2002). The results are stable through the two estimators but slightly higher in the LSDV

model financial globalisation's role in FDI inflows is documented in the literature, and it was the hallmark of African Economies after the failure of Structural adjustment programmes (Lall, 1995). In the 1990s, SSA countries became open to the rest of the world as recommended by the Economic Recovery Programme (ERP). Most of the countries in the region-initiated policies to attract more capital flows. Policies such as the openness of capital accounts became common during the era of the ERP (Asiedu, 2002; Morrisset,2000).

Trade Openness has a significant impact on FDI flow into the host country. Countries that are open in terms of trade and have the least amount of trade restrictions for domestic and foreign investors to trade across borders stand a chance to receive more FDI. A 1% increase in trade size increases FDI inflows by 0.002% when only country effects enter the LSDV model but not when full fixed effects are controlled in column 3. Trade openness retains its significant impact on FDI inflows in column 6 when the PPML model is applied even though the estimate is smaller than LSDV estimates. The results are consistent with the works of Liargovas and Skandalis (2011) and Sekkat and Veganzones-Varoudakis (2007). It does not matter the intention of the FDI inflows; foreign investors prefer countries where goods and services are free to move across borders without any impediments. For example, export oriented FDI may need countries with fewer trade restrictions to export goods to their host countries.

I find no significant relationship between GDPs per capita growth and FDI. The result is intriguing because the intuition is that higher domestic income growth spurs demand for goods and services, making the host country more attractive for FDI (Jaiblai and Shenai, 2019). However, this line of reasoning may not always hold given the different FDI motives. For example, a resource seeking investor may not be worried about the growth rate of income level of the host country. Therefore, some developing countries in Africa continually receive more significant foreign direct investment than a good performing country due to differences in resource endowment. Therefore, I argue that the impact of GDP per capita on FDI inflows will also depend on the motive of the investment in the host. For example, efficient seeking FDI may negatively respond to GDP growth. Higher GDP growth will mean that the cost of inputs, especially labour, will be higher, which may drive away foreign investors.

Socio-Political risk, as used in the study, refers to those factors associated with political instability and conflict. FDI embodies financial resources, so investors are careful in choosing a country to invest. Countries known for political unrest may not receive their total share of global investment. A volatile country may look unsafe for foreign investors, giving the tendency for them to lose their investment either

through conflict or expropriation. From table 3.4, the impact of conflict on the flow of FDI is negative and significant in the PPML model. A volatile country drives away foreign direct investment (Kolstad and Tøndel 2002). The results are expected due to some historical cases of conflicts and political unrest in the region. Polity2, a measure of democracy, shows that foreign investors are highly sensitive to democratic institutions. Fundamental democratic rights, like civil liberties and political rights and institutional democracy, matter to multinationals operating in developing countries. The argument is that democratic institutions lead to lower levels of country risk (Jensen, 2008). Democratic countries stand the chance of maintaining economic and policy stability, a prerequisite for a business to thrive. Thus, multinationals will enter foreign markets with some guarantees that economic policies will not change radically after entry. This result is in line with the findings by Busse and Hefeker (2007) Harms and Ursprung (2002), Jensen (2003) and Busse (2004). They showed that fundamental democratic rights are positively associated with FDI inflows, even if the specifications of their models differ.

Inflation is another traditional measure of macroeconomic instability in the FDI determinants. Asiedu and Lien (2010) used inflation to capture the level of macroeconomic uncertainty. Consistent with the literature, I find a negative correlation between inflation and FDI inflows. High macroeconomic uncertainty reduces FDI inflows, even though the magnitude is zero.

Moreover, Macroeconomic volatility is a common characteristic of many African economies. Using the inverse of income Per capita as a proxy for returns on investors capita, Jespersen, Aylward, and Knox (2000) and Asiedu (2002) found that the inverse of real GDP per capita is related to FDI/GDP. The high correlation between returns on investors' capita and GDP per capita necessitates the need to analyse how GDP growth instability affects the inflows of FDI into the host country. The results in my preferred model in column 6 reveal that FDI inflow is more sensitive to growth volatility as captured by the GDP per capita growth volatility. The impact of growth volatility is consistently significant across different specifications and models. A 1% standard deviation increase in GDP growth volatility reduces FDI inflows by 0.012% all fixed effects are controlled. The results presuppose that investor may not only prefer higher GDP growth but stable GDP growth. Frequent fluctuation in host country GDP may signify uncertainties around economic activities and the incomes of the host country. Business cycles have a significant impact on the overall investor and consumer confidence. GDP growth volatility is a common feature of most African economies but missing in most FDI determinants literature. For example, the Democratic Republic of Congo is the most unstable country regarding GDP growth in the sample. The government has recorded 30

years of negative GDP per capita growth, affecting their FDI over the past years.

In column 6, I find no significant relationship between resource rent and FDI inflows when full set of fixed effects are controlled. Most FDI in Africa is believed to be resource seeking Dupasquier and Osakwe (2006) and Aseidu, 2002). The results contrast with Asiedu (2006) and Kinoshita & Campos (2003), who found that natural resources influence FDI flow positively possibly explained by differences in the time-periods and methods used.

The connection between aid and FDI is debatable, and research results remain inconclusive. Consistent with Harms and Lutz (2006) and Karakaplan, Neyapti, and Sayek (2005), I find a negative relationship between aid and FDI in all forms of specifications in the LSDV model but not when the PPML is employed. A 1% increase in foreign aid replaces 0.007% FDI inflows. Countries FDI inflows may reduce if foreign donors begin to fund capital infrastructure projects rather than human capital investment. According to Selaya and Sunesen (2012), aid used to finance complementary inputs like public infrastructure and human capital investment increases the marginal productivity of capital. However, aid in pure capital infrastructure projects crowd out private investment. It is easy to believe that aid and FDI plays a complementary role however the impact of aid on FDI depends on the type of aid. Traditionally, SSA countries have been the biggest recipients of aid (worldbank, 2019) and this could be a potential cause for the low amount of FDI received in the region.

Table 5. 5: Traditional determinants of FDI

	POLS	POLS+Country FE	POLS+Country FE	PPML	PPML+Country FE	PPML+Country +Time FE
Financial Openness (index)	0.025***	0.025***	0.021***	0.009***	0.007***	0.008***
	(0.007)	(0.007)	(0.005)	(0.001)	(0.002)	(0.002)
Trade index	0.008**	0.008**	0.004	0.001	0.002*	0.002*
	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)
GDP per capita growth	0.010	0.010	0.005	-0.001	0.003	0.000
	(0.010)	(0.010)	(0.009)	(0.005)	(0.004)	(0.004)
Conflict	-0.406***	-0.406***	-0.107*	-0.253***	-0.052*	-0.018
	(0.059)	(0.059)	(0.062)	(0.017)	(0.029)	(0.029)
Inflation	0.009	0.009	0.008	0.010***	0.005	0.004
	(0.011)	(0.011)	(0.010)	(0.003)	(0.004)	(0.004)
GDP volatility	-0.068***	-0.068***	-0.034**	-0.003	-0.016***	-0.014***
	(0.021)	(0.021)	(0.015)	(0.004)	(0.004)	(0.004)
Resource rent	0.002	0.002	-0.015	0.010***	0.001	-0.004
	(0.008)	(0.008)	(0.010)	(0.001)	(0.003)	(0.004)
Foreign Aid	-0.036**	-0.036**	-0.020**	0.005***	-0.003	-0.003
	(0.017)	(0.017)	(0.008)	(0.002)	(0.003)	(0.002)
_cons	4.102***	4.102***	3.638***	-0.342***	0.201	0.243
	(0.441)	(0.441)	(0.364)	(0.057)	(0.222)	(0.222)
N	479	479	479	499	499	499
R^2	0.09	0.77	0.84	0.30	0.57	0.61

* $p < .10$, ** $p < .05$, *** $p < .01$

5.5.2 FDI Determinants with business environment

In table 5.6 below, the aggregate business freedom index is added to the traditional determinants of the FDI model. The business freedom index measures the overall effectiveness of government in regulating business. The variable measures the state of African business environment. In columns 5 and 6, business freedom index attracts more FDI into SSA countries. When business freedom increases in host countries, FDI inflows increase. Ghazalian and Amponsem (2018A) find a similar result by employing the Heritage Foundation and the Frazer institute indices of economic freedom. They found that economic freedom and its sub-components positively impact FDI inflows. It is important to note that business environment indicators affect foreign investors at the initial investment stage, and others stay with the investor until it exits the business. The transmission mechanism through which the business environment affects FDI inflows is through the reduction (increase) of direct and indirect costs of starting a business in host countries. Africa's performance in creating a conducive business environment has been slow compared to some western countries. The sign and level of significance of the traditional determinants remain the same when the business freedom index is added to the baseline model. The Business freedom index is derived from measurements relating to the difficulty of starting, operating, and closing a business. The business freedom indicator is measured on a scale ranging between 0 and 100, with 100 corresponding to the freest business environment. An improvement in the sub-components means country stand the chance of receiving more FDI.

Table 5. 6: FDI determinants with Business Environment

	POLS	POLS + Country FE	POLS + Country FE + Year FE	PPML	PPML + Country FE	PPML + Country FE + Year FE
Business Freedom index	0.012	0.014	0.024**	0.002	0.006**	0.006***
	(0.011)	(0.012)	(0.009)	(0.002)	(0.002)	(0.002)
Finance Openness	0.027***	0.030***	0.020***	0.008***	0.008***	0.009***
	(0.007)	(0.007)	(0.006)	(0.001)	(0.002)	(0.002)
Trade	0.008***	0.009***	0.004	0.001	0.002*	0.002**
	(0.003)	(0.003)	(0.003)	(0.001)	(0.001)	(0.001)
GDP growth rate	0.009	0.009	0.015*	0.004	0.008*	0.005
	(0.011)	(0.010)	(0.008)	(0.005)	(0.004)	(0.004)
Conflict	0.032	-0.054	-0.074	-0.046***	-0.045***	-0.035*
	(0.079)	(0.097)	(0.087)	(0.013)	(0.017)	(0.020)
Inflation	0.010	0.010	0.015	0.009***	0.007*	0.006
	(0.013)	(0.013)	(0.012)	(0.003)	(0.004)	(0.004)
Volatility	-0.057**	-0.057**	-0.031	-0.005	-0.016***	-0.013**
	(0.023)	(0.025)	(0.020)	(0.006)	(0.006)	(0.006)
Resources rent	0.002	-0.005	-0.016	0.012***	-0.000	-0.005
	(0.008)	(0.010)	(0.010)	(0.002)	(0.004)	(0.004)
Foreign Aid	-0.053**	-0.049**	-0.027*	0.008***	-0.001	-0.001
	(0.024)	(0.023)	(0.017)	(0.002)	(0.005)	(0.005)
Constant	3.500***	3.892***	2.652***	-0.425***	0.003	-0.149
	(0.694)	(0.524)	(0.481)	(0.096)	(0.223)	(0.226)
N	460	460	460	470	470	470
R^2	0.12	0.75	0.84	0.30	0.57	0.61

Note: Business freedom index measures the overall effectiveness of government regulating business. The quantitative index is derived from measurements relating to the difficulty of starting, operating, and closing a business. $^{*} p < .10,\ ^{**} p < .05,\ ^{***} p < .01$

5.5.3 FDI Determinants with individual business environment variables

In this sub-section, I expand the aggregate measures of Ease of doing business to include time require to obtain an operating license, time to build a warehouse, time to register a property and an institutional based variable (regulatory quality). Each of these indicators enters the models separately to avoid the high correlation between some of these indicators.

Starting with days to start a business, I find no significant relationship between FDI and days to start a business. In column [2], there is a positive relationship between regulatory quality and FDI inflows. Investors are attracted to quality regulatory institutions. "Regulatory quality captures perceptions of the ability of the government to formulate and implement sound policies and regulations that permit and promote private sector development" (WDI,2020). An improvement in the regulatory system increases FDI inflows. Regulatory quality impacts FDI inflows no matter the intention of the FDI. A good regulatory environment reduces risks for multinational investors, specifically by lowering bureaucratic institutional powers. Countries with good regulatory bodies reduce the propensity of corruption and business uncertainty. Foreign Direct investment increase by 0.017% for a unit increase in regulatory quality. Investors are concerned with regulatory quality because it impacts their activities from entry until they exit. Unlike time spent to start a business that only affects investors when starting a business, regulatory quality affects the investor throughout the investment's life cycle; hence, it's a highly prioritised indicator for the investor when deciding where to invest.

Less FDI flows to countries where investors must spend many days before they can receive operating permit to start production. Investors' sensitivity to this variable is high because spending many days before receiving an operating license increases the cost of starting a business. Investors who try to get an operating permit within a shorter period may have to pay a bribe before getting their active licenses. FDI inflows to Africa fall by 0.011% when firms spend additional days to receive operating permits.

In column [4], the number of days spent building a warehouse in the host country is added to the model. Building a warehouse may not only involves the days spend to put up the structure but may include the number of days spend to receive the building permit and the number of days spent registering the property. Host countries where investors spend a lot of days to build a warehouse for reasons of poor infrastructure, corrupt institutions can affect

their operations, which may deter investors. The results reveal that FDI inflows reduce by 0.001% when investors spend additional day on building a warehouse.

From column [5], I include time require to register a property into the model. The results suggest that spending additional day to register a property like land deters foreign investors, hence a fall in foreign direct investment flows. This result is expected in developing region like sub-Sahara Africa, where investors go through a lot of hassle to get a property registered due to poor institutions and corruption. The results are consistent with the works of (Bayraktar, 2013) who finds business environment Projects into the host country. New investors begin to form a wrong perception about the institutional quality of the host country. Such a false perception about the host country may reduce new investment flowing into the host country. Spending many days registering a property may not deter investors who are already operating in host country, but it has a considerable impact on new investors who are planning to locate their investment.

Table 5. 7: Determinants of FDI with individual business indicators

	Start Business	Regulation	Permit	Warehouse	Property
Financial Openness	0.008***	0.008***	0.016***	0.006***	0.006***
	(0.002)	(0.002)	(0.005)	(0.002)	(0.002)
Trade Openness	0.009***	0.010***	-0.001	0.009***	0.009***
	(0.002)	(0.002)	(0.003)	(0.002)	(0.002)
GDP Per capita Growth	0.005	0.002	-0.031**	0.002	0.005
	(0.004)	(0.004)	(0.014)	(0.004)	(0.004)
Conflict	-0.024	-0.026	-0.089	-0.014	-0.003
	(0.021)	(0.018)	(0.060)	(0.023)	(0.021)
Inflation	-0.002	-0.001	0.030***	-0.002	-0.003
	(0.003)	(0.003)	(0.008)	(0.004)	(0.003)
Volatility	-0.013***	-0.016***	0.011	-0.013***	-0.015***
	(0.005)	(0.004)	(0.013)	(0.005)	(0.005)
Resource rent	-0.005	-0.004	0.065***	-0.005	-0.004
	(0.003)	(0.003)	(0.014)	(0.004)	(0.004)
Foreign Aid	-0.004	-0.005*	-0.021**	-0.005*	-0.005*
	(0.003)	(0.003)	(0.009)	(0.003)	(0.003)
Business Environment	-0.001	0.209***	-0.011***	-0.001***	-0.001**
	(0.001)	(0.081)	(0.003)	(0.000)	(0.000)
_Constant	0.144	-1.346***	-1.828***	0.434**	0.120
	(0.177)	(0.223)	(0.635)	(0.190)	(0.172)
N	523	528	66	473	499
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.62	0.63	0.87	0.62	0.61

Note- Start Business, is the number of days it takes a multinational company to get into full operations in Africa. Regulation refers to the state of African regulatory bodies. Permit is the number of days it takes to obtain operating permit in Sub-Sahara Africa. Warehouse measure the number of days it takes to build a complete warehouse. Property measures the number of days it takes to register a property. Standard errors in parentheses. $^*p < .10$, $^{**}p < .05$, $^{***}p < .01$

5.5.4 FDI determinants by geographic region

Total inflows of FDI into various economic regions have differed significantly over the past 50 years. The differences observed in FDI flows across the regions signify the uniqueness of domestic investment conditions and the host countries' policies towards foreign investment. From figure 5.6 average FDI inflows into the Southern African regions have been consistently high since the 1970s to the late 2000s. South Africa, the second to Nigeria biggest economy in Sub Sahara Africa, is in the southern African region. The region has recently experienced a series of political unrest, which could be one of the reasons for the sharp decline in FDI inflow. FDI into the Western sub-region has gained momentum over the past decade, although FDI inflows are below the total regional average. FDI inflows plunge into negative in the middle of the 1980s in the West African sub-region. The period is associated with the IMF structural adjustment program, which demanded domestic countries in the region to concentrate on debt repayment rather than attracting more capital flows. Countries became net lenders to the rest of the world, and domestic policies were geared towards reducing debt (Lall, 1995). Central Africa and Eastern Africa have been on a good FDI growth trajectory. The recent improvement in the economic structures in Rwanda, Ethiopia and Kenya contributes to growth in FDI inflows in Eastern Africa. The surge in FDI inflows in Central Africa may be attributed to the massive volume of natural resources discovered in the region.

Figure 5. 6 Regional FDI inflows
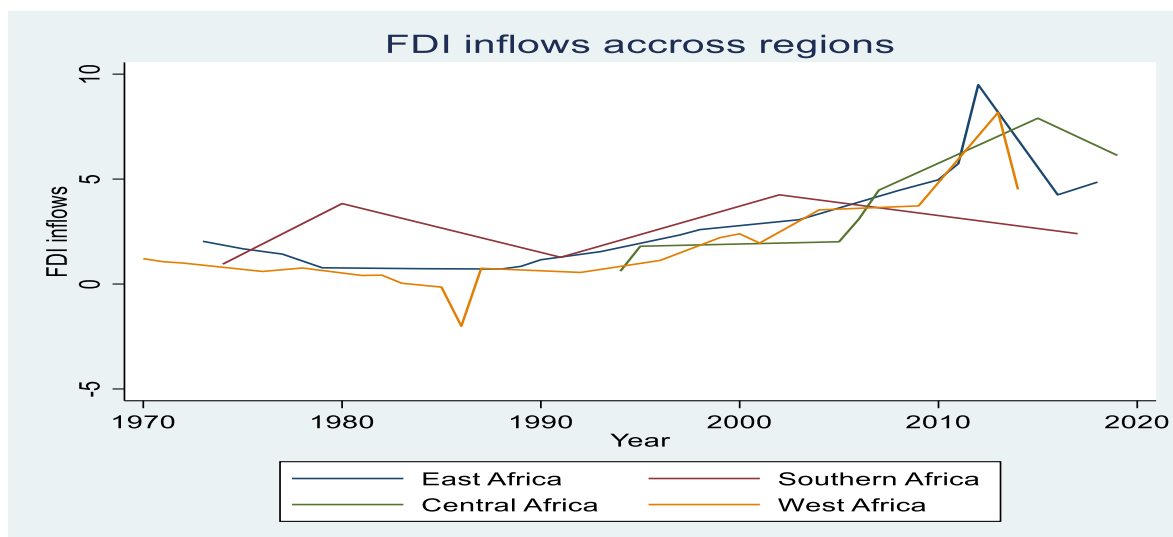
In table 5.8 below, regional analysis has revealed interesting results worth considering. Column 1 presents the results for the Eastern and Southern African countries. The region contains some of the poorest countries in Africa, e.g.South Sudan, Eritrea and Burundi. Central Africa shares standard features with East Africa regarding regional diversity and low economic performance. The results reveal that business environment proxied by days to start a business deters FDI inflows in eastern and Central Africa but not in the West African

region. Regulatory quality plays a significant impact on the flow of FDI in the East, Southern and Western Africa.

Table:5. 8: Business environment and FDI; Regional analysis

	East& South Africa	Central Africa	West Africa
Start business	-0.008***	-0.004***	0.000
	(0.001)	(0.001)	(0.001)
Reg Quality	0.218**	-0.168	0.259**
	(0.098)	(0.346)	(0.114)
Finance Openness	0.010***	0.001	0.009***
	(0.003)	(0.007)	(0.003)
Trade	0.002**	0.000	0.006***
	(0.001)	(0.004)	(0.002)
GDP per capita growth	-0.002	0.013	0.010**
	(0.008)	(0.011)	(0.004)
Conflict	-0.032	-0.089**	-0.016
	(0.030)	(0.035)	(0.067)
Inflation	0.005	0.027**	0.005
	(0.005)	(0.011)	(0.006)
GDP volatility	-0.016*	0.034**	-0.014**
	(0.009)	(0.014)	(0.006)
Resource rent (%GDP)	0.006	0.002	-0.013***
	(0.008)	(0.009)	(0.003)
Foreign Aid (%GNP)	-0.016***	0.001	-0.003
	(0.006)	(0.005)	(0.002)
Constant	-0.909***	0.591	-0.638**
	(0.277)	(0.548)	(0.295)
N	162	72	214
R^2	0.79	0.69	0.74
Country effects	Yes	Yes	Yes
Year FE	Yes	Yes	Yes

Standard errors in parentheses
* $p < .10$, ** $p < .05$, *** $p < .01$

5.5.5. Robustness checks

In this subsection, I investigate the robustness of my results. In the first part of the robustness checks, I test whether my results remain same when using different FDI measures. I use FDI stock as the dependent variable instead of FDI inflow. Secondly, I investigate the robustness of my results by using different measures of business environment. I include the Fraser institute of economic freedom measure (EFW), Legal and property rights, Government effectiveness, Government integrity and freedom to trade internationally.

5.5.6 Using FDI stock as Dependent Variable

The role of Business environments in attracting FDI inflows remain significant when FDI stock is used. The negative impact of starting Business variable on FDI stock is not undisputable. Even though starting business indicators may be more sensitive to new inflows of FDI coming in, it may also negatively impact the available stock of FDI through its impact on reinvestment, especially when firms want to integrate vertically. From columns [1-3], regulatory quality plays a significant role in determining FDI   location. Foreign Direct investment stock increased by 0.7% for a unit increase in regulatory rate. The impact and significance of regulatory quality are higher than starting business indicators. The results are not different when FDI inflows are used instead of stock, an indication of the robustness of my results.

Table 5. 9:**Determinant of FDI using FDI stocks**

	PPML	PPML+Country	PPML+Country+Yea
StartBusiness	0.002	-0.010***	-0.003***
	(0.002)	(0.001)	(0.001)
RegQuality	0.380**	-0.330*	0.659***
	(0.174)	(0.195)	(0.180)
Finance Openness	0.009*	0.012***	0.002
	(0.005)	(0.004)	(0.004)
Trade (Koff)	-0.015***	0.009***	0.014***
	(0.005)	(0.003)	(0.003)
GDP Per capita	-0.052***	0.001	0.007
	(0.020)	(0.007)	(0.006)
GDP volatility	-0.082**	0.019	0.018**
	(0.037)	(0.015)	(0.009)
Inflation	0.117***	0.031***	-0.002
	(0.019)	(0.010)	(0.010)
Conflict	0.177***	-0.051	0.062
	(0.038)	(0.049)	(0.042)
Resource Rent	0.032***	-0.005	0.002
	(0.006)	(0.005)	(0.004)
Aid	-0.145***	-0.047**	-0.018*
	(0.022)	(0.020)	(0.010)
Constant	9.6***	9.2***	9.13***
	(0.400)	(0.324)	(0.283)

Observations	560	560	560
R²	0.41	0.94	0.95

Standard errors in parentheses * $p < .10$, ** $p < .05$, *** $p < .01$

In each column of table 5.9, I include different measure of business environment indicator into the model. In the first column, economic freedom of the world enters the model independently. It is observed that, economic freedom attracts more FDI. In column [2] I include Government Integrity into the model. Government Integrity measures the state whereby a government is devoid of such practices as corruption, nepotism, and bribery (Heritage Foundation,2022). Raising government integrity by a unit point increase FDI inflows by 0.008%. Foreign investors prefer to invest in countries where domestic governments are less subject to bribery and corruption.

In a pure market economy, the ability for private firms and investors to accumulate wealth is very important. In column, [3] I include an indicator for property rights and legal system of the host country. The ability of private investors to freely enforce contracts is crucial to the success of every business. Legal and Property rights have positive impact on the flow of FDI. Countries with a robust legal system which can protect property rights and enforced contracts are likely to receive more FDI. Government trade restrictions ranges from tariffs, export taxes outright trade bans and trade quotas. Such restrictions affect the foreign investors no matter the intention of the investment. In column [4] the freedom to trade internationally, has a positive impact on the flow of FDI. Trade restrictions impede overall economic efficiency and raise cost for both individuals and businesses. Countries where such trade restrictions are less attracts more FDI. The quality of public services, and the freedom of the civil service to act independently from any political interference is very important for the foreign investor in deciding where to invest. An effective government is independent from any political interference. The results show that, FDI flows to countries where there is such effective public service.

Table 5.9 1: Determinants of FDI with different measures of Business environment

	Economic freedom	Gov Integrity	Legal Property rights	Freedom trade	Gov effectiveness
Finance Openness	0.009***	0.008***	0.008***	0.008***	0.009***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
Trade	0.002**	0.002**	0.002**	0.002*	0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
GDP per capita growth	0.004	0.005	0.003	0.004	-0.001
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Conflict	-0.022	-0.024	-0.013	-0.016	-0.018
	(0.019)	(0.020)	(0.019)	(0.020)	(0.019)
Inflation	0.008*	0.005	0.007*	0.006	0.005
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
GDP volatility	-0.009	-0.012**	-0.010*	-0.010*	-0.014***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.004)
Resource rent	-0.003	-0.006	-0.004	-0.004	-0.004
	(0.004)	(0.004)	(0.004)	(0.004)	(0.004)
Foreign Aid (%GNP)	-0.003	-0.002	-0.004	-0.003	-0.003
	(0.004)	(0.005)	(0.004)	(0.004)	(0.002)
Business Env.	0.125**	0.008***	0.117***	0.102***	0.157*
	(0.075)	(0.003)	(0.036)	(0.039)	(0.086)
Constant	-0.479	-1.043***	-0.852***	-0.357	-0.925***
	(0.421)	(0.197)	(0.264)	(0.302)	(0.198)
N	429	470	429	429	482
Country FE	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
R^2	0.59	0.61	0.60	0.59	0.62

Robust Standard errors in parentheses $^*p < .10$, $^{**}p < .05$, $^{***}p < .01$

5.6 Conclusions and policy prescriptions

The main objective of the chapter is to analyse the role of the domestic Business environment on the flow of FDI in Sub Sahara Africa. In other to achieve this, the study utilises the World Bank ease of doing business indicators, which measures the direct and indirect cost of starting a Business in Africa. I use an up-to-date dataset from the world Bank ease of doing business indicators to examine how ease of doing business impact the flow of FDI. The PPML estimates suggest that aggregate ease of doing business measured by Business freedom and its subcomponents have a significant impact on the flow of FDI. Countries where multinational companies spend a lot of days to have their business in operations, deter subsequent FDI inflows. The institution component of the investment environment also plays a positive impact on the flow of FDI. Countries with good regulatory bodies stand the chance of receiving more FDI. The results are stable when I use different measures of the business environment. In the analysis, I use the time required to receive an operating license, time to build a warehouse and time to register a property, and they support my findings that a poor investment climate deters investment. The results are robust when the stock of FDI is used as the dependent variable.

To provide more insights, I group African countries by their geographical region. The regions are Eastern and Southern Africa, West Africa, and Central Africa. The findings confirm that the impact of staring business is pronounced in the southern. I control for some explanatory variables, and the noticeable result is the impact of trade openness, foreign aid, and financial openness on the flow of FDI. Trade openness and financial openness have a positive and significant impact on FDI inflows. The negative impact of conflict on the flow of FDI in Africa is striking. Countries known for conflict may not receive the full share in FDI. The negative impact of conflict on the flow of FDI suggests that in the absence of cross border investment insurance, countries known for instability may not receive the full amount of FDI. The findings suggest foreign aid replaces FDI. Foreign aid with the intention of building economic structures may reduce FDI, and aid aimed at building the social institutions may increase FDI inflows. Hence the impact of aid on the FDI depends on the sector the aid is supporting. The negative impact of conflict on FDI inflows necessitates the need for the government of developing countries to provide Political risk insurance, which can cover possibilities, such as acts of civil unrest or insurrection and even acts of terrorism and war.

From the above findings, the policy recommendations are for African countries to build a resilient business environment. Building institutions capable of speeding up business start-ups process. African countries must switch all business start-up processes online to avoid all bureaucratic bottlenecks in the traditional public sector. A good example is Ghana which has started the electronic port clearing system, where goods clearing at the port are done electronically to avoid delaying at the harbour. Building good institutions is tantamount to making the investment climate friendly. Secondly, the government of African countries must

put in a place cross border investment insurance scheme. This insurance scheme will assure foreign investors that their investment will not suffer losses emanating from political instability. Most countries in Africa may not be able to insure such huge foreign investment. However, the African Union could manage such insurance. Moreover, African countries need a joint industrial policy. Such policy will help in determining the type of foreign investment Africa needs at different growth stages. Moreover, business environment is a crucial aspect towards attracting future FDI. Therefore, monitoring the FDI effects of the various sub-categories of the business environment and their associated rankings is important to ensure that the sub-Saharan African countries continue their progress (without slippage in the rankings) towards achieving a more open and friendly environment for the conduct of business.

Appendix 5A: Number of years a country experience negative GDP growth.

Country code	Growth		
	Positive growth	Negative growth	Total
COD	20	30	50
CIV	22	28	50
MDG	24	26	50
NER	24	26	50
BDI	25	25	50
TCD	25	25	50
ZWE	25	25	50
MRT	26	24	50
COG	27	23	50
GMB	27	23	50
GAB	29	21	50
TGO	29	21	50
ZMB	29	21	50
AGO	30	20	50
CAF	30	20	50
ZAF	31	19	50
NGA	32	18	50

Country code	Positive growth	Negative growth	Total years
SEN	32	18	50
NAM	33	17	50
BEN	34	16	50
KEN	34	16	50
MLI	34	16	50
SEY	34	16	50
SLE	34	16	50
GNB	35	15	50
MWI	35	15	50
SDN	35	15	50
BFA	36	14	50
RWA	36	14	50
CMR	38	12	50
ETH	38	12	50
LSO	38	12	50
MOZ	40	10	50
SOM	40	10	50
EST	41	9	50
GHA	41	9	50
LBR	42	8	50
CPV	43	7	50
BWA	44	6	50
GIN	46	4	50
TZA	46	4	50
UGA	46	4	50
MUS	48	2	50
Total	1458	692	2150

Appendix 5B: Number of years a country recorded zero (0) FDI.

Countrycode	Zero FDI inflows		
	F	T	Total
BDI	28	22	50
ETH	37	13	50
SDN	38	12	50
UGA	42	8	50
CPV	43	7	50
ZWE	43	7	50
BEN	44	6	50
BFA	45	5	50
TCD	45	5	50
COD	46	4	50
GNB	46	4	50
MDG	46	4	50
GIN	47	3	50
LSO	47	3	50
SOM	47	3	50
ZAF	47	3	50
BWA	48	2	50
CMR	48	2	50
KEN	48	2	50
MLI	48	2	50
MRT	48	2	50
MWI	48	2	50

NAM	48	2	50
RWA	48	2	50

TGO	48	2	50
TZA	48	2	50
CAF	49	1	50
EST	49	1	50
GAB	49	1	50
GHA	49	1	50
SEN	49	1	50
SLE	49	1	50
AGO	50	0	50
CIV	50	0	50
COG	50	0	50
GMB	50	0	50
LBR	50	0	50
MOZ	50	0	50
MUS	50	0	50
NER	50	0	50
NGA	50	0	50
SEY	50	0	50
ZMB	50	0	50
Total	2015	135	2150

Chapter 6: Location choice of Chinese investment in Africa

6.1 Introduction

The rising trends of China's direct investment in Africa has prompted much attention on the role of Chinese FDI for African performance. Over the last two decades, China has been cooperating with African governments mainly through investment treaties and bilateral trade agreements (Abodouhui et al., 2018) and is aiming to become Africa's largest partner. Historically, China's relations with Africa date back to the 15th century, but African Chinese ties tended to be informal until recently (Mlambo et al., 2016). China's active and formal relations with Africa began in the early 1950s when Yat-sen fortified its power and established active policies to enter contracts with Africa (Stein, 2021). Chinese foreign direct investments increasingly play an important role in Africa's economic performance. China's FDI inflows to Africa support incomes, trade, and a strengthened industrial economy. FDI inflows also enhance the development of soft infrastructures such as technology and facilitates capacity building and knowledge transfer. Chinese investment in Africa infrastructure development cannot underestimated. Whalley and Weisbrod (2012) and Doku et al. (2017) have therefore postulated a positive relationship between Chinese investment and Africa economic growth.

After successful economic liberalization, China became an open market economy where relations with Africa reflected a comparative advantage paradigm. China's presence in Africa mainly in the form of trade and FDI. For example, China's trade with Africa increased substantially from 2005 onwards (Stein, 2021). Similarly, China's foreign direct investment in Africa has risen sharply as part of the Forum on China-Africa Co-operation (FOCAC), which came into existence in 2000. Figure 6.1 shows Chinese FDI flows to Africa have steadily increased over the last two decades, rising from a low base in 2003 to peak levels in 2007 and 2018 before tapering off in tandem with the financial crisis of 2007 and, more recently, the global pandemic. By comparison, the U.S recorded peak FDI flows to Africa in 2008, after which the downward spiral has led to zero and even negative flows in more recent years.

Figure 6. 1 Chinese FDI vs USA FDI to Africa

Source: U.S. Bureau of Economic Analysis.

Figure 6.2 shows the sectorial investment patterns of Chinese investment in Africa. New Chinese investment projects tend to go into the mining and manufacturing sectors. Similarly for projects aimed at expanding existing investments tends to come in with higher values. Investment in supporting industries has been growing over the years due to firms' desire to vertically integrate. Co-location refers to the same firm investing into the same location in a dissimilar enterprise (e.g., company A investing in distribution centre to support an existing manufacturing plant). Such supporting projects goes into the manufacturing and service sector. From a sectoral perspective, many manufacturing projects come in the form of expansion of existing projects and, to a lesser extent, in the form of new projects. The manufacturing sector has also received a significant number of new projects. Chinese construction projects in Africa are entirely based on new projects partly reflecting cheaper cost structure in Africa.

Figure 6. 2 Sectorial breakdown of FDI
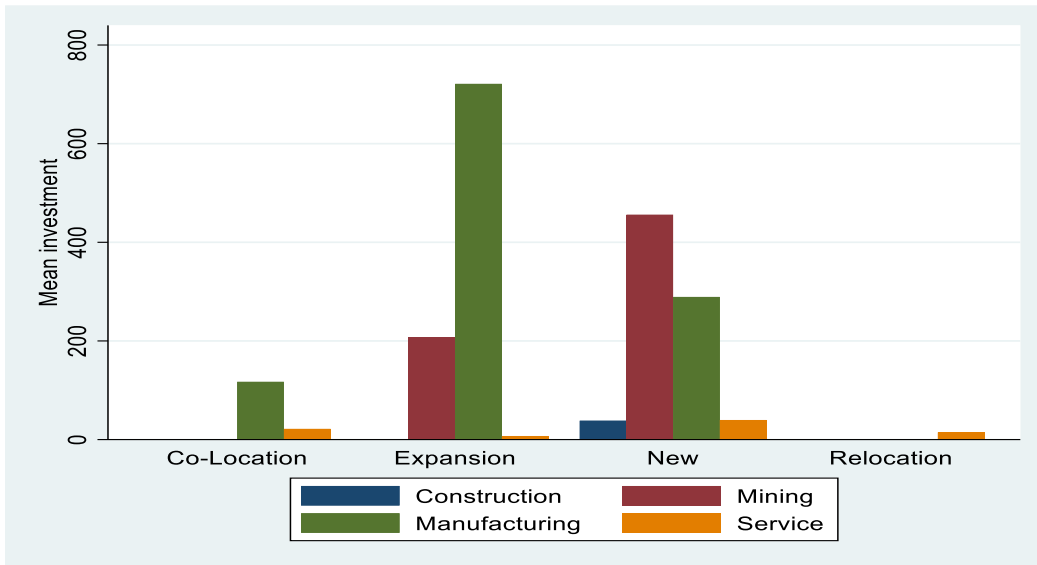
Source: Own calculation from Orbis cross border investment)

Although China has established FDI relations with almost all African countries. Table 6.1 shows that the key African recipients of China's FDI in 2019 include six countries which accounted for 49.1% of total Chinese FDI flow to Africa. Top of the rankings is South Africa, receiving the highest share (13.8%) of total Chinese FDI to Africa, followed by DR Congo which received 12.5% while Angola, Zambia, Ethiopia, and Ghana received less than 7%

Table 6. 1Main recipients of Chinese FDI (USD billion, 2019)

Country	Total stock, in USD billion	Percent of Chinese FDI in Africa
South Africa	6.1	13.8 %
DRC	5.5	12.5 %
Angola	2.9	6.5 %
Zambia	2.8	6.5 %
Ethiopia	2.5	5.6 %
Ghana	1.8	4.1 %
Total six countries	**21.6**	**49.1 %**

Source: U.S. Bureau of Economic Analysis

Despite the current significance of Chinese investment in Africa's economy, the factors that attract Chinese companies to invest in Africa have not been extensively studied. Consequently, the empirical literature on the determinants of Chinese investment in Africa is scanty. The Paucity of bilateral investment data between China and Africa partly contribute to the scarcity of studies on the determinants of Chinese FDI investment in Africa. In this chapter I contribute to the current debate vis-à-vis the host country characteristic which attract or deters Chinese investors by utilising a bilateral Chinese data from the Orbis database. To the best of my knowledge, this is the first study to employ binary choice estimator to model the decision of chines investors

in Africa. The chapter again contributes to the ongoing debate by performing a sectorial analysis. The aim of such sectorial analysis is to understand how the factors that influence Chinese investment decisions varies according to sectors. The literature on location choice has ignored the linkage between new investment and existing projects. The decision by a company to invest in a country or sector may be influenced by the amount or number of existing projects in the country or sector. I solve this problem by controlling for initial level of Chinese investment.

Against this background, the chapter aims to investigate the location choice of Chinese FDI in Africa. To achieve the objective of this study, I use panel data on 262 projects from China to Africa over the period 2013-2021. I arrange the rest of the chapter as follows: Section 6.2 offers an in-depth review of existing literature on Chinese FDI determinants in Africa. Section 6.3 outlines the empirical framework, Section 6.4 describes the datasets used in the study, Section 6.5 discusses the estimation results, and Section 6.6 summarises the findings and presents policy implications.

6.2 Literature review

The rising importance of China's FDI flows to Africa has focused increasing attention on the bilateral determinants of FDI. The factors which Chinese investors consider before choosing African country and sector as their investment destination remains important in the economic literature. The literature on the determinants of Chinese FDI to Africa links China's internalization strategy to factors relating to theories proposed by Dunning about the location decision of Multinational companies (2000; Faeth, 2009). There are multiple theories and models proposed for analyzing the determinants of foreign direct investment, including internalization theory, neoclassical theory of trade, risk diversification models, aggregate variables, policy related theories (Buckley and Casson, 1976: Faeth, 2009: Abodohui et al., 2018). These theories form the general underpinnings of the Ownership location and internalisation (OLI) paradigm determinants of FDI by Dunning. According to Hurst (2011), these general theories of FDI decisions are aimed at overcoming imperfect external markets by internalizing operations until costs exceed benefits.

The existing literature has extensively adopted the eclectic paradigm theory of Dunning (2000) to help explain the determinants of China's FDI to Africa. The eclectic paradigm holds the view that Chinese MNEs invest in regions where they can exploit their ownership, locational, and internalization advantages (Abodohui et al., 2018). The ownership advantages are firm-specific advantages relating to a brand name like Huawei and patents accumulated by the firm to overcome rivals and cost of operation in cross-border countries (Wahid et al., 2009; Abodohui et al., 2018). Locational advantages are country-specific advantages that make it preferrable to other countries. Such advantages centre on access to raw materials, abundant labour, low labour cost, political, economic, and institutional factors (Wahid et al, 2009). Internalization advantages enable MNEs to use their assets internally rather than contracting through franchising or licensing to other firms in the host country (Bezuidenhout and Kleynhans, 2018). The eclectic paradigm was extended by Dunning and Lundan (2008) to categorize the motives of MNEs into four distinct motives resource-seeking, market-seeking, strategic-assets seeking and efficiency-seeking motives. The determinants of China's FDI to Africa are (can be) linked to these motives.

The question on whether Chinese investment projects are resource-seeking is ubiquitous in the international economics literature. Pigato and Tang (2015) assert that countries which have benefited from China's bulk investment are rich in natural resources. Some have argued that China's investment in Africa is a strategy of providing infrastructure in Africa in exchange for natural resources (Adisu et al. 2010; Kolstad and Wiig 2011. Yang (2005) expounds that resource-seeking FDI focuses on obtaining unavailable resources or expensive resources in the home country. Although China has natural resource endowments, its natural resource reserves per capita encompassing iron core, copper, and petroleum are relatively low (Deng, 2004).

China has adopted an explicit strategy to acquire natural resources and has even encouraged a strategy of internalization with direct state aid to Chinese private (Alon, 2010). Over the last two decades, China has experienced fast growth and development, compelling it to seek resources via a strategy of internalizing assets abroad (Buckley et al., 2007). Africa is noted for its rich natural resources. For example, South Africa is rich in minerals such as platinum, manganese, and gold (Alden and Alves, 2009). Zambia is prosperous with copper, and Angola is endowed with oil, while DRC is rich with cobalt mineral resources, all which China has ambitiously pursued (Stein, 2021).

Agricultural resources in Africa have also attracted investment from China in recent years. Shirley (2021) notes that the persistent doubling in food prices coupled with the abandonment of farming lands due to urbanization of the farming populace along with an expected spike in the middle-class population from 400 million to 800 million (in China?) represent a potential threat to food security. Therefore, China has sought to diversify its agri-imports away from the U.S. to agritech investments in Africa. In short, access to natural resources in Africa is argued to be one of the key determinants of Chinese FDI in Africa. This is supported in the wider literature. For example, a study by Kolstad and Wiig (2011) on Chinese FDI in 29 African countries suggest that Africa's natural resources are an important determinant of China's FDI in Africa. Cheung et al., (2012) and Bezuidenhout and Kleynhans, (2018) also find that Africa's natural resources significantly attract Chinese FDI.

Utesch-Xiong and Kambhampati (2021) argue that the extent to which African natural resources determine Chinese FDI in Africa is uncertain due mixed findings. In contrast, others have found no significant relationship between Chinese FDI in Africa and African resources (Cheung and Qian, 2009; Shan et al., 2018). Although the resource seeking motive is a primary determinant of China's FDI in Africa, it is important to note that China's FDI in Africa also stems from factors of relating to the market-seeking motive.

Chinese investments with a market-seeking motive try to expand production and (access to) markets in other countries. Chinese MNEs define are undertaking commercial opportunities to establish themselves in Africa (Alden, 2012). Among the explanations for this motive is that increasing inward FDI into China has tightened local market competition, hence, China has adopted the strategy of expanding into emerging economies such as Africa to overcome such competition (Yeung and Liu, 2008). Moreover, due to the infant stage of Chinese technology, Chinese MNEs may not possess ownership-specific advantages such as branding, managerial capabilities, and international experience to establish themselves in the Western world (Yeung and Liu, 2008). In contrast, due to the wide technology gap between China and Africa, China can handle less complex developing markets such as Africa (Alon, 2010).

Market size accounts for the potential demand of foreign market goods and services. Shirley (2021) emphasizes that China's population shares similarity with that of Africa in terms of size and demand

preferences. Africa has a middle-class population of 350 million that is quite close to that of China which stands at 400 million. This segment of the population shares similar demand for consumption goods such as smart city development, education, technology. In short, Africa is a fast-growing market that is attractive for China. Using various proxies for market size, (GDP or Gross National Income of the host country, population size), a positive and significant relationship between market size and Chinese FDI in Africa has been found (Sanfilippo, 2010; Kolstad and Wiig, 2011; Shan et al., 2018). Some mixed evidence, however, has also been found. For example, Koukouma and Xu (2013), on the other hand, find that market size is positive but insignificant while Ross (2015) finds no evidence of a relationship between market size and China's FDI in Africa.

While the determinants of China's FDI into Africa center mainly on natural resources and market access, others have also found that the efficiency-seeking and strategic asset-seeking motives are important.

The efficiency-seeking motives suggests that MNEs internalize their operations abroad where they can produce at a lower cost or take advantage of low labor costs. Anne-Lise (2014) argues that Chinese investment abroad is unlikely to be efficiency-seeking because China has enough labor at a low cost. Similarly, Ross (2015) also proposes that Chinese inward FDI is mainly efficiency-seeking, and it is thus unlikely that its outward FDI is efficiency related. In contrast Shirley (2021) analysis of why FDI flows from China to Africa points out that China's per capita GDP of $11,000 in 2020 classifies it as a high middle-income country. Consequently, China now has comparatively higher labor and operation costs, compelling Chinese companies to seek other locations commensurate with their capacity scale. In this regard, Africa is a notable region that appeals to Chinese companies (Shirley, 2021). Besides, as De Mello (1997) notes that even if there is a similar labor cost, companies may internalize operations based on labor quality. The unemployment rate and productivity are typical proxies for the efficiency-seeking determinants motive of FDI. Bezuidenhout and Kleynhans (2018) find a strong relationship between China FDI in Africa and the size and quality of labor force. However, Ross (2015) differs with his finding that productivity and labor market conditions have no statistical influence over China's FDI flows to Africa.

In addition, Chinese MNEs tap into foreign markets where they can build a brand, marketing networks, management expertise, technology know-how and other assets to compete, mostly by acquisition and mergers. Ross (2015) suggests that such investment is (more) likely among the developed countries and that Africa may not offer appealing opportunities in this regard. This possibly explains the relative absence of examining Chinese asset-seeking FDI in Africa. Existing works investigating determinants of China FDI in Africa about asset-seeking FDI of China in Africa include Bezuidenhout and Kleynhans (2018) who tested for technology, skill labor and quality of life as determinants capturing the strategic asset-seeking FDI of China in Africa.

They found that Chinese firms prefer to invest in African countries with higher quality of life, higher-skilled labor and availability of technology.

Many other studies have given much attention to Chinese FDI in Africa and trade openness but the findings have been inconsistent. Asiedu (2002) has noted that trade openness can positively relate to China's FDI to Africa. Narrowing the study of trade openness to Ghana, the results by Shamudeen (2019) showed a positive and significant relationship between China's FDI and Ghanaian openness. In a similar vein, the findings of Koukouma and Xu (2013) indicate that trade openness is positively correlated with Chinese FDI but is not significant. It has been shown that Chinese MNEs prefer to establish markets in African manufacturing sectors with special trade rules (Broadman, 2007). On the other hand, a panel study by Bezuidenhout and Claasen (2011) found that trade openness was an insignificant determinant of Chinese FDI flows to Africa. The inconsistency in results suggests that the importance of trade openness for China's FDI in Africa may be country specific.

In terms of infrastructure as a determinant of China's FDI to Africa, Chinese investors are perceived to have ownership advantages of experience and skills in infrastructure development and this complements their attraction to the infrastructure sector of Africa, especially countries with under-developed infrastructure (Utesch-Xiong and Kambhampati, 2021). This is exemplified by the study of Tang (2014) in which the investments of two Chinese firms in Africa were examined. He found that both firms invested in Africa to exploit the infrastructure gap by relying on the existing infrastructure to market their products. In this vein, African FDI from China can be attracted in two ways: African countries with smaller infrastructure stocks provide an avenue for investment or countries with larger infrastructure facilitate the ease of doing business. (Sanfilippo, 2010; Utesch-Xiong and Kambhampati, 2021).

More generally, infrastructure comprises telecommunications and transportation infrastructure. Kolstad and Wiig (2011) have shown that a substantial amount of China's FDI flows to Africa are in the telecommunications sector. Kaplinsky and Morris (2009) distinguishes between private Chinese companies that invest in telecommunications while state owned enterprise (SOEs) tend to direct investments towards transportation infrastructures (that) promote China's trade in natural resources. In summary, studies on the effects of infrastructure on Chinse FDI to Africa tend to find consistent and conclusive results; infrastructure is a significant determinant of FDI flows into Africa (Ross, 2015; Bezuidenhout and Kleynhans, 2018).

Although the literature on FDI has established strong linkages between China's FDI to Africa with various motives (resource-seeking, market-seeking, efficiency-seeking and strategic asset-seeking), others suggest that China pursues these motives in line with weak and risky institutional and macroeconomic factors of Africa. For instance, Kolstad and Wiig (2012) find that China is attracted to African countries with rich resources and weak institutions. Sanfilippo (2010) also reports similar findings that China continues to invest

in African countries with high political risk when the central government economically backs the investment. Buckley et al (2007) and Anne-Lise (2014) draw similar conclusions. In contrast, Inflation, a proxy for macro-economic stability, is found to be insignificant in determining China FDI to Africa (Ross, 2015), signifying that China invests in African countries whether there is economic stability or instability.

6.3 Data

My dataset comprises variables at the country, sector, and firm levels. The data are gleaned from different sources. Bilateral firm and sector level FDI data come from the Bureau van Dijk Zephyr dataset (Orbis). Country-level data is obtained from the World Development Indicators and the World Bank Doing Business Database. My sample of data consists of some 262 investment projects by Chinese multinational companies in 36 African countries from 2013-2021. The dependent variable assumes a value of '1' if China invests in the country in a particular year and '0' otherwise. The '1' stands for the total investment decision no matter where the investment occurs. If no Chinese investment takes place for a particular year in a country, the dependent variable will take a value of '0'. The analysis is also performed at the sectoral level. To achieve this, the dependent variable assumes '1' if there is an investment in sector K_{it} , where K refers to the sector, the investment is taking place i is the country receiving the investment and t is the time the investment is taking place.

Table 6. 2 Variable definitions and data sources

Variable	Description	Source
Dependent variable		
Invest_Choice	A dummy variable equal to one if a Chinese company directly invests in an African country and zero otherwise.	Bureau van Dijk Zephyr database
Manuf_Choice	A dummy variable equal to one if a Chinese company directly invests in the manufacturing sector of an African country and zero otherwise.	Bureau van Dijk Zephyr database
Services_Choice	A dummy variable equal to one if a Chinese company directly invests in the services sector of an African country and zero otherwise.	Bureau van Dijk Zephyr database
Agric_Choice	A dummy variable equal to one if a Chinese company directly invests in the agricultural sector of an African country and zero otherwise.	Bureau van Dijk Zephyr database
Independent variables		
Resources	Total natural resource rents (% of GDP).	World Development Indicators, World Bank
Market size	GDP per capita	World Development Indicators, World Bank
GDPPC (ln)	GDP per capita (U.S. dollars) is expressed in natural logarithmic values.	World Development Indicators, World Bank
Openness	KOF Globalisation index.	KOF Swiss Economic Institute
		World Development Indicators, World Bank
Regulate	Regulatory quality index.	
		World Development indicators
Population	Total population	
		World Development Indicators, World Bank
Starting Business	Number of days it takes to start a business.	
Unemp	Unemployment (% of total labour force).	World Development Indicators, World Bank
UK Legal Origin	Dummy Variable =1 for UK Legal Origin and 0 otherwise	Porta et al., (2008)
Inflation	Consumer prices (annual %).	World Development Indicators, World Bank

Table 6.3 shows that there is a sharp difference in terms of the number of FDI projects across countries. Chinese investment projects are most frequent in South Africa, Morocco, Egypt, Nigeria, and Kenya. Its interesting to note that these countries are rich in natural resources. (for example, South Africa is rich in Coal and Gold, Morocco is rich in Phosphates, and Congo is rich in copper. On the other hand, some countries like Togo, Mauritania, Bostwana, Guinea and Senegal received only 1 project over the 9 years since 2013. Not surprisingly, the total number of Chinese projects has reduced substantially since the start of COVID19 in 2019, falling from peak levels in 2018 (55 projects) to only 7 projects in 2021.

Table 6. 3 Number of Chinese projects in African countries

	2013	2014	2015	2016	2017	2018	2019	2020	2021	Total projec.
South Africa	6	9	6	4	3	12	4	5	1	50
Morocco	0	3	3	5	4	6	14	3	1	39
Egypt	0	0	0	2	5	11	2	1	2	23
Kenya	0	3	6	2	1	1	9	1	0	23
Nigeria	2	0	3	6	1	3	4	0	0	19
Ethiopia	3	3	1	0	3	2	3	0	0	15
Ghana	2	3	1	0	0	1	4	0	0	11
Tunisia	1	2	0	0	0	2	2	0	1	8
Tanzania	0	1	1	0	0	4	2	0	0	8
Algeria	2	0	0	0	1	2	1	1	0	7
Cameroon	0	2	4	0	1	0	0	0	0	7
Mauritius	0	0	1	1	0	0	0	3	0	5
Uganda	1	1	0	0	1	0	2	0	0	5
Zimbabwe	1	1	1	0	1	1	0	0	0	5
DR Congo	0	0	2	0	0	1	1	0	0	4
Rwanda	2	0	0	0	0	0	1	0	1	4
Angola	1	0	0	0	1	0	0	0	0	2
Benin	0	0	0	0	1	0	0	1	0	2
Chad	0	0	1	0	1	0	0	0	0	2
Cote d'Ivoire	0	0	0	0	1	1	0	0	0	2
Gabon	0	1	0	0	0	1	0	0	0	2
Mozambique	0	1	0	0	0	1	0	0	0	2
Niger	0	0	0	0	0	2	0	0	0	2
Sudan	0	0	0	1	0	0	0	0	1	2
Zambia	0	0	0	0	0	1	1	0	0	2
Botswana	0	0	0	0	0	0	1	0	0	1
Cape Verde	0	0	0	0	0	1	0	0	0	1
Comoros	0	0	0	0	1	0	0	0	0	1

Congo	0	0	0	0	0	0	0	1	0	1
Guinea	0	0	0	0	0	1	0	0	0	1
Liberia	0	0	0	0	0	1	0	0	0	1
Mauritania	0	0	0	1	0	0	0	0	0	1
Namibia	0	0	1	0	0	0	0	0	0	1
Senegal	0	0	0	0	1	0	0	0	0	1
Togo	0	0	0	1	0	0	0	0	0	1
Total	21	30	31	23	27	55	51	16	7	261

Source: Bureau van Dijk Zephyr database

Table 6. 4 Top five most frequent investing companies

Project Company	Frequency	Percentage
Huawei Technologies Co., Ltd	20	7.6
Hilton Worldwide Holdings Inc.	17	6.4
Louvre Hotels Group SAS	11	4.2
Rezidor Hotel Group AB	9	3.4
Vivo Communication Technology Co.	9	3.4

Source of data: Bureau van Dijk Zephyr database

It is also interesting to highlight that the top five companies which frequently invest in Africa are in the telecommunication and tourism sector. Huawei and Hilton Hotel are the companies which frequently invest in Africa. Chinese companies operating in Africa take four forms: enterprises, Chinese private companies, state-owned, Chinese entrepreneurs, and Chinese provincial enterprises (Abodouhui et al., 2018). Chinese private companies constitute 90% of the total number of companies investing in Africa, and these MNEs contribute 70% of China's stock of FDI. Chinese state-owned enterprises are not significant number-wise, but they remain the largest investors in Africa by value terms (Shirley, 2021). As of 2010, 1,955 Chinese companies were operating in Africa, of which China state-owned enterprises accounted for more than 100; by 2015, about 2,200 Chinese companies were investing in Africa (Pigato and Tang, 2015).

In sector terms Chinese investments are directed toward infrastructure, energy, natural resources, utilities, real estate at the same time, private Chinese companies' investment projects have links to manufacturing, mining and trade (Gu, 2009). However, Chinese state-owned enterprises invest mainly in the power and natural resource areas such as mining and infrastructures (Sanfilippo, 2010). Shirley (2021) notes that such areas generate a higher return on investment. For instance, one third of Africa's energy and infrastructures have been constructed and funded by Chinese state-owned actors since 2010.

Table 6. 5 Main investing sectors

Project sector	Frequency	Percentage
Manufacturing	78	29.8
Hotels	50	19.1
Sales Office	35	13.4
Retail	27	10.31
Logistics and Distribution	15	5.73

Source of data Bureau van Dijk Zephyr database

6.4 Methodology

McFadden (1974) introduced the conditional logistic regression model as a random utility model developed to deal with discrete choices and circumstances where an agent selects one alternative among different known possibilities. The conditional logistic model has been increasingly used for location choices. For example, Carlton (1979; 1983) utilizes the conditional logistic regression model to investigate the location decisions of domestic firms' choices across several U.S. states. Luger and Shetty (1985) use logistic regression to model inward FDI location choices among U.S. states. The conditional logistic model is also popular in geography economics to estimate the location choices of economic agents. Following Disdier and Mayer (2004), the model set out below is extended to include a sectoral dimension. The model consists of a simple profit maximization program. Let $L = (1, \ldots, l)$ be a set of possible locations (countries) and $J = (1, \ldots, j)$ be the set of sectors in the host country. Each country-sector-time association offers a profit to the multinational company as follows:

$$\pi_{ljt} = U_{ljt} + \varepsilon_{ljt} \qquad (6.1)$$

where

$$U_{ljt} = \beta X_{ljt} \qquad (6.2)$$

The X vector variables are all observable characteristics of the country-sector-year that may directly or indirectly impact the profit of the multinational company, such as labour cost, cost of starting a business, domestic growth and β is a vector of coefficients to be estimated. The ε_{ljt} denotes all the latent characteristics of the country-sector-year. Empirically, the logit model states that the probability for the Nth firm to choose country L, given sector J and year t is given by:

$$P(l/j,t) \equiv prob(\pi_l > \pi_i) = prob(\varepsilon_i < \varepsilon_j + \beta(X_j - X_i)) \quad where \quad \forall i \neq j \quad (6.3)$$

By assuming error terms are independent and identically distributed, equation (3) can be written as

$$P(l/j, t, \alpha_i) = \frac{\exp(\beta X_l + \alpha_{i,l})}{\sum_{i=1}^{n} \exp(\beta X_i + \alpha_{i,j})} \qquad (6.4)$$

As documented by Train (2003), X_l is a vector of explanatory variables including the lag of Chinese investment to proxy for the stock of Chinese investment and α_i is unobserved individual effects that are time-invariant.

6.5 Empirical results

This section presents the results from the conditional logistic model. Table 6.6 shows the estimates from the conditional logistic model. The first column shows the total investment decision by a Chinese multinational firm. The dependent variable-takes the value of `1` if China has undertaken an investment project in Africa at a point in time. The rest of the columns show sectorial investment decisions, i.e., the decision to invest in the manufacturing, agricultural, and services sector. Table 6.6 shows how factors that influence the location choices of a company to invest in one industry over the other vary from sector to sector.

Overall, investment decisions of Chinese companies are based on whether the host country is resource-rich or not. In column [1], resource endowment of African countries significantly impacts the number of Chinese investment projects received. In column [2], the choice of investing in the manufacturing sector is influenced by the number of natural resources in the host country. Countries with a considerable amount of resource deposits attract more Chinese manufacturing FDI. The results are consistent with Pigato and Tang (2015), who concludes that countries that have benefited from China's bulk investment projects are rich in natural resources.

In contrast, the agricultural sector investment decisions do not favor countries endowed with natural resources. The reason is that countries with natural resources like gold, bauxite, and oil are typically known for land degradation, hence the reasons for few agricultural investment projects going into resource-rich countries. Countries endowed with natural resources received fewer agriculture investment projects. In the last column, natural resources endowment does not significantly impact locating services FDI. Services FDI includes investment in the banking sector, hotels, and retailing. Chinese investment decisions into services are not reliant on a country's natural resources endowment.

Population growth plays no significant role for Chinese investors when deciding on the country and the sector to invest.

The host country's legal origin plays a significant role in attracting chines investment projects. The legal background, whether British or French, is fundamental to the Chinese investor when deciding where to invest. In column [1], the total investment decision is linked significantly with U.K. legal origin. Chinese investors are more likely to invest in countries with U.K. legal origin than French legal origin. Chinese investors also attach importance to the legal origin when deciding whether to invest in the manufacturing or agricultural sector. Legal heritage plays a positive and significant role in attracting Chinese investment. Similar results are documented in an estimation based on a panel of annual observations from 2001 to 2012 by Glaister, Driffield and Lin, (2020). They find that prior colonial linkages are positively related to inward FDI from colonizers to former colonies. The key characteristic of legal origin and traditions is that they have been embedded in territories through conquest or colonization. Such legal heritage from the western world has a significant impact on the way laws regarding contracts and property rights are executed in the host countries (Porta, Lopez-de-Silanes and Shleifer, 2008)

The link between host country market size and Chinese investment location has been thoroughly investigated. Aggregate investment decision by Chinese multinationals is positively and significantly related to the host country market size as proxied by GDP per capita. Chinese investors will likely locate their investment projects in countries with bigger market sizes. The probability of investing in the manufacturing and agriculture sector increases for countries with larger market sizes. In other words, larger countries such as South Africa receive a large share of Chinese investment over other African countries. The results are consistent with Kolstad and Wiig, (2011), Sanfilippo, 2010 and Shan et al. (2018), who find a positive and significant relationship between market size and Chinese FDI in Africa. Market size plays no significant role in service FDI.

The role of economic openness in Chinese investment decision-making is heterogeneous across sectors. Whilst economic openness discourages total Chinese investment into Africa, countries which are open are more likely to receive Chinese agricultural investment. Chinese multinationals may want to invest in countries which are closed to avoid fierce competition. Economic openness includes the absence of trade barriers which allow the flow of agricultural products from host countries to China. Manufacturing and services FDI have no significant relationship with economic openness.

The distance between the host country's capital city and investing country is important to MNEs in choosing where to invest. The probability of Chinese investing in a host country goes down by 0.001 when the distance between the host country and investing country increases. Thus, the further the host country is from China, the less likely it is to be chosen by Chinese firms to locate their capital.

Table 6. 6 Chinese direct investment location choices in Africa

Variables	Total investment choice	Manufacturing choice	Agricultural choice	Services choice
Lag investment	0.001	0.001	-0.001	-0.001*
	(0.001)	(0.001)	(0.001)	(0.000)
Resource rent	0.119**	0.060**	-0.230**	-0.066
	(0.046)	(0.032)	(0.104)	(0.040)
Population growth	0.603	-0.090	0.408	-0.003
	(0.368)	(0.233)	(0.877)	(0.218)
UK legal origin	1.832**	1.106*	5.162***	-0.115
	(0.771)	(0.572)	(0.796)	(0.342)
GDP per capita (growth)	0.352**	0.236*	0.496***	-0.117
	(0.161)	(0.133)	(0.158)	(0.114)
Starting business	0.009	0.002	-0.137	0.006
	(0.015)	(0.019)	(0.108)	(0.016)
Economic Openness	-0.032**	-0.011	0.029**	0.010
	(0.013)	(0.011)	(0.014)	(0.011)
Distcap	-0.001**	-0.000**	-0.002***	0.000
	(0.000)	(0.000)	(0.001)	(0.000)
Constant	11.342***	2.444	14.486***	-0.440
	(3.881)	(1.856)	(4.756)	(1.327)
Observations	262	262	262	262

Note: The dependent variable for each column takes a binary form. Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

6.6 Conclusions and policy implications

This chapter applies the conditional logistic regression model to investigate Chinese FDI location decisions in African countries, at aggregate and sectoral levels. The results reveal a sharp heterogeneity in Chinese firms' decisions regarding which country and sector to locate their investment projects. Specifically, natural resources endowment tends to be more critical for Chinese firms when deciding which country to invest. In addition, Chinese companies probably choose the manufacturing sector over other sectors in countries rich in natural resources. On the other hand, services FDI decrease in a resource-rich country. Market size tends to be more critical for Chinese MNEs because large markets generate more opportunities to exploit economies of scale. But the role of the market size in attracting Chinese FDI varies with the sector the investment is taking place. While market sizes tend to matter in manufacturing and agricultural FDI locations, market sizes play no significant impact on services FDI location decisions. Economic distance discourages Chinese firms from investing in the host country because transaction costs increase with distance.

The results from this chapter have some clear-cut and important policy implications. First, the factors influencing Chinese MNEs to invest in Africa are heterogeneous. There is a need for African governments and policymakers to design bespoke policies capable of attracting sector specific FDI. FDI policies geared towards attracting investment must take different forms depending on the type of FDI a country desires to draw. Countries aiming to receive more manufacturing FDI must make all efforts to improve upon their investment climate. Short-term policies like achieving short-term macroeconomic stability which transforms into long-term GDP per capita growth must be implemented. For example, Increasing GDP per capita may involves maintaining proper macroeconomic policies.

Secondly, economic openness discourages FDI inflows in general terms. However, when FDI is divided into sectorial components, economic openness favours agricultural investment projects hence countries aiming to receive more agricultural FDI must pursue openness policies. There shall always be a trade-off in attracting one form of investment. It is a matter of a country prioritizing the type of investment it needs.

Finally, to create an enabling environment to attract FDI, the existing research shows that it is essential to grasp the factors that impact different types of FDI and their different sensitivity to the determinants of FDI location choices. Further research is needed at the firm level to understand how the factors determining the location of FDI change according to firm size and ownership structure. How do small and big firms respond to these country characteristics when choosing where to invest.

Chapter 7 Summary and Conclusions

7.1 Introduction

The desire to meet Africa's Sustainable Development Goals (SDG) targets remains essential, however, developing regions like SSA lag when it comes to capital receipts. The resource gap between Africa and the developed world has contributed to the slow growth record in many African countries. Since the introduction of the structural adjustment program in Africa by the World Bank in the early 1980s, much emphasis has been placed on the importance of foreign direct investment (FDI). A large body of literature has examined host countries' factors that determine foreign investment. FDI as a financial asset is responsive to a hostile business environment. There are strong reasons to believe that a country's business environment will significantly impact the amount of FDI it receives. The poor performance of inward FDI in Africa is troubling. This thesis contributes to the body of knowledge by examining domestic factors related to the ease of doing business and FDI inflows. The primary aim of the thesis is to explore the role of the domestic business environment in attracting FDI and the impact of FDI on growth conditioned on the financial sector. FDI brings about financial resources and technological know-how that can support domestic investment to sustain growth. The theoretical and empirical literature has shown that FDI can contribute to a host country's economic growth.

In 2008, UNCTAD reported that FDI inflows have the potential to create jobs, increase productivity, transfer skills and technology, boost exports and continue the long-term economic growth and development of developing countries. FDI can spur technology transfer within the same sector (horizontal spillovers) or between different sectors (vertical spillovers), further increasing productivity. Sub-Sahara Africa recognises that FDI as a potential source of economic development, modernisation, investment, and employment. Due to the relative stability in FDI flows compared to other capital flows, Sub-Sahara Africa increasingly relies on it as the primary source of capital (Adams 2009). (Buckley, Clegg, and Wang 2007a; Dunning and Lunden 2008).

7.2 Summary of the results

The thesis comprises four main empirical chapters. The findings from the four empirical chapters are summarised below. The first empirical chapter (Chapter 3) investigates the role of financial development in the FDI-growth link. In accounting for financial development, I recognise that using a single indicator to measure financial development in Africa is not the best due to the wide range of financial products African financial sector provides. The results suggest FDI promotes growth when the overall level of financial sector development is above a certain threshold. I find only five countries in Africa which meet this financial threshold. The findings from the chapter also reveals that the growth-enhancing effects of FDI can be ambiguous if one fails to account for financial development. In measuring financial development, I consider the financial sector's depth, accessibility, efficiency, and stability. Unlike previous literature, these indicators are aggregate indexes comprising different measures of financial development.

The second empirical chapter (Chapter 4) uses the quantile fixed effects model to investigate the impact of FDI on development at different stages of growth. The first empirical chapter argues that the role of FDI on growth depends on the level of financial development. This chapter finds that the impact of FDI may also depends on the growth stage the country is operating in. Developing countries may not realise the growth effects of FDI due to a lack of economic and institutional structures. The quantile regression results suggest that FDI promotes growth in the highest quantile of GDP per capita growth. Hence, the benefit of FDI in South Africa and Somalia will not be the same.

The third empirical chapter (Chapter 5) suggests that the flow of FDI into SSA countries is sensitive to the ease of doing business in Africa. FDI flows to countries with a good business environment. The chapter uses the Poisson Pseudo-Maximum Likelihood (PPML) estimation strategy, and the least squares dummy variable (LSDV) approach. The results from the chosen model, PPML estimation shows that ease of doing business in Africa greatly impacts FDI inflows. To measure the ease of doing business, proxy measures including time to register a property, days to start business, aggregate business freedom, and regulatory quality are gleaned from multiple sources.

The last empirical chapter, (Chapter 6) analyses the locational choices of Chinese investment in Africa. The chapter utilizes data at the bilateral and sectorial level to estimate the locational determinants of FDI (from China) into Africa. Using the logit model, the chapter outlines quantify the probability of China chooses one country and sector over the others. The result from the chapter suggests that total Chinese investment decision in Africa is influenced by natural resources intensity of the host country. Its highly probable that, Chinese investment project will be in a resource rich country. The choice of choosing manufacturing sector over other sectors is also influenced by the presence of natural resources in the host country

7.3 Policy recommendations

The lesson from Chapter 3 is that African countries must build a resilient business environment capable of easing business start-up processes. African countries must switch all business start-up processes online to avoid bureaucratic bottlenecks in the traditional public sector. A good example is Ghana which has started the electronic port clearing system, where goods clearing at the port are done electronically to avoid delays at the harbour. Building good institutions is tantamount to making the investment climate friendly.

Chapter 4 recommends that SSA countries should be more concerned about creating vibrant financial institutions before liberalising their capital account to attract FDI. Instead of gauging financial development on just the level of private sector credit, host countries must consider financial development from a more rounded perspective, including accessibility, depth, efficiency, and stability point of view. Host countries must differentiate between the financialisaton of the host countries and financial development. What we usually observe in Africa is a mere financialization of African economies. There should be a financial system that can cheaply allocate funds to those who need them. This will help firms access external finance to help them adopt technologies introduced by foreign firms, thereby creating a strong linkage with host countries. This raises the argument against financial sector taxation recently adopted in Ghana. Such financial tax impedes financial accessibility, efficiency, and financial innovation. Secondly, SSA countries must work on strategies to reduce credit costs. Techniques like a differential interest rate will help companies which borrow purposely to invest in certain needed industries to receive credit at a lower cost. A higher lending rate deteriorates investment and further translate into the real economy. Policies geared towards lowering interest rate on borrowing must be put in place to ensure local investor are financially viable.

From chapter 5, policy prescriptions regarding attracting more foreign investment should not be generalised among countries in Africa due to the heterogenous role of FDI in the continent. Countries must reconsider their development stage before providing incentives to attract more FDI. Foreign direct investment, as it embodies technology and know-how and foreign capital, needs countries with good institutions to function.

Finally, in chapter 6 it is apparent that, the factors that influence Chinese MNEs to invest in Africa are heterogenous across sectors. Therefore, African governments and policy makers should design bespoke policies capable of attracting sector specific FDI. Policies geared towards attracting FDI must take different forms depending on the type of FDI a country desire to attract. Countries aiming to receive more manufacturing FDI must make all efforts to increase their per capita incomes.

7.4 Limitations and directions for future research

In this thesis, an attempt is made to make the results reliable to benefit policymakers in Africa. However, there are some weaknesses which are worth mentioning. First, and foremost the paucity of data as well as it quality in SSA cannot be ruled out from this study. In the third empirical chapter, some countries do not have complete data on business environment variables. There are some missing data for some of the countries. To get enough data for each country, I resort to different datasets hence the possibility of compatibility issues from merging the data from different sources. Another limitation of the thesis is the missing data on FDI inflows for some countries. However, the use of the PPML methodology mitigates this limitation.

The banking sector will always allocate funds to more efficient and productive areas; hence it's important to segregate the credit that goes to firms from domestic households. A developed financial sector may not guarantee financial accessibility due to frictions in the financial sector. I recommend that future research use new data as they become available to analyse the role of credit that goes to only the private sector on the FDI growth link. This will broaden our understanding of the impact of credit constraints on the FDI growth nexus. The results require threshold analysis to determine exactly the financial threshold point above which finance will act as a precondition for FDI to impact growth.

In the first empirical chapter, most business environment variables are time and institutional based. I recommend that future research include cost-based variables in the analysis. Cost-based variables measure the direct cost of starting a business in Africa. Future research may also consider sectoral FDI data. Such sectorial analysis will broaden our scope on how each FDI type responds to business environment changes.

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