ESSAYS ON PRIVATE CAPITAL FLOWS AND REAL SECTOR GROWTH IN AFRICA

By

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ABSTRACT

Globally, countries continue to implement policies aimed at the attraction and retention of capital flows due to its perceived significant effect on economic growth and development. The benefits of capital flows are touted as being able to drive down domestic interest rates, smooth consumption, transfer of technology and improve the functioning of the financial sector. In as much as there is a copious body of literature on capital flows and economic growth, there remain essential areas that the literature has been silent. Among these are capital flows and real sector growth in the light of the allocation puzzle; the real sector amid financial sector development and institutions; private capital flows-macroeconomic volatility-financial development connections, and thresholds in the capital flows-real sector growth dynamics. Filling these gaps will provide the needed knowledge and policy directions on how countries that are known to depend on capital flows can harness these flows for growth and development, especially at the level of the real sector. Using robust econometric procedures, this study examined four thematic areas of capital flows in Africa.

The first essay investigated the evidence and/or otherwise of an allocation puzzle and bi-directional relationship between private capital flows and real sector growth. The study covered 42 Sub-Saharan African (SSA) countries between 1980 and 2017. We used growth in manufacturing, industry, agriculture, and services to capture the real sector and proxied private capital flows by foreign direct investment, portfolio equity flows, and private non-guaranteed debt. We employed the two-step dynamic systems GMM model to establish our empirical relationships. We found no evidence in support of the allocation puzzle, which suggests that SSA countries with relatively high growth in the real sector will attract more private capital. However, at a decomposed level, we established a bi-directional relationship of a positive association between debt flows and growth in agriculture and services, with no

evidence of an allocation puzzle. Though we found a bi-directional association between debt and industrial growth, the association was detrimental in both directions. Also, the study established a two-way inverse reverse effect between equity flows and manufacturing growth. Finally, while the impact of foreign direct investment on the real sector is positive at the disaggregated level, there is a positive bi-directional effect between foreign direct investment and growths in manufacturing, industry, and service value additions. The study provides a strong foundation for an alternative source of financing, especially for the growth of the service and agriculture sectors regarding debt and equity, from the reliance on the traditional FDI. The findings also indicate parallel reactions between real sector growth and private capital in SSA.

The second essay had two separate objectives fused into one. The first part examined the brinks of financial development at which private capital to Africa enhances growth at the level of the real sector. We deployed a newly developed financial development dataset to moderate the association between private capital and the real sector, and the Lewbel instrumental variable two-step GMM estimator (IV – GMM), with Kleibergen-Paap robust standard errors and orthogonal statistics in establishing our empirical relationships over the period 1990 to 2017, for a sample of thirty (30) countries in Africa. Initial estimations at the overall level of the real sector, manufacturing, and industry show that FDI has no growth effects and even worsens the growth of the agriculture sector. Financial development stifles growth. On decomposing the real sector, we found the interaction between FDI and financial development to enhance the growth of the real sector and its components at face value. However, our marginal effect analysis shows that the growth impact of FDI on the overall real sector, industry, and service sector growth starts at the threshold level of the 25th percentile of financial development, while the growth impact on manufacturing is only evident at the 90th percentile of financial development. Finally, although financial sector growth aids foreign direct investment in enhancing the growth of the agriculture sector, it cannot wholly eradicate the initial adverse impact from FDI. We further found that portfolio equity has no growth impact on Africa's real sector, while debt flows harm the overall real sector, manufacturing, and industrial growth, but no impact on agriculture and services' growth. We found that financial development reinforces the conservative view that capital flows enhance economic growth, but the reinforcement depends on the type of sector, either debt or equity, and the percentile levels of financial development.

A similar objective was to analyze the interconnections between private capital flows, the quality of institutions, and the growth of the real sector in Africa. The study covers thirty (30) African countries. Our empirical analysis, with a panel data between 1990 and 2017, indicates that private capital flows (FDI, private debt, and equity) have no direct impact on the growth of the real sector. A decomposition divulges that FDI has no impact on manufacturing and detrimental to industrial and agriculture sectors. Portfolio equity is injurious to growth in services and unresponsive to the growth of all other sectors. Private debt was also insensitive to the growth in agriculture and services, and even damaging to manufacturing and industrial growth. Initial assessments show that countries with robust institutional frameworks can benefit significantly from capital flows, as we found institutions do moderate the positive impact of capital flows on the growth of the real sector, starting from the 25th percentile of institutions. Our marginal analysis confirms that the impact of private capital on real sector components is dependent on the type of capital, the sector, and the percentile level on institutions, in some cases, as far as the 90th percentile. Our results show that for policy implementation, it is not a case of one cup fits all, but sector-specific capital flow institutional policies should be the way forward.

The orthodox view is that uncertainty is a deterrent to investment, and by extension, private capital inflows. Paying specific attention to the volatility of the domestic exchange rate, private capital flows and a newly developed indicator of financial development, the third chapter of the thesis examined the impact of exchange rate uncertainty on private capital flows, and whether financial development matters in such association. Specifically, the study sought to answer four questions: Is the exchange rate uncertainty – capital flows nexus strictly monotonic? Does exchange rate volatility deter capital flows? Can financial development mitigate the adverse effect of economic uncertainty on capital flows? At what threshold point does financial development jettison the negative impact? The study covers 40 countries over the period 1990 – 2017. We establish our empirical relation with a system general method of moments (GMM) two-step robust estimator with orthogonal deviations. We found evidence in support of a non-linear U-shaped relationship between uncertainty and capital flows, and that the impact of uncertainty on capital flows depends on varying levels of uncertainty. We also document that uncertainty deters all forms of capital flows, and that countries with a well-functioning financial system can transform the adverse impact of volatility on capital flows. However, our marginal analysis shows that curbing the adverse effect of volatility on private capital depends on the type of capital flow, the indicator as well as the percentile level on financial sector development, in some cases as far as to the highest percentile. We further established that with the current state of the financial sector, financial institutions' development offers the quickest route to curtailing the adverse impact of volatility on capital flows, as it has a lower threshold value or critical point compared with financial markets' development.

In the final essay, we investigated the possibilities of non-monotonic or nonlinearities in the capital flows - economic growth dynamics, as some studies posit that the effect of capital flows on economic growth changes course after attaining a certain threshold level, either based on the levels of capital flow itself or some mediating variables. We proxied capital flows by foreign direct investment (FDI) inflows and growth by real sector components. With data from 1990 to 2018, for a sample 36 African countries, the study employed Seo and Shin (2016) dynamic panels threshold effect with endogeneity as well as Seo et al. (2019) estimation of dynamic panel threshold model using Stata to achieve the study's objectives. In the first part of the analysis, we employed three indicators of human capital development as threshold variables, and FDI flows as the regime dependent variables. These are the mean years of schooling, gross national secondary school enrolment, and primary school pupil to teacher ratio. In the subsequent analysis, we deployed FDI as both the threshold and regime dependent variable. The study found significant thresholds in the capital flows - real sector growth relationship as mediated by human capital and foreign direct investment. The significance impact of foreign direct impact on real sector happens at both the lower and upper levels of the mediating variable but the component of real sector matters. We established that in most cases, the impact of FDI on the growth of the real sector is harmful in the lower regime and beneficial in the upper regime of human capital for both manufacturing and services sectors, and vice versa for both agriculture and industrial sectors. The results indicate that increasing levels of human capital development and FDI inflows are necessary for the growth impact of FDI on Africa's real sector, but not under all sectors as he results are dependent on the varying threshold variables of both human capital and foreign direct investment.

Key words: Real sector, allocation puzzle, financial development, institutional quality, volatility, exchange rate, thresholds, system GMM, Africa.

DECLARATION

I, Asamoah Michael Effah, do hereby declare that this work is the result of my personal research and has not been presented by any person for any academic award in this or any other university. It is being submitted in fulfilment of the requirements for the award of Doctor of Philosophy in Finance and Economics, at University of The Witwatersrand. I bear sole responsibility for any shortcomings.

Michael Effah Asamoah 11TH May, 2021

Student ID: 906480 Date

DEDICATION

This work is dedicated to my entire family, especially, my wife (Mrs. Clarice Panyin Effah-Asamoah and my little angel (Abena Pomaah Effah-Asamoah).

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"No one who achieves success does so without the help of others. The wise and confident acknowledge this help with gratitude" - Alfred North Whitehead.

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CHAPTER ONE

INTRODUCTION

"The secret of getting ahead is getting started. The secret of getting started is breaking your complex overwhelming tasks into small manageable tasks, and then starting on the first one."
– Mark Twain

1.1 Background of the Study

Africa's growth agenda for a period (between 1970's and early 1990's) could be described as insipid, and was largely characterized by volatile economic performance, unstable governments, the incidence of high rates of poverty and high public sector debt (Collier, 2006). Within that period Africa's growth was somewhat described as a "tragedy" (Easterly and Levine, 1997). However, most African economies are experiencing high growth relative to other developed and emerging economies (IMF, 2011). According to AfDB (2012), average annual growth for Africa from 2004 to 2008 was around 6.4%. AfDB (2012) further noted that between the periods 2008 to 2011, when there was global slow in growth due to the global financial crisis, African economies grew marginally relative to other economic blocks, except East Asia, whose growth rate was 8.5% approximately. Within that period, Africa grew by nearly 4% in comparison to Europe (0.2%), Central Asia (0.2%), and Latin America (3.4%). It is important to note that between 2010 and 2014, average annual growth of Africa has not fallen below 5%.[1] It is important that such high growth is maintained[2].

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[1] IMF (2013), World Economic Outlook. Washington DC: IMF.

[2] Obviously, most African countries will find it hard to maintain such growths, especially, in the wake of the on-going trade wars among global trade powers. Also anticipated global shutdown from the novel corona virus will surely hamper Africa's growth for some time to come.

The strength of an economy is determined by its Gross Domestic Product (GDP). Theoretical and empirical propositions exist on how countries can increase the value of GDP. Africa's recent higher growth can be attributed to a host of factors, such as capital inflows, debt reliefs, increase in remittance, and reduction in political unrest (AfDB, 2012). Thus, extant literature has established the ability of capital flows to help tackle the slow growth of most African countries. Private capital flows have increasingly become the preferred source of investment for most developing countries over and above domestic investment, and there seems to be a positive correlation between capital flows and economic growth (WESP, 2015; UNDP, 2011).

The flow of private capital has been enormous (IMF, 2011; Egbetunde and Akinlo, 2015). According to Sy and Rakotondrazaka, (2015), by the end of 1990, more than half (62%) of external capital flows into Sub-Saharan Africa (SSA) were in the form of ODA, remittances accounted for 7% with only 31% being in the form of private capital. Two decades later, private capital flows accounted for nearly 54% of external financial flows to SSA, with remittances and ODA accounting for 24% and 22% respectively. The decrease in the flow of ODA is also very significant as it suggests that Sub-Saharan African countries are increasingly becoming less aid dependent (Sy and Rakotondrazaka, 2015). Gradually, private capital flows are becoming a significant source of investment in Africa. The expectation is that the increase in figures or value will translate into higher economic growth.

Statistical evidence shows that by the end of 2009, private capital flows to developing countries had increased about fivefold from its initial value in 1995 (UNDP, 2011). Although the global financial crisis caused a dip in the flow by 26% between 2007 and 2008, the growth recovered by almost 7% in 2008, increasing from its value of $686 billion in 2008 to $737 billion in 2009. Before the growth in 2008, private capital flows had risen from $184 billion to $929 billion from 2002 to 2007 (UNDP, 2011). Furthermore, the increase in net private capital flows to developing economies inched up by more than three folds between 2005 and 2013, rising from $ 155.7 billion to $ 327.2 billion; an increase of about 110.5% (WESP, 2015). There was a dip of about 6% in 2014 from the peak attained in 2013. Prospects were however positive for the years 2015 and 2016. By mid-2014, there has been an increase in private capital flows to most emerging countries including markets such as South Africa (WESP, 2015). Decomposing private capital, there was close to 20% drop in the level of portfolio debt flows between 2013 and 2014 whiles FDI proved to be the most stable of the components, increasing in quantum. Regarding the direction of flow, WESP (2015) noted that emerging economies in Asia received most (about 60%) net inflows, with Latin America accounting for 24%, Africa, and West Asia gained 8% with about 7% going to Europe.

Following Solow-Swan (1956) seminal work on the neoclassical growth theories, a lot of studies have focused on the relationship between capital flows and economic growth. Some studies have concluded that capital flows affect economic growth positively (Alley, 2015; Ahmed and Zlate, 2014; Durham, 2004; Borensztein et al., 1998). However, other academics contend that capital flows on its own cannot facilitate growth directly unless it operates through a conduit (Prasad, 2003). Among this transmission, mechanisms include financial sector development (Agbloyor et al., 2014; Adjasi et al., 2012; Choong et al., 2010); economic stability (The World Bank, 2001; Fernandez et al., 2015); well-resourced human capital (De Mello, 1997; Borensztein et al., 1998) and trade openness (Balasubramanyam et al., 1996).

There is however empirical contradiction to the long-standing neo-classical theory on the way in which private capital affects economic growth. This thesis focused principally on the existence of recent empirical contradiction to the neo-classical growth theory and capital flows. Also, even though current figures (WESP, 2015) show an upsurge in capital flows to Africa, the flow is still impeded by uncertainties in macroeconomic conditions. Macroeconomic environments have been known to present poor absorptive tendencies to the flow of private capital, mainly where there exist unprecedented volatilities (Singh, 1997). Notably, the thesis considered the empirical conundrum observed in which countries that grow and invest less tend to attract more capital, otherwise known as allocation puzzle on a set of African countries. The role of nonlinearities and asymmetries was carefully modelled to account for the peculiar nature of African economies and the data set available. Further, the study examined the various channels that gave credence to the existence, and or lack of the of the allocation puzzle. And finally, the study analysed the effect of macroeconomic surges on the attraction of private capital in the presence of risk mitigating mechanisms.

Most importantly, the thesis focused on growth at the level of the real sector in the light of the above discussions. Departing from previous studies, we measured economic growth by growth at the disaggregated level. Specifically, we ascertained the capital flows growth nexus with our lenses on the growth in manufacturing, industry, agriculture and services.

1.2 Problem Statement

In the standard neo-classical theory of growth, capital should flow from rich countries where the labor-capital ratio is high to low jurisdictions. In rich countries, there are low marginal returns of capital invested because capital abounds, relative to developing countries where average returns on capital are high. Moreover, in flowing to developing countries, capital should flow in higher proportion to countries that are closer to achieving convergence of steady-state growth relative to the world frontier. With the increase in growth, such countries will need more capital to finance current levels of investments and also smoothen consumption (Gourinchas and Jeanne, 2013; Gourinchas and Rey, 2013). There is, however, a puzzle as to the direction of recent global private capital flows (Bernake, 2006). Current evidence on capital flows and growth seems to contradict the long-standing neoclassical theory of capital allocation. First, the neoclassical view that capital will move from rich countries to developing countries runs contrary to empirical evidence in what is known as Lucas (1990) assertions that capital flows from poor to rich countries. Various mechanisms explain the Lucas puzzle, notable among them include institutional weakness in developing countries (Alfaro, Kalemli-Ozcan and Volosovych, 2007); defaulting on debt repayments (Reinhart and Rogoff, 2004).

Another puzzling empirical evidence of the neoclassical view is the correlation between capital flows and growth. Solow-Swan (1956) contends that countries with high growth rates will be able to attract significant inflows of capital to finance productive investment and growth. The empirical evidence, however, suggests otherwise. This puzzling evidence is known as the “allocation puzzle” (Gourinchas and Jeanne, 2013). Earlier evidence of the puzzle has been documented by Prasad et al. (2007), and later by Alfaro, Kalemli-Ozcan, and Volosovych, (2014) and MacDonald (2015). In Sub Saharan Africa, upsurge in private capital flows has been described as enormous (Sy and Rakotondrazaka, 2015; Egbetunde and Akinlo, 2015; IMF, 2011), despite the low growth rate (Global Finance, 2013)[3].

1. *Evidence of allocation puzzle and reverse effect*

Employing more extensive data set, various measures of capital flows and disaggregated growth, this study examined the empirical basis of the allocation puzzle for Sub Saharan African counties from 1980 to 2017. The study also examined the possible existence of a negative relationship between measures of growth and capital flows. The thesis went further

[3] https://openknowledge.worldbank.org.

to test the causal link between measures of private capital flows and real sector growth in the wake of empirical contradictions to the neo-classical theory. As noted by Spatafora and Luca (2012), literature has not been unifying on the causal link between capital flows and growth. And not much is known in the case of capital flows and the growth of Africa's real sectors. The main objective was to find evidence in support of an allocation puzzle, and whether the evidence is one of a causal relationship.

2. What might be the reasons for the empirical observation?

As stated earlier in the capital flow-economic growth nexus, capital flows might not have any direct effect on growth (Prasad, 2005). To explain the "allocation puzzle," previous studies note various mechanisms that may account for the existence of contrary evidence to the theory. Aguiar and Amador (2011) and Gourinchas and Jeane, (2013) found that the puzzle is a feature of the categorization of capital flows into public and private flows and that the allocation puzzle could be as a result of public flows. Also, Alfaro et al. (2014) attributed the observed association to sovereign-to-sovereign transactions that dominate most international transactions. Alfaro et al. (2014) contend that once total flows do not involve sovereign to sovereign flows, the prediction of the neoclassical theory holds.

On the other hand, Prasad (2007) finds that the inverse association could be attributed to exchange rate overvaluation as a result of the influx of external capital. Gourinchas and Jeane (2013) however contend that the allocation puzzle is a "savings puzzle". That is, the puzzle is driven by national savings. Here they contend that the allocation puzzle is related to the literature on investments, savings, and growth. Gourinchas and Jeane (2013) further shows that the difference between a nation's investments and its savings, that is, has positive association with growth. MacDonald (2015) posits that the allocation puzzle is a function of capital account openness, primarily influenced by the accumulation of foreign account reserves. In this study, we follow the lines on literature on the lines of the determinants of capital flows like that of Prasad et al. (2007).

Few studies have found financial markets as a reason for empirical evidence. Sandri, (2014) and Buera and Shin, (2011) posit that the negative association is a consequence of lack of financial access by entrepreneurs. When this happens, projects are financed from the savings of these entrepreneurs, leading to an increase in capital outflows rather than inflows. The above studies, however, failed to predict the exact threshold effect of these mediating variables. Thus, the study explored whether the relationship between private capital flows and disaggregated growth is dependant on the development of Africa's financial sector through a marginal effect analysis.

Another possible reason that might explain the puzzle might not be different from some mechanisms underlying the Lucas puzzle. As noted by Alfaro et al. (2007), institutional weakness is among the mechanisms driving the flow of capital instead from poor to rich countries. Several studies have found the institutional quality to be a driving force in the attraction of capital flows, especially FDI (Asamoah et al., 2016; Asiedu and Lien; Ali et al., 2010; Globerman and Shapiro, 2002). Moreover, Kim (2010) found that FDI is higher in countries with higher levels of corruption and low democracy. About SSA, Bokpin et al., (2017) found FDI to abound in countries with weak institutional quality. Their results confirm earlier positions by Li and Resnick (2003) that most multinational enterprise will prefer to invest in countries where there exists autocracy, and weakness in the enforcement of laws to exploit the systems. Given that the average institutional quality for SSA is low

(Bokpin et al., 2017)[4], the study determined whether institutional quality could be a possible reason for the influx of capital flows even when growth is far from the steady state.

3. Macroeconomic volatility, capital flows and financial development

Instability in whatever form or direction is known to be mostly detrimental. Regarding the direction of private capital flows, the literature posits that one of the mechanisms needed for the attraction of capital flows is macroeconomic stability (The World Bank, 2001). Regarding the sustenance of the MDGs, UNDP (2011) contends that "A financial shock can result in the sudden reversal of capital flows and also in a sharp decline of inflows" (p.86). Thus, the relevance of host country economic stability in the attraction is very crucial. Recent studies have focused on capital flow volatility in the capital flows-economic growth nexus (Alley, 2015; Converse, 2012; Broto et al., 2011; Alfaro et al., 2007). With the increase in flows to less developed countries, a study on the potential impact of macroeconomic volatility, especially about Africa is imminent. At the same time, private capital flows to African has been known to be highly volatile and unpredictable. A lot of uncertainties can derail the flow of private capital making the flow very unstable (see, UNDP, 2011). The volatility associated with private capital flows is detrimental to the growth of countries that are highly dependent on such forms of investment. Issues of monetary policy and economic crises have at times been linked with lower inflows of private capital (Kaminsky and Reinhart 1999; Calvo, Leiderman, and Reinhart, 1996). A conscious effort should be made to avert the factors that pose a hindrance to private capital flows in Africa. Although there abound a host of studies of private capital flows, those that have focused on tackling the impediments to the flow are scanty. As noted by previous studies, the main threats to capital flows are volatilities of

[4] Bokpin et al (2017) notes that between 1996 and 2011, the average mean institutional quality variable is -0.63 on a scale of -2.5 to 2.5. They noted that over the period, the lowest institutional quality was as low as -2.3 while the highest was 0.87.

certain macroeconomic variables (Fernandez et al., 2015; Alley, 2014; WorldBank, 2001; Kyereboah-Coleman, 2008; UNDP, 2011; Cavallari and D' Addona, 2011). However, studies that seek to tackle the impact of macroeconomic uncertainties on capital flows do not abound in the capital flows literature. In this study, we employed the GARCH family models to capture volatility of economic variables and examined the non-linear association between capital flows and macroeconomic volatility. Specifically, the study focuses on exchange rate volatility and its impact on private capital flows in Africa. The study further sought the application of financial development as a mitigating variable to boost capital flows amid economic volatilities.

4. Threshold effects

Existing studies on the allocation puzzle have always assumed a linear relationship as a starting point, raising doubt on the validity of the conclusions drawn from such studies. The study presents the argument that the relationship between private capital flows and growth need not necessarily be linear. Such a connection is too complicated to be merely either strictly positive or strictly negative. For sure, one cannot also assume that private capital will always flow more to countries that are far from the steady state as opposed to the Solow-Swan (1956) theory. MacDonald (2015) notes that FDI follows the neo-classical theory, when FDI was found to positively correlate with growth, making the specific nature of the puzzle not very clear. Thus, this study demystified the standard argument of slow growth countries getting the lions' share regarding private capital. The thesis tested for the existence of nonlinearity based on the evidence that beyond a certain point, there will be a decrease in the flow of private capital when growth is stagnant, which might lead academics back to the neo-classical theory. Earlier literature on capital flows has sought to include the quadratic term of the dependent variable in the standard equation. Contrary to previous studies, the study employed a robust threshold technique that accounts for endogeneity of both threshold variable and regime independent variables. We employed human capital and capital flows as our threshold variables.

These contributions pushed the frontiers of the literature on the allocation puzzle in African countries and have opened new dimensions for further research.

1.3 Research Questions

From the ensuing deliberations and the objectives of the study, we sought to provide answers to the research questions below;

1. What is the empirical evidence on the link between private capital flows and real sector growth in the light of the allocation puzzle in SSA?

2. What is the complexion of the media (financial sector development and Institutions) through which capital flows affect real sector growth?

3. To what extent do the measures of financial development accelerate the flow of private capital to Africa amid macroeconomic uncertainties?

4. To what extent do the complex relationships between capital flows and real sector growth result in states of nonlinearity?

1.4 Research Objectives

Per the research questions stated above, the specific objectives of the study were to:

1. Explore the empirical relationship between private capital flows and real sector growth in the light of the allocation puzzle in SSA.

2. Analyse the effects of financial sector development and institutions as a transition mechanism on the association between capital flows and economic growth (real sector growth).

3. Analyse the catalytic impact of financial development on impediments to the flow of disaggregated capital flows imposed by the volatility of the macroeconomic environment. The objective was to determine if the impact of volatility is linear or non-linear, and what level of financial development can mitigate the adverse impact of volatility on capital flows.

4. Examine the conditions of non-linearity and thresholds in the capital flows – real sector growth nexus. The objective was to determine thresholds in mediating variables such as human capital and capital flows itself in the capital flows – real sector growth connexion.

1.5 Significance of the study

The thesis added to the host of literature and expanded our understanding of the interaction between growth and private capital flows in Africa, and the channels through which such association occur. The central point of the study was the deepening of understanding about the on-going debate on the allocation puzzle. Again, there was little or minimal focus of Africa's real sector. Yet, it is within the real sector that social cost and benefits lies. A study of capital flows solely focused on the real sector was thus eminent. Given the relevance of capital flows to economic growth and in the wake of the recent contradiction to theory, does it mean that African countries that want to attract large volumes of capital flows should remain underdeveloped? Is there a point in time that African countries could attract capital flows and still grow concurrently? Much is known about the effect of capital flow surges on economic growth, however, what will be the impact of a macroeconomic surge on the attraction of capital flows and does risk mitigating measures help in this direction? Lastly, the thesis sought to provide an antidote to the dampening effect of macroeconomic volatilities on capital flows through the application of financial development. The other contribution laid in the application of diverse econometric procedures which have not been employed in the capital flows –economic growth literature. In most cases, the reliability of results is correlated with the econometric procedure applied. We applied an instrumental variable and threshold techniques yet to be applied in the capital flows – growth literature. This thesis thus provided relevant responses to the research questions posed above.

1.6 Thesis Structure

The thesis consists of six standalone chapters woven into one. The rest of the thesis is organised as follows: Chapter two investigated the relationship between the components of private capital and the real sector. It looked at issues of bi-directional relationship in relation to the allocation puzzle. We employed the two-step systems GMM to obviate simultaneous causality bias as the central panel data estimation.

Chapter three investigated the various channels through which private capital flows impacts the growth of the real sector. The limitation of current literature was the role of mediating variables in officiating capital flows – real sector growth dynamics. Employing the Lewbel (2012) instrumental variable general method of moments (IV-GMM) and marginal effect analysis, we determined the levels of financial development and institutions that meditate the association between capital flows and real sector growth.

In chapter four, the study assessed avenues that boost the influx of private capital flows in the midst of macroeconomic uncertainties. Employing newly developed indices of financial development through a marginal effect analysis, the chapter ascertained the right levels of financial development that could boost capital flows even when there exist unprecedented volatilities in economic variables. We employed time-varying general autoregressive conditional heteroscedasticity (GARCH) to capture macroeconomic volatility and applied the dynamic panel system GMM two-step estimator to assess the effect of macroeconomic volatility on private capital flows in Africa.

In chapter five, we extended the capital flows – growth debate by arguing that there exist possible thresholds in the relationship between capital flows and real sector growth. Employing Seo and Shin (2016) dynamic panel data analysis with endogeneity and Seo et al. (2019) we tested for any threshold effect of capital flows on growth, when the relationship is mediated by human capital and foreign direct investment.

Chapter six summed up the entire study with recommendations for policy implementation and further studies.

CHAPTER TWO

PRIVATE CAPITAL FLOWS AND REAL SECTOR GROWTH IN SSA: EVIDENCE OF ALLOCATION PUZZLE AND CAUSALITY?

"If a man empties his purse into his head, no one can take it away from him. An investment in knowledge always pays the best interest." – Ben Franklin

2.1 Introduction

The association between capital flows and economic growth emanates from the assumptions of the neoclassical growth theory (Solow-Swan, 1956). The theoretical basis posits that in a closed economy where foreign capital is restricted, higher domestic interest rates stifle investment and growth. However, in a liberalized economy, barriers impeding capital flows are removed. The influx of capital leads to a fall in the domestic interest rates culminating in increased investments and high growth. Obstfeld (2012) shows the flow of capital to originate from countries where the marginal product of capital is low (because of the abundance of capital) to countries that offer higher marginal rates per capital (obviously because the latter countries are capital deficient). Furtherance to Obstfeld (2012), Romer (2012) and Alley (2015) posit that investors are likely to earn a relatively higher return on the same amount of capital invested in capital deficient countries than when invested in capital abundant countries.

Following Solow-Swan (1956) prediction, Prasad, Rogoff, Wei, and Kose (2005) sought to provide both direct and indirect roots through which capital flows theoretically impacts growth positively. Empirical studies have been pursued to prove the validity or otherwise of the theoretical predictions, albeit with mixed findings. The intrinsic benefits of capital flows rest on their ability to smoothen consumption and propel the growth of recipient economies

(Aizenman, Jinjarak, and Park, 2013; Bunmann, Hermes, and Lensink, 2013). The growth enhancement emanates from the lower cost of capital, improved financial markets, and transfer of technology (Prasad et al., 2005). Again, while boosting the growth of recipient economies, capital flows to developing economies serve as means of portfolio diversification to source economies (Hoti, 2004).

The burgeoning academic literature notes the critical interventions of capital flows to the growth of the economy. For a sample size of 100 countries, Aizenman et al. (2013) contend that the outcome of the association between capital flows and growth is dependent on the type of flow. Employing lagged capital flows disaggregated into portfolio and equity investments, short-term debt and FDI, they found the overall association between FDI (both inflows and outflows) and higher economic growth to be very robust and strong, equity flow and growth were found to be less robust and stable. Other studies also report a positive association between growth and capital flows (Kose et al., 2009; Klein and Olivei, 2008; Choong et al. 2010)[5].

The above studies confirm that the ability of capital flows to impact growth is not in doubt and therefore any failure to understand the nature of such relationship may present dire consequences to countries with excessive dependence on external capital for economic transformation. Moreover, government policies aimed at attracting capital flows should not lose sight of other enabling variables (trade openness, a contented labour force, cordial investment environment, economic freedom, and many more) that are essential to the attraction of such flows. However, some studies also doubt the direct positive association

[5] See Bumann et al. (2013) for a meta-analysis of such studies.

between capital flows and economic growth.[6] It thus implies that the specific role of private or international capital flows in economic growth remains a topical issue among academics and policymakers. Moreover, critical questions about the directional flow of capital remain unanswered.[7] Current arguments have also tended to focus on testing the validity of earlier theories on capital flows and economic growth (Prasad, Rajan, and Subramanian, 2007; Gourinchas and Jeanne, 2013; MacDonald, 2015)[8].

Theoretical conventions of the neoclassical growth framework predict that capital flows enhance economic growth[9] and that faster-growing economies should attract relatively more capital to enhance growth rates[10]. The latter proposition is because fast-growing economies have relatively better investment opportunities and may be creditworthy. However, some empirical studies suggest a contradiction to the view postulated above.

The study thus focused on the allocation of decomposed private capital flows and economic growth on the back of earlier theories of the neoclassical growth model. The main thrust was the weak link between theoretical predictions and empirical evidence on the directional flow of private capital and economic growth. The study was necessary because of the ability of capital flows to transmit to destination economies benefits such as financial sector

[6] See Henry (2007) and Edison et al, (2004) for studies that provide evidence of no clear relationship between capital liberalization and economic growth. Among such include Chanda, (2005); Durham (2004).

[7] See Lucas (1990) for why capital flows less from rich to poor countries and Prasad et al (2007) for the upstream from of capital to the U.S from less developed economies.

[8] These authors have documented contradictions to earlier propositions of the neo-classical growth theory. They contend that fast growing developing economies are attracting less capital inflows as opposed to less growth developing economies, a phenomenon that seems to contradict theoretical propositions.

[9] Mankiw et al. (1992) show that in the augmented Solow model, capital flows affect the rate of savings, which in turn affects growth. Also Caselli and Feyrer (2007); Gourinchas and Rey (2014) demonstrates the positive association between capital flows and economic growth.

[10] "Thus, the neoclassical growth framework makes a very robust prediction for the sign of the correlation between productivity growth and capital flows. Countries that grow at a higher rate should receive more capital inflows" Gourinchas and Jeanne (2013, pp. 1492).

development (Bailliu, 2000; Arteta et al., 2003), technological know-how, support for human-capital development and investment purposes. Additionally, Levchenko and Mauro (2007) suggest that flows of such nature help economies avoid the uncertainties associated with the dependence on short-term flows for investment and growth. However, the literature remains divided on the relationship between capital flows and economic growth, and more importantly, the voluminous literature is silent on the effect of capital flows on real sector growth or the effect of real sector growth of capital flows. This thesis employed both aggregate and disaggregated compositions of real sector growth to test its association with capital flows in SSA. Specifically, we tested for evidence of the "allocation puzzle," and causality in the association between real sector growth and private capital flows in SSA.

By controlling for various capital flows and growth determinants, the main conviction lied in the contribution to literature in various ways. This work differed from previous ones in many ways. First, extant studies on capital flows-growth nexus had focused on Gross Domestic Product (GDP), GDP per capita and productivity catch-up as the only proxies for economic growth. To the best of our knowledge, this was the first shot at taking a critical look at the link between capital flows and real sector growth, and in the light of the "allocation puzzle," and from the lenses of SSA. We presented findings on the existence or otherwise of the "puzzle" from the view of developing economies (SSA). For instance, MacDonald (2015) employed data from emerging and developing countries with no specific focus on SSA. Gourinchas and Jeanne (2013) employed data on non-OECD countries with selected SSA countries. Prasad et al. (2007) also used data including selected SSA grouped as non-industrial and non-transition economies. When countries are aggregated, the data may provide misleading conclusions for policy implementation. Studies have established that countries that are party to regional trade blocs and trade treaties stand to benefit more from the attraction of foreign investment, compared to individual countries (Wakeman-Linn and

Wagh, 2008; Garcia-Herrero and Wooldridge, 2007). It is obvious that countries that are similar in certain characteristics possibly face the same challenges and will benefit from implementing similar solutions. That provides the basis for our focus on SSA.

Secondly, although an array of studies abounds on the specific role of capital flows on economic growth, only a hand-full have thoroughly examined any causal relationship between growth and capital flows. We know little about any bi-directional association between capital flows and economic growth[11]. Tsai (1994) found a two-way relationship between growth and capital flows. However, the focus was on FDI. Similarly, Anwar and Nguyen (2010) concluded on a two-way linkage connecting foreign direct investment and economic growth, but the focus was on Vietnam. Iamsiraroj (2016) notes that there exists a positive association between capital flows (FDI) and economic growth and vice versa. Gossel and Biekpe (2014) found a one-way linkage between growth and foreign direct investment and a weak association between portfolio flows, but for South Africa. Calderon and Nguyen (2015) investigated a causal link between capital flows and output growth for a set of 38 SSA countries. They however employed FDI, aid and foreign borrowing and measures of capital flows and used GDP growth to proxy output growth. Much of the empirical literature has concentrated on FDI and economic growth to the neglect of other capital flows (portfolio equity and private debt), as well as the focus on GDP growth. It thus suggested the scanty literature of any bi-directional relationship between private capital flows and economic growth in SSA. More importantly, reverse effect between the growth of the real sector and private capital flows was non-existent to the best of our knowledge, more so for SSA. Is there a mutual impact between capital flows and real sector growth? Although some literature has

[11]Kholdy and Sohrabian (2005) notes that on the effect of causality between FDI on the economic growth of developing economies, there is ambiguity. Luca and Spatafora (2012) also note that there is no unanimity in the literature on any causal relationship between growth and capital flows.

established a positive correlation between economic growth and capital flows, the critical question is whether this association is reverse causal. The study thus determined the possibility of any bi-directional (evidence of causality) relationship between the components of capital flows and real sector growth in SSA.

The third contributions rest on the application of econometric techniques in the determination of the allocation puzzle for SSA. We employed an estimation procedure that has rarely been employed in the context of the allocation puzzle. With the notion that the allocation puzzle is driven by either the savings or investment behaviour or countries, Gourinchas and Jeanne (2013) employed a wedge analysis framework to confirm that the allocation puzzle is a savings puzzle. MacDonald (2015) only employed a productivity catch technique to ascertain that the allocation puzzle is driven by the degree of capital account openness in the sampled countries. A similar approach was employed by Alfaro et al. (2014). We developed a Cobb Douglas production function that inculcates the growth of the real and its components. We then apply a system GMM technique to deal with issues of endogeneity of the explanatory variables. The system GMM two-step estimator is robust in dealing with issues of heteroskedasticity and is asymptotically efficient. Although Prasad et al (2007) also employed the GMM estimator, the technique was deployed using a five-average of the data. Again, the study provides recommendations for policy implementations. The outcome may provide true direction for the association between capital flows and economic growth in SSA.

The rest of the chapter is structured in the following order: Section 2.2 provides a brief account of the real sector in Africa. Section 2.3 presents a review of the literature on the capital flow-economic growth connexion. In section 2.4 the study discussed the allocation puzzle. In section 2.5, the study methodology was specified. Section 2.6 discusses the findings of the study. Section 2.7 presents various recommendations for policy implications and further studies. Section 2.8 concludes the chapter.

2.2 Overview of Real Sector and Capital flows in SSA

Growth in GDP might not be reflective of actual or real output growth, which also means using GDP growth as a measure of welfare growth or gains may be misleading. However, growth in the real sector will be significant in the drive towards employment creation and largely a reduction in poverty. As echoed by the then UN secretary general on the attainment of the MDGs, "Macroeconomic policies should not focus narrowly on debt stabilization and curbing inflation but *should ultimately be supportive of the growth of real output and employment*. It is often necessary, therefore, to relax unnecessarily stringent fiscal and monetary restrictions and to use countercyclical fiscal and monetary policies to boost employment and incomes and to minimize the impact of external and other shocks on poverty" (UN Secretary-General, 2010 Report in a High-Level Plenary Meeting on MDGs). The above statement implies that GDP growth should not only remain output values but should translate into growth of the real sector, "which is where the social costs and benefits ultimately reside" Aizenman (2013, pp. 1).

The balanced growth model suggests that to achieve effective economic growth, all sectors of the economy should grow proportionally. These distinct sectors of the economy include the external sector, the fiscal sector, the financial and the real sector. Activities in the real sector include manufacturing, agriculture, construction, industry, services (trade, business, transport, government) mining and quarrying, and utilities. Thus, growth in the real sector is evident by the annual growth of industrial value-added, agricultural value-added, manufacturing value-added, and services value-added. The use of value-added of these sectors as a proxy for economic expansion and activity is thus in the right direction. The relevance of the real sector lies in its ability to contribute to the economy's aggregate demand because of the nature of activities in the sector. The productive nature of the sector contributes to the strength of the economy. Activities in the real sector have a direct bearing on economic output and growth. Secondly, the performance of the sector could be a measure of the effectiveness of the government's macroeconomic policies, as most policies focus on improvements in the production of goods and services and the welfare of the people. More importantly, the sector is also known for its ability to employ more people thereby generating income and improving the standard of living of many people in the economy.

Although agriculture has been the backbone of most SSA economies as it accounts for a large share of GDP and employment, productivity rates have been low, especially among many low-income countries. The absence of a resilient and dynamic agricultural sector is likely to curtail the growth envisaged by leaders in Africa. Data shows that growth rates for two of the continents promising economies (Ethiopia and Rwanda) between 1995 and 2010 were driven by growth in the agricultural sector (Watkins, 2014). Recognizing the relevance of agriculture to the growth of the continent, the African Union promulgated two declarations as means of steaming agriculture production in the continent. These were the 2003 Maputo Declaration on Food Security and Agriculture in Africa. A more recent declaration is the 2014 Malabo Declaration on Accelerated Agricultural Growth and Transformation and the associated Comprehensive African Agriculture Development Programme (CAADP). Growth in agriculture can enhance economic growth by boosting productivity if countries in SSA that are agriculture base should support modern farming, create linkages with other sectors and pursue agriculture as business ventures instead of the usual sustenance farming mechanisms.

Industrialization has been identified by current global leaders as one of the drivers of sustained economic growth as depicted in goal 9 of agenda 2030, especially for developing economies. It is essential for structural changes and sustained growth as it shifts production to capital and technological-driven activities from hitherto labor-driven activities. Data shows that between 1970 and 2010 for all regions of the world, there is a positive relationship between the rise in industrialization and indicators of social inclusion, notable reduction in poverty, improved income distribution and human development index. The need for industrialization has become necessary as current data shows a continuous dip in the manufacturing share of GDP for most developing countries, plummeting global commodity prices from primary exports, which hitherto sustained the growth of many resource-endowed economies (UNCTAD, 2016; UNIDO, 2016).

Manufacturing is seen to be essential for long-term growth and structural changes in most economies and an indicator of industrialization. The sector provides the avenue for job creation, wages, technological development and innovation needed to maintain the growth of the sector and other sectors. The manufacturing sector remains the anchor of growth for most developing economies as the growth of these economies is largely due to share of manufacturing in GDP and growth of their manufacturing value added (UNIDO, 2015). On the relevance of the manufacturing sector to sustained growth, UNCTAD (2016) notes that much of the difference in recent growth between East Asia and other developing countries within the last three decades is attributable to growth in their manufacturing relative to GDP. While the ratio stands at 25% for South East Asia, it is almost 30% for North East Asia. UNCTAD (2016) further notes a strong correlation between the growth of the manufacturing sector and increased employment and productivity. Although Africa's share of global manufacturing rose slightly by 0.3% between 2000 and 2008, the proportion of manufacturing relative to export for the same period fell by 4%. SSA's share of global manufacturing value added inched up by 0.13% between 1990 and 2011 (Watkins, 2014; UNIDO, 2015).

Global trends in the growth of industrial productivity regarding manufacturing value added have been impressive over the years except for the year 2009, where there was a drop due to the global financial crisis. Manufacturing value added increased averagely by 2.9% between 1990 and 2000 and by 3.1% between 2000 and 2016. In developing economies, manufacturing value added increased by 4.8% and 18.1% within the same period. For Africa, the value of manufacturing value added has been on the ascendency from $113 billion in 1990 to $129 billion in 2000 and increased approximately by 86% to $ 240 billion by 2016 at 2010 constant prices. Although there was an increase in the absolute values, Africa's share of global manufacturing has been experiencing a nose-dive since 1990 when it accounted for only 9.2% of global share to 6.5% by 2000 before dropping further to 4.4% by 2016. The decline is in sharp contrast to other regions especially the Asia Pacific region where the share of global manufacturing value added have been on the ascendency with 38.6% in 1990 to 54.3% by 2000 and a whopping 76% by the end of 2016. Significantly, Africa's share of global manufacturing value added stood at 2% in 2016 whiles the share of manufacturing value added relative to GDP fell to 10.5% in 2016 from 12.8% attained in 1990 (UNIDO, 2015; 2017). Lower share of manufacturing is likely to derail any industrialization prospects, which may affect growth, as a vibrant manufacturing sector can help sustain growth episodes over a relatively long period, especially, when the share of manufacturing relative to growth is huge, or the manufacturing sector drives growth. There is, however, some light at the end of the tunnel as averaged annual growth in manufacturing value added increased from 1.4% between 1990 and 2000 to 4% between 2000 and 2016. Although these values are low when compared to the Asia Pacific region (4.6% and 5.9%), they are high when compared to that of Europe (1% and 1.3%) (UNIDO 2018; 2016). Prospects for the continent are high as indicated by the 2015 Competitive Industrial Performance (CIP) Index. The index assesses countries competitiveness about production and export for structural change. The index shows prospects for South Africa, Nigeria, Egypt, Algeria, Tunisia, Botswana, Namibia, and Mauritius.

Table 2: 5–year averages of real sector growth variables, measures of capital flows, and GDP Growth

Year	GDP	AGVA	INVA	MANVA	SERVA	FDI	PEQTY	PNG
1980-1984	2.179	1.181	3.842	5.270	3.017	0.979	0.000536	0.000891
1985-1989	3.819	4.280	3.882	5.741	3.756	0.971	0.000122	0.000293
1990-1994	1.720	1.553	2.241	1.412	1.403	1.035	0.000127	0.000009
1995-1999	4.391	4.907	4.887	4.021	4.248	2.554	0.001439	-0.000864
2000-2004	3.689	2.463	4.524	3.523	4.824	3.061	0.000546	0.000124
2005-2009	4.605	2.801	4.781	3.506	6.315	4.119	0.00329	0.000343
2010-2014	4.984	3.287	5.859	5.396	6.206	5.473	0.00824	0.004737

Source: Author's compilation using data from The World Development Indicators. GDP is Gross Domestic Product; AGVA is agriculture value added; INVA is industrial value added; MANVA is manufacturing value added; SERVA is service value added; FDI is foreign direct investment; PEQTY is portfolio equity flows; PNG is private non-guaranteed debt.

Table 2 shows the averages of all measures of private capital flows, real sector growth value and GDP growth on a five-year average base. All measures of real sector growth have increased from their initial figures obtained in 1980-1984 to high figures by 2010-2014. A glance at individual values shows that for instance growth in agriculture value added had increased from 1.181% to 3.287% by 2010-2014. Agriculture recorded high growths from 1985-1989 as well as 1995-1999. The 1995-1999 growth was the highest over the study period. The increasing recorded growth in agriculture emphasises the recent admonishing by the African Center for Economic Transformation that: “agriculture presents the easiest path to industrialization and economic transformation. Increasing productivity and output in a modern agricultural sector would, beyond improving food security and the balance of payments (through reduced food imports and increased exports), sustain agro-processing, the manufacturing of agricultural inputs, and a host of services upstream and downstream from farms, creating employment and boosting incomes across the economy" (ACET, 2017; pp. 1). For agriculture to lead economic transformation in SSA, it is essential that we eliminate the many issues facing the sector. Among these include lack of financial access to farmers and high-interest rates (Meyer, 2025; Mhlanga, 2010); land tenure and access to land by most farmers (ACET, 2017; Banjole and Duflo, 2007); boosting productivity, mechanising farming and access to market for produce (ACET, 2017; Meyer, 2015).

Similar growth pattern occurred across all sectors. The industrialization agenda of SSA is evident in the growth rates of manufacturing value added, and industrial value added. It is also worthy to note that in periods where manufacturing growth was low (2000 – 2014), industry growth was on the ascendency and for periods where growth in industrial value addition was low (1980 – 1999), manufacturing drove industrialization. The growth in industrial value addition has been phenomenal as it rose from 3.842% in 1980-1984 to 5.859% by 2010-2014. The significance of the growth especially from 1990-1994, when manufacturing growth was on the decline shows that industry growth was not entirely dependent on manufacturing but also other sectors such as mining, construction, electricity, water, and gas. It is also an indication that SSA's industrialization agenda is achievable with a focus on the growth of the mining, water, gas and construction sectors.

Further analysis of table 2.1 shows significant growth in services valued added. The sector achieved the largest jump in growth between 1980-1984 and 2010-2014. Growth in the service sector had more than doubled, growing approximately 105.70% by 2010-2014 from the initial value of 3.017% recorded in 1980-1984. The sector has also achieved the largest growth across most periods from 2000-2004 up to 2010-2014. The constant growth of the sector supports recent assertions that the service sector can drive growth in Africa. For instance, AfDB (2018) noted that since early 2000, Africa's growth and poverty reduction was accompanied by a decline in agriculture labour force with massive growth in the service and manufacturing sectors. AEO (2018) further notes that for Nigeria, between 2012 and 2016, there has been a constant drop in the extractive sector share of GDP whiles services and manufacturing increased over the same period. Within the same period, 3.5% of the agriculture labour force moved to the service sector in Cote d'Ivoire, where average service sector productivity was almost 3.2 times that of the agriculture sector. By 2016, the contribution of the service sector to GDP had grown from its initial value of 23.4% to 31.7% in Cote d'Ivoire (AfDB, 2018).

Critical observation also shows that there was a dip in the growth of all sectors in 1990-1994. The 1990-1994 recorded the lowest growth rates over the study period. The lowest growth across sectors culminated in the lowest GDP growth also for the study period. It stands to suggest that there is a strong correlation between the growth of the real sector and growth in GDP. Regarding private capital flows, there has been a constant increase in the quantum of private capital flows across all components. FDI has risen from its initial figure of 0.979 in 1980-1984 to an average of 5.47%. Though minimal, portfolio equity and private non-guaranteed debt have both increased from their initial figures in 1980-1984.

2.3 The capital flow – growth nexus: A review

In the simplest form of the neo-classical theory (Solow-Swan, 1956), economic growth follows the shape of a production function, where output is a function of technology, capital, and labour. Following a Cobb-Douglas production function, there is a diminishing marginal return on capital and labour, in a closed economy. However, technology is determined exogenously. Thus, the advancement in technology is an essential component for growth and that with a given level of capital and labour, technological advancement could lead to increased output and growth. The model further helps in predicting the length of time it will take for slow-growing economies to "catch up" with fast-growing economies. Focusing on the characteristics of positive returns to inputs, economic growth could result from capital input when labour and technology are held constant. Thus, between two countries, per worker capital may account for the difference between the levels of production. The amount of capital could be from domestic or external source.

In a liberalized economy, it means that capital flows could augment domestic capital to enhance growth. It thus suggests that in the simplest form of the neoclassical model, capital stocks in the form of capital flows augment domestic investment to propel economic growth. Within this framework, De Mello (1997) predicts the capability of foreign direct investment to stimulate growth of an economy. However, based on the assumption of diminishing return of capital inputs, the neoclassical theory predicts a steady convergence for all economies. Thus, the impact of private capital on economic growth is a short run phenomenon, with no growth impact in the long run.

Empirical studies on capital flows have focused on varied dimensions, with mixed or complex conclusions. Among these include the drivers of capital flows (Byrne and Fiess, 2016; Anyanwu and Yameogo, 2015; Brafu-Insaidoo and Biekpe, 2014), capital flows and associated surges (Opperman and Adjasi, 2017; Broto et al, 2011), capital flows and macroeconomic volatilities (Asamoah et al, 2016; Caporale et al., 2015), capital controls efficiency (Alley, 2017; Forbes and Warnock, 2012), and the effect of capital flows on domestic investment (Adams et al., 2016; Gocer et al., 2014; Brafu-Insaidoo and Biekpe, 2011). There are also numerous studies that have focused on the relationship between growth, productivity and capital flows.

The relevance of empirical studies is to draw conclusions that confirm theoretical predictions. There abounds an array of literature on capital flows and growth. However, testing theoretical predictions through these empirical studies have yielded mix results, thus failing to conclusively conclude on either a positive or negative association between measures of capital flows and economic growth, making room for further studies. Assessing the effect of both aggregate and disaggregate capital flows and its volatility on economic growth for a selected number of 26 SSA countries, and employing dataset between 1980 and 2011, Nyang'oro (2017) reveals of a positive association between portfolio equity and economic growth while private equity and debt flows were found to be detrimental to growth. Regarding aggregation, both net and gross are disingenuous to economic growth. Thus, although capital flows may benefit the economy, it is dependent on the type of capital flow.

Employing Blanchard et al., (2016) neoclassical growth equation, Alley (2017) provides evidence of a weak association between capital flow components and growth enhancement of a selected set of 25 SSA economies over ten years. He demonstrates that capital flow characteristics are important for any significant effect on growth. When flow surges are considered, FDI and equity flow enhance growth while debt flows (bond) impedes economic growth. Furtherance to the above, the negative conclusion of debt on economic growth could be explained in the presence of capital formation while such explanation could not hold for the positive associations of equity and foreign direct investment flows on economic growth. Finally, the relevance of capital controls was evident in its ability to diminish any adverse effect of capital flow surges on economic growth. The overriding evidence is for countries in SSA to attract more FDI and equity capital, while reducing reliance on debt (bond) flows, which is becoming an increasing source of funds to some SSA governments.

Employing aid flows, FDI and sovereign debt flow as measures of capital flows for a set of 38 SSA countries. Calderón and Nguyen (2015) determined whether capital flows boost growth of selected developing economies By employing a two-step approach methodology to resolve issues of omitted variable and reverse causality, they show that within the period between 1979 and 2012, output growth does not matter for the attraction of capital flows for countries is SSA. On the other hand, aid flows and FDI are growth enhancers whiles sovereign debt flows do not boost growth. At a 1% significance level, aid flows seem to matter most for the growth of SSA economies as a 1% increase in aid flows to the continent will impact growth by 0.022 percentages points. Although the effect of FDI flows is much smaller than aid flows, at a 5% significance level, a 1% increase in the flow of FDI will positively impact growth by 0.002 percentage points. Thus, for SSA countries, there is no reverse causality regarding capital flows and growth, since capital flows are relevant for growth to occur, but growth can occur in the absence of capital flows.

Few studies have sought to concentrate solely on the relationship between the individual components on capital flows and economic growth. On the relationship between FDI and economic growth, Omri and Kahouli (2014), using a growth framework and simultaneous-equation models estimated by the generalized method of moment, found that there exists a bi-directional causal relationship between the economic growth of 13 countries in the Mena region and FDI flows. The study employed data from 1990 to 2010. Using data from 1975 to 2009 on Tunisia, Hassen and Anis (2012) found that FDI has a significant effect on economic growth over the period. Using a cross-country dataset of 124 countries from 1971 to 2010, Iamsiraroj (2016) determined the linkage between FDI flows and economic growth. By the application of the simultaneous system of equation approach, Iamsiraroj (2016) found a positive association between higher rates of economic growth and higher FDI flow. Based on the simultaneous equation approach, the study notes the existence of an unending cycle where current FDI inflows promote growth; the growth attracts increased FDI, which leads to further growth. Employing the simultaneous equation for 61 provinces in Vietnam between 1996 and 2005, Anwar and Nguyen (2010) concluded on the existence of a mutually two-way linkage between economic growth and FDI flows. Basu et al. (2003) had earlier found similar results for a set of 23 developing economies using data from 1978 to 1996. They further note that for liberalized economies, the causal relationship is bi-directional, however, in closed economies, the impact is from economic growth to FDI. Again, on the bi-directional movement of FDI and growth, Hansen and Rand (2006) sought out to find if such association existed for a set of thirty developing countries. By employing a bivariate VAR panel model, they found a way movement from FDI to growth with the reverse being insignificant. Choe (2003) however found that causality was strong from growth to FDI on a sample of 80 countries. Adams (2009) had concluded on the relevance of FDI to the sustainability of the SSSA's economic growth when he employed OLS estimations for a sample of 42 countries. However, he also notes of the crowding out effect of FDI. Other studies on the FDI-growth connexion include Adjasi et al., 2012; Azman-Saini et al., 2010; Alfaro et al. 2004; Borensztein et al., 1998.

Studies that have solely concentrated on the relationship between portfolio investments (equity and debt) flows and economic growth do not abound in the capital flows literature, unlike FDI flows. Most studies perform separate regressions on equity flows and economic growth as part of a larger capital flows-growth regression. Decomposing the components of capital flows, Agbloyor et al. (2014) found that for a set 14 SSA countries, data from 1990 to 2007 shows an inverse relationship between economic growth and portfolio equity flows. Thus, they conclude that portfolio flows alone hurt economic growth. Employing data on 80 developing countries from 1979 to 1998 on the effect of equity portfolio on economic growth, Durham (2004) contends that their effect on growth is not direct and portfolio (equity) flows on its own cannot enhance growth. To this effect, equity flows would have promoted economic growth when host countries are developed financially or have strong institutions. On a data set of 44 developing countries over 11 years, Soto (2000) concludes that whiles portfolio equity flows were robust and positively correlated with economic growth, portfolio bond flows were found to be insignificantly correlated economic growth.

Most studies about debt flows and economic growth in SSA have yielded mixed results with the majority showing an inverse association. Using private non-guarantee flows as a measure of debt, Agbloyor et al. (2014) found debt to initially deter growth in 16 SSA economies between 1990 and 2007. Employing data on Nigeria over 30 years from 1975 to 2005, Adegbite et al. (2008) found external debt flows to impact growth positively up to a point, after which the effect becomes negative. Fosu (1996) had earlier noted the adverse effect of foreign debt flows on 29 Sub-Saharan economies between 1970 and 1986.

Scholars have also questioned the ability of capital flows to provide economic stability. Capital flows may lead to an excessive expansion of domestic credit, bubbles in real estate and equity markets, appreciation of local currencies, making local products less competitive in the global market as well as rising current account deficits (UNCTAD, 2013). Stiglitz and Rashid (2013) show that although such flows (sovereign bonds) allow some comfort, they come along with significant maturity and currency risks, making recipient countries susceptible to the negative impact of these flows.

In summary, the association between capital flows and economic growth have provided mixed results thus leaving conclusions on the subject entirely mixed. Whiles the general expectation is that capital flows should have a positive impact on growth, some forms of capital flows provide a better positive impact on growth than others. On the type of flows, FDI generally impacts growth more than the other forms of flows. FDI is also known to be very stable than portfolio equity and debt flows, as they are more volatile and less resistance to shocks and economic fluctuations. The effect of debt flows is known to be mixed. Succinctly, the review of the above literature has echoed the relevance of our study, as we found no studies on the relationship between the growth of Africa' real sector and the attraction of capital flows. More importantly, within the context of the allocation puzzle, the literature shows that there is a lacuna with the African context. Again, the above review has shown the depth of gap on any two-way relationship between private capital flows and real sector growth in Africa.

2.4 The allocation puzzle

One of the main theoretical underpinnings on why countries open their doors to external capital flows is the neoclassical view that explains the benefit of capital flows to the economy. The simplest neoclassical model on trade and growth confirms with the gains from trade and financial integration. Thus, countries experiencing financial constraint or financial development gap could resolve such issues in the view of the neoclassical theory on financial integration (Allen et al., 2014). The fallouts from being financially constraint is attributed to factors such as lower aggregate savings (World Bank, 2013), and emergent financial service sector (Ojah and Kodongo, 2014; Allen et al., 2014). However, solving the financial development gap empirically have provided mixed results as there seem to be empirical contradictions to theory. As stated earlier, the standard neoclassical model makes two propositions on the destination and source of capital. Between two countries, the returns on capital or marginal product per capital in the country with less financial integration will be higher than the country that is more financially integrated. This situation should lead to an exodus of capital or investment into the country with a high marginal product of capital.

The neoclassicals posit that all things being equal, more capital should flow from rich countries where capital abounds, and the rate of return on capital is relatively low to developing countries where the marginal return on capital is high because of competition for capital. In the view of the neoclassical, because most developing economies are closed to external finance or trade, the quantum of capital available for investment and production is very limited. The scarcity of capital leads to hikes in domestic interest rates. Because most cannot afford capital at the high rates, growth and investment stifle. However, in many rich economies, where the country is opened, there are little or no barriers to capital, and the cost of capital is relatively lower. Recognizing the limited sources of capital in developing economies, there are large movements of capital from rich countries, supposedly to take advantage of the high rates. With the inflow of new or additional capital, there is a gradual drop in the cost of capital in many hitherto closed economies. In this context, investments will virtually flow down-hill more and more to developing countries, with virtually little or no investment in rich countries, especially from less developing countries. The resultant effect is an improvement in the levels of investment in both financial and real assets such as plant and machinery, equipment and fixtures as well as infrastructure. The increase in investment could also lead to reductions in levels of unemployment and income inequality between the rich and the poor. Thus, developing countries will continue to receive more capital from the rich until a point in time when the rates of return on capital can be deemed equal between the rich and developing countries.

The standard neoclassical view on capital flows holds because of the virtues of financial integration, and in periods around the world wars when economists such as John Maynard Keynes and Harry Dexter White were concerned about the benefits and movement of capital flows and financial liberalization. Especially, the flow of capital from poorer to wealthier countries, as most developing countries are known to be aid-dependent with a lot of external imbalances (Helleiner, 2005). Although Obstfeld and Taylor (2004) contend that financial liberalization may be advanced in the era of these economists, contradictions may be existing currently because, in the modern era, financial integration involves more economies, large amounts of capital moving in various directions as well as varied financial instruments

(Bernanke, 2006). Thus, questions begun to emerge about the role of capital flows to growth, when new evidence emerge about the uphill flow of capital from poor to rich countries. Since the seminal work of Lucas (1990), strands of literature have attempted to explain why so little capital flow from rich to developing countries as against the opposite. For instance, Collier and Gunnings (1999; pp. 92-93) noted, “Despite a lower level of wealth per worker than any other region, African wealth owners have chosen to locate 39% of their portfolios outside Africa”. About SSA, available evidence shows that more capital is flowing out of the region regarding GDP in comparison with other developing economies (Collier and Gunnings, 1999). The up-hill flow of capital is worrying when it is evident that most poor or developing economies appear to operate current account deficits, are aid-dependent and look to the rich or developed economies for external capital for investment and potential growth. The up-hill movement is worrying as it could contribute to issues of exchange rate instability in most developing countries. There will be the need to convert domestic currencies to foreign currencies. Perhaps, a critical question that needs answers is why the up-hill flows of private capital. Why will developing countries that mostly rely on budgetary support and aid for investments choose to locate most of their portfolios in already developed or prosperous economies?

Various reasons could explain the upstream movement of capital. Lucas (1990) sites difference in human capital between the poor and rich countries, which could mean that investing in a developing country could be less productive. A well-developed human capital is essential for labour productivity in terms of production, which has a direct impact on investment returns. Given that the augmented Solow model recognizes the relevance of human capital for economic growth, investors will consider human capital as an important ingredient in their decision to invest. Since the level of human capital in developing economies is relatively low, it is obvious that production funded by capital will be low.

Another reason for the up-hill movement is capital market imperfections, with the fear that interests on investments will not be paid or profits on investment cannot be repatriated. Market imperfections could result from the investment climate, which includes the business environment of the country seeking capital[12]. The absence of these location-specific factors coupled with a lack of profitable investment opportunities does not give economic agents the confidence to invest in many developing economies. For instance, Alfaro et al. (2008) show that fundamental differences and capital market imperfections give credence to the up-hill movement of capital. Using data from 1970 to 2000, they posit that levels of institutional quality are the leading cause of the upstream movement of capital from poor to rich countries. Thus, to deal with the movement of capital to developed economies, policymakers in developing countries should focus on investor protection schemes, uphold the rule of law and order, and reduce corruption, stable governments as while as bureaucratic quality. The domestic environment regarding risk-return relationships could also be a factor that seems to push capital out of poor or developing as well as the propensity of developing countries to default on debt repayments (Le and Zak, 2006; Reinhart and Rogoff, 2004). Expectations are that when the issues of market imperfections are reduced or eliminated, the rate of up-hill capital movement will also be reduced if not eliminated. The up-hill movement of capital is therefore because of less robust macroeconomic fundamentals that exist in many developing countries, which leads to a large outflow of capital from developing to developed countries.

Furtherance to the Lucas (1990), another intriguing revelation that refutes the neoclassical theory is the direction of capital flows among "developing or poor" countries. Expectations

[12] The World Investment Report (2005) defines investment climate as "the set of location-specific factors shaping the opportunities and incentives for firms to invest productively, create jobs, and expand" (World Bank 2004). A more recent definition is also provided as "the support for policy, legal, and institutional reforms intended to improve the functioning of markets and reduce transaction costs and risks associated with starting, operating and closing a business in the World Bank Group's client countries" (World Bank Independent Evaluation Group (IEG 2015;p. 23).

are that "poor countries" that have experienced high and steady growth rates relative to the world frontier growth should attract more capital inflows, obviously to support current growth rates and investments opportunities. However, recent studies posit that "poor countries" with lower growth rates far behind the world frontier growth rates are receiving more capital inflows thereby establishing an inverse relationship between growth and capital flows. The inability of capital to flow towards high growth countries has been christened "the allocation puzzle" (Gourinchas and Jeanne, 2013; 2007). The puzzle, which Prasad et al. (2007) considers being a deeper form of the Lucas puzzle, shows that the growth of the economy does not attract more capital inflows. Prasad et al. (2007) note that countries with far fewer growth rates are attracting more capital than those that are deemed to be fast growing, have stronger institutions, good infrastructure, conducive investment terrain and are less likely to default. Using data from 1970 to 2004, on a set of 59 non-industrialised countries, Prasad et al. (2007) show that the quantum of foreign capital flowing into high growth countries was far less in comparison to medium and low growth countries. Similarly, between 2000 and 2004, whiles all developing countries in the sample exported capital alongside India and China, most low-growth countries attracted large amounts of capital inflows. Thus, over the period, growth rates are high for countries that have depended on less foreign capital inflows.

Employing data on a set of 65 non-OECD countries between 1980 and 2000, Gourinchas and Jeanne (2013) found great inconsistencies in the neoclassical predictions between the flow of foreign capital and economic growth. They show that over the period, countries that have achieved higher growth rates relative to their counterparts seems to attract fewer amounts of net capital inflows, revealing an inverse association between net capital inflows and productivity growth rates. Employing the Hodrick-Prescott filter in the computation of productivity growth and capital flows data from Lane and Millesi-Ferretti (2007) external worth of nations database, they found a significant negative relationship between net capital flows and productivity growth even after controlling for initial capital abundance, initial debt, population growth, capital controls, and financial openness. An analysis of the puzzle, however, reveals that the allocation puzzle is a function of the savings component of net capital flows as well as the publicly originated capital inflows.

Although the initial association between capital flows and growth produced an inverse relationship on a sample of 67 countries from 1980 to 2007, Alfaro et al. (2014) show that the negative association was due to the public component of capital flows. Thus, when we decompose capital flows into private and public flows, there exists a positive association between private capital flows and growth, a phenomenon that supports the neoclassical view of capital flows-growth nexus. It is therefore imperative for governments to focus more on addressing issues relating to public savings, official flows as well as current accounts and not solely on private savings, if the full benefits of capital flow on growth will be attained. Similar conclusions by Schroth (2016) shows that indeed capital does that not flow to fast-growing economies in the right proportion and that although FDI flows seems to follow growth, large savings in the form of sovereign debt mostly offsets the positive relationship between FDI and growth resulting in the allocation puzzle between total capital flows and growth in developing countries.

Looking at the association between patterns of international capital flows and productivity growth, MacDonald (2015) sought to provide supporting evidence of the existence or otherwise of the allocation puzzle on a dataset of 92 countries comprising both developing and emerging market economies from 1980 to 2010. Employing measures of capital flows from The Lane and Milesi-Ferretti (2007a) dataset and total factor productivity to measure productivity growth, MacDonald (2015) confirms the deviation from the theory by earlier studies on the existence of a robust negative association between net capital inflows and productivity growth. In explaining the negative association, MacDonald (2015) contends that the association is driven by the capital account openness, meaning that countries with larger capital account openness will experience directional movements between capital flows and growth. It is worth noting that the conclusion of MacDonald confirms earlier results by Aguiar and Amador (2011) who had earlier concluded on an inverse association between net capital flows and growth and that such inverse relationship is a consequence of capital account openness. Their results imply that it is not merely that countries furthest from the productivity frontier explain low levels of capital inflows, but the flows may be affected by the capital account openness of these countries. However, a decomposition of the components of capital flows on productivity growth provided mixed results. Whiles foreign direct investments associated positively with growth, a phenomenon that supports the neoclassical, other components of capital flows (portfolio equity and debt) confirm the allocation puzzle for most open economies. Thus MacDonald (2015) is of the view that the allocation puzzle, is a function of the distinction of capital flows based on the type of flow (FDI or portfolio flow) rather than on the source of the flow (private or public) as indicated by earlier studies (Alfaro et al., 2014).

These studies on the allocation puzzle have found mixed results on the existence of the puzzle. One important observation among all these studies is the sample employed. Almost all the above studies have geographical limitations when it comes to SSA. However, these studies are conscious of their sample size, while Prasad et al. (2007) focused on non-industrialised countries, Gourinchas and Jeanne (2013) focused on OECD countries. Although Alfaro et al. (2014) and MacDonald (2015) employed a sample of both developing countries, SSA as an investment destination has received attention. Other observations included the measures of growth, the make-up of capital flows, and the sources of data.

Despite the copious amount of evidence, there is virtually no study that has turned its lenses on SSA as a capital flow destination. Evidence on the existence of the allocation puzzle on SSA is virtually non-existent. Although most studies have incorporated SSA countries in a large set of developing or non-industrialised economies, Alfaro et al. (2014, pp. 2) note, "such correlations can have different signs and thus imply opposite relationships between net capital flows and growth depending on which countries dominate the sample". Therefore, turning out attention to SSA in various decompositions of the private capital flows and real sector growth, we assessed evidence and reverse effect of the allocation puzzle on a set of 42 SSA countries while employing a larger data point from 1980 to 2017.

2.5 Data and methodology

We present the main variables of interest for the study and other determinants of foreign capital flows and real sector growth: Data description, the main estimation procedure, and strategy.

We constructed a panel of 42 SSA countries to test for evidence and reverse effect of the allocation puzzle. We used a larger dataset as opposed to previous studies with data spanning from 1980 – 2017. The selection of countries depended on the availability of data. Appendix 1 shows a list of countries. We sourced data on an annual basis from the African Development Indicators and World Development Indicators of the World Bank, and the Global Development Finance databases, Chinn and Ito (2008) provides data on capital account openness. Following Gourinchas and Jeanne (2013), we chose the study period based on two main considerations. First, measures of financial openness show that by the mid-1980s to 1990s, most countries have liberalized their economies. For SSA, these periods saw the setting up of most stock markets as indications of financial market liberalization. Capital control measures were also relaxed coupled with the introduction of various financial products. Using the Chinn and Ito (2008) index of financial openness, the average level of financial openness from 1980 to 2015 for the samples in our study ranges between -1.51 and 1.66[13]. Again, since the focus is on long-term capital flows, we needed to employ the longest data-span as possible, as it will help avoid distortions in results over a short period as such results are likely to be affected by economic volatilities in some countries or possible changes in the global business environment.

2.5.1 Measuring of Capital Flows.

The literature provides various measures of capital flows, mainly either “stock” or “flow” measures. According to Bornschier et al., (1978) whiles stock measures look at the level of foreign capital penetration or the proportion of capital attributable to external owners, flow measures, on the other hand, looks at the quantum of foreign capital flowing into an economy at a point in time. Stock measures also look at the benefit of capital over a long period. Iamsiraroj (2016) notes that the use of “stock” measures means we must account for depreciation of capital. However, this might be an issue. We focused on flow measures as our main form of data. Again, “flow” measures are either net flows (Outflows – Inflows) or actual inflows. Departing from (Prasad et al. 207) on the use of stock flows, we used flows as measures of capital flows (MacDonald, 2015; Alfaro et al. 2014; Gourinchas and Jeanne, 2013). As noted by Bornschier et al., (1978) and Alfaro et al. (2004) foreign capital inflows capture the amount of new capital flowing into a country at a point in time, thereby indicating of the additional capital year in year out. Using net flows thus satisfies the objectives of the study as we determined whether new capital will cause growth or growth will attract new capital flow at any point in time, bearing in mind also the amount of capital going out.

[13] According to Chinn and Ito (2008), the index is between -2.6 (very closed) to 2.6 (very open). The most closed in our sample is Ghana (-1.51) and the most open is Seychelles (1.66).

We extracted data on capital flows from World Development Indicator Series Database published by the World Bank. The database as constructed relies on varied sources. These include The World Debt tables, Historic CDs of the Global Development Finance (GDF), the vintages of the World Bank-Global Development Finance and International Development Statistics (IFS). In this study, we employ foreign direct investment, portfolio equity flows, and private non-guaranteed debt flows as the indictors of private capital flows. These variables are explained below.

Foreign Direct Investment (FDI) is the total value of investment flowing into the reporting entity by external investors. The aim is to acquire a permanent interest in the management of the local entity, which in most cases is to acquire not less than 10% of equity ownership. It is the sum of equity capital, reinvestment earnings, other long-term capital and short-term capital as shown in the balance of payment. FDI inflow is a percentage of GDP. Iamsiraroj (2016) and Driffield and Jones (2013), obtained inflows of FDI from the UNCTAD Stat. We employed net flows as constructed by WDI dataset. We expected that the net flows of FDI would augment the already existing local capital to boost production, which will eventually lead to the growth of the real sector. We expected FDI to impact growth positively and vice versa.

Portfolio Equity flows (PEF) is becoming an increasing source of private capital to most SSA economies. It includes inflows from equity securities other than those recorded as a foreign direct investment (FDI). Portfolio equity includes shares, stocks, depository receipts and direct purchases of shares in local stock markets by foreign investors. We expected there will be a causal relationship between both portfolio equity flows and measures of real sector growth. We further anticipated a mixed relationship between capital flows and economic growth, a positive relationship is possible based on the neoclassical theory of capital flows and growth and where macro and economic dynamics of the host country is quite stable.

However, due to its volatile and "hot money" nature, a negative relationship is a high possibility. We employed the net flows of PEF for each specified country.

Private Non-Guaranteed Debt Flows (PNG): There is a variety of debt flows used in the literature. These flows include debentures, bonds, notes, and money market instruments. Other forms are loans, transactions in currency and deposits, trade credits and financial leases. Debt flows could be either short term or long term (Durham, 2004; Soto, 2000). Others have proceeded to group debt as either public or private guaranteed (Alfaro et al. 2008; Agbloyor et al., 2014). According to Alfaro et al. (2014; 2008), it is much easy to assign both FDI and equity flows as private. However, the difficulty lies in the decomposition of debt flows to identify the private components.

Given that the focus of the study was on private capital flows, we followed Agbloyor et al., (2014) and employed private non-guaranteed debt from the WDI database as our main measure of private debt.

Total Private Capital Flows: Total private flow is the sum of foreign direct investment, portfolio equity flows and private non-guaranteed debt (FDI + PEF + PNG).

2.5.2 Measuring Economic Growth

The assumptions of the neoclassical theory form the theoretical basis or framework for most empirical studies on the relationship between economic growth and capital flows. There have been varied measures of growth in the capital flows – economic growth nexus. Within the framework of the allocation puzzle, the most commonly used measures of economic growth are GDP Growth (Alfaro et al., 2014; Prasad et al., 2007) and TFP Growth, i.e., productivity catch-up (MacDonald, 2015; Gourinchas and Jeanne, 2013). According to Gourinchas and Jeanne (2013), differences in the marginal product of capital between two countries may result from how growth is measured (GDP or TFP growth rates). A higher growth rate is likely to attract high investments and capital inflows, which means that high growth increase capital stock. Thus, between two countries, the differences in the quantum of capital inflow could depend on the levels of GDP or TFP growth.

Real GDP growth has been the ultimate measure of economic growth in the literature; however, the economic transformation of the population is much evident by the growth of the real sector. Welfare gains and benefits are known to reside in the real sector. We employed annual growth in value added of components of the real sector as a contribution to growth and economic activity. Therefore, an important distinction of our study was relating capital flows to production growth, and not necessarily growth, as measured by GDP in most studies. We proxied growth using measures of the real sector. Previous studies on the real sector have employed measures of value-added from the Groningen Growth and Development Centre (GGDC) constructed by Timmer and de Vires (2009). Among such studies, include McMillan and Rodrik (2011) and Aizenman et al. (2013). The GGDC measures of real sector employs ten variables which include manufacturing; agriculture; public utilities (gas, water and electricity); mining; construction; transport, storage and communication; wholesale and retail (inclusive of restaurants and hotels); community, personal and social services; finance, insurance and real estate; and government services. Aizenman et al. (2013) sought to increase the aggregation of these sectors to nine by combining community, personal and social services, and government services into one sector instead of the ten employed by earlier studies. Alfaro and Charlton (2007) employed data on industrial value-added from the Industrial Statistics Yearbook of the United Nations Statistical Division, which reports data by industry (also using ISIC Rev. 3 classifications), while Vu and Noy (2009) also used data on total value added from the OECD Structural Statistics Analysis (STAN) 2006 edition. We could not use data from GGDC as it contained data on only eleven countries in Africa.

Employing the annual growth of the real sector from the World Bank World Development Indicators, we increased the number of aggregations of the sectors to four. Maintaining agriculture and manufacturing, WDI combines mining, construction, public utilities, and manufacturing as industrial. Also, transport, storage and communication, government services, wholesale and retail (including hotels and restaurants), community and personal services, finance and real estate are classified as services. We, therefore, followed Ductor and Grechyna (2015) and used measures of the real sector by the WDI. Thus, our measures of growth are proxied by annual growth of industrial value-added, manufacturing value-added, agricultural value-added, and service value-added. According to the International Standard Industrial Classification (ISIC), revision 3, value-added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. Value added is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources.

Annual growth of agriculture valued-added encompasses value additions in forestry, hunting, and fishing, as well as cultivation of crops and livestock production. Industrial value-added comprises value additions in mining, manufacturing (also reported as a separate subgroup), construction, electricity, water, and gas. Services value added comprise value additions in wholesale and retail trade transport, and government, financial, professional, and personal services such as education, health care, and real estate services. All aggregates are based on constant 2010 U.S. dollars. We also constructed an index measure of real sector growth from the four measures, called the Real Sector Growth Index. Consistent with the literature (Asiedu, 2013; Asamoah et al. 2016), the real sector growth is an equal weight of the four components, that is, growth in agriculture, manufacturing, industry, and service value additions.

2.5.3 Control Variables

We followed the literature on the determinants of economic growth and capital flows and employed various variables as controls. These variables are known to be exogenous to either capital flows or the growth process. Broad measures include both determinants of capital flows, financial openness, resource endowments, and macroeconomic stability. We obtained measures of trade openness, natural resource rent, inflation, gross capital formation, gross savings rate, exchange rate, and broad money from the WDI. Data on Human capital was sourced from the Penn World Tables (Feenstra, Inklaar, and Timmer, 2015). We also controlled for legal system origin using Porta et al. (1998).

Broad money captured by M2, which represents money and quasi-money, and it is the summation of all currency outside banks and demand deposits except for those at the central bank. The impact on the real sector may depend on the extent to which government interferes in the circulation of money. We expected mixed effects on the real sector. While an expansionary policy will increase money in circulation and for production, a contractionary policy will lead to high interest rates and cost of production. We measured trade as the sum of imports and exports of goods and services scaled by GDP. Trade openness measures the extent to which an economy is opened to trade. We expected a positive effect on trade liberalization on the growth of the real sector and the attraction of portfolio investments. We expected trade openness to positively attract foreign capital flows, especially if the investments are, market seeking. Openness of trade should also inspire sectoral growth. We measured natural resources endowment through its contribution to growth. It is the summation of oil, mineral and forest rents expressed as a percentage of GDP. We hypothesized mixed effect of natural resources on the various sectors. While the industrial sector may benefit from natural resources extraction, growth in agriculture may suffer if farmlands are demarcated for extraction. Natural resources can aid the attraction of capital, especially when local capital is not adequate. We therefore expected a positive effect on private capital flows. We also used gross capital formation as a percentage of GDP to capture the effect of domestic investment. We hypothesized that investment in the form of additional capital will have a positive effect on the growth of all sectors. We expected mixed effect of gross capital formation on the attraction of capital flows. A positive effect is plausible when domestic investments are inadequate, however, to the extent that domestic investments exceed requirement, foreign capital will be crowded out. We used the inflation rate as a measure of macroeconomic (in) stability. Its measure is the annual percentage change in the consumer price index (CPI). It is an indication of the policy direction of the government and could have the effect of the real sector through firms and household savings and investments. To the extent that rising inflation will reduce consumers' purchasing power, leading to a reduction in sectoral revenue, we hypothesized an adverse impact on growth of the real sector. We also expected inflation to deter capital flow investments as persistent increases in price will make planning difficult and erode profit of capital providers. Gross domestic savings (GDP – total consumption) capture the savings rate as a percentage of GDP. Savings are expected to impact positively on the growth of all sectors. However, the impact of capital flows is expected to be negative as domestic savings can act as capital for investment. We measured exchange rate by the official exchange rate determined by the national authorities, or the rate determined in the legally sanctioned exchange market. Countries with devalued currencies relative to foreign currency will be attractive to foreign enterprises. We expected a positive impact of exchange rates on capital flows investments and growth of the real sector. We measured human resources or human capital development with data from the Penn World Tables (Feenstra, Inklaar, and Timmer, 2015). The index is based on years of schooling and returns to education. Human capital is essential in the conversion of raw materials to finished goods. High human capital should have a positive impact on the growth of the real sector. A developed human capital will aid in the conversion of raw materials into finished products. Again, countries with a well-developed human capital attract capital for growth as postulated by the neo-classical theory. We measured financial openness with the Chinn and Ito (2008) index of financial openness. We captured legal origin with a dummy variable. We followed La Porte et al. 1999 to identify the legal origin of the countries in our sample as either common law or civil law countries. We did not expect colonial ties to have any positive impact of legal systems of sectoral growth or the attraction of portfolio investments. Annual percentage growth rate of GDP at market prices is based on constant local currency. Aggregates are based on constant 2010 U.S. dollars. We used GDP growth for robustness.

2.5.4 Estimation Approach

We specified two sets of equations to capture the association and simultaneous causality between growth and capital flows. From the ensuing review of both theoretical and empirical literature, we specified a separate two-way regression for growth on capital flows, and capital flows on growth. We specified a regression model to capture the association between real sector growth and private capital flows.

Growth model – The Neoclassical Model

Growth models suggest both direct and indirect ways that capital flows could influence economic growth. According to the neoclassical theory, growth is a function of capital, technology, and labor, suggesting a direct association. However, according to the endogenous growth model, capital could influence growth indirectly through the level of human capital. The capital could be either from foreign or local sources. We, therefore, constructed a growth model that inculcates all the determinants of growth, notably, capital and output based on a simple neoclassical growth model.

The neoclassical growth model provides a framework for measuring growth of countries through an exogenous productivity route. The model provides for certain assumptions which are deemed to hold for the countries in our study. Following Gourinchas and Jeanne, (2013) and Alley (2017), we derive a growth model that accounts for the relationship between available resources (both foreign and domestic) and growth of economies through the lenses of the neoclassicals.

For any chosen country in our sample, the economy is deemed to be engaged in the production of a sole homogenous product. Using a Cobb-Douglas production function, where capital and labour are the main inputs (Gourinchas and Jeanne, 2013), we estimate equation (2.1) below:

$$Y_t = K_t^{\alpha}(A_t L_t)^{1-\alpha}\ , 0 < \alpha < 1 \qquad (2.1)$$

Where Y_t denotes the homogenous product being produced; K_t represents the stock of physical capital; L_t denotes the labour supply; and A_t captures the level of productivity.

The maximum employed labour supply or productive capacity is proportional to the total population; hence, effective labour is equal to the general population. The production function has a constant return to scale regarding the two factors of production employed (i.e.. Capital and effective labour). There exists free entry and exist of profit maximizing firms because factor markets are deemed perfectly competitive. Given the competitive nature of factor markets, firms produce at the optimum. Note also that the economy is open, it is small relative to the entire world, so it can borrow and lend at the given global gross interest rate. From the financial market and at the global interest rate, economy can hold both financial liabilities (capital inflows) and assets (capital outflows).

The function in equation (2.1) can be rewritten in terms of per capita by dividing both sides of the equation by effective labour $(A_t L_t)$. This leads to equation (2.2) below:

$$Y_t = K_t^{\alpha}(A_t L_t)^{1-\alpha} \Rightarrow \frac{Y_t}{A_t L_t} = \frac{K_t^{\alpha}(A_t L_t)^{1-\alpha}}{A_t L_t} \quad \Rightarrow \frac{Y_t}{A_t L_t} = (\frac{K_t}{A_t L_t})^{\alpha} \qquad (2.2)$$

This implies that,

$$y_t = \frac{Y_t}{A_t L_t} \; ; \qquad k_t = \frac{K_t}{A_t L_t} \tag{2.3}$$

Where y_t denotes output per capita, which is produced by the application of effective labour per capital, k_t. The capital per effective labour can be sourced from both domestic (k_t^d) and external or foreign sources (k_t^f). Thus, in the small open economy where output could be dependent on both domestic and external sources of capital, aggregate per capita output could be written as:

$$y_t = (k_t^d + k_t^f)^\alpha \tag{2.4}$$

The effect of capital flows, both domestic and external on output per capital and actual growth (GDP) in the presence of other controls can be estimated in the equations 2.5, 2.6 and 2.7, which had been deduced from equations 2.1 through to 2.4.

We thus specified our empirical baseline growth model[14] in equation (2.1) where growth is dependent on a set of variables.

$$y_{it} = \alpha y_{it-1} + \Sigma\beta_1 X_{it} + \Omega_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. (2.5)$$

Where, Y_{it} represents economic growth proxied by gross domestic product for country *i* at time *t*; X_{it} denotes a set of control variables known to include trade and financial openness, human capital, natural resources; Ω_{it} is the error term, with *i* and *t* denotes country and time specific variables.

To account for the effect of capital flows on growth, we estimated the Blanchard et al. (2016) growth equation which captures the direct effect of capital inflows on growth using annual data on 42 SSA economies. Thus, we estimated equation (2.6) as below.

[14] The base line equation employs a varied array of control variables that are widely employed in most empirical growth studies. Among these include GDP growth, gross capital formation, trade openness, institutional quality, etc. (See Alley, 2017; Ostry et al., 2010; Barro, 2003; Kroft and Lloyd-Ellis, 2002). We employed some of these variables in addition other control variables.

$$y_{it} = \alpha y_{it-1} + \Sigma\beta_1 X_{it} + \Sigma\beta_2 \mathrm{H}_{it} + \Omega_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2.6)$$

Where, Y_{it} represents GDP growth, X_{it} represents denotes a set of control variables, H_{it} represents a set of private capital inflows, notably bond and non-bond assets from external sources. To test for evidence of any association between real sector growth and private capital flows, we modified the Blanchard et al. (2016) growth model to include measures of real sector growth and measures of private capital growth. We decomposed the error term in equations (2.5) and (2.6) into country effects, a time-varying idiosyncratic shock with the standard *iid* assumption and a model error term.

We thus estimate our final real sector growth model relating to set of private capital flows and a other determinants of growth as depicted in equation (2.7) below:

$$RSG_{it} = \alpha RSG_{it-1} + \Sigma\beta_1 X_{it} + \Sigma\beta_2 \mathrm{PCF}_{it} + U_i + \varepsilon_{it} + \lambda \mathrm{t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (2.7)$$

Where RSG_{it} measures annual growth in the real sector for country *i* at time *t*. These are annual growth in manufacturing, industrial, agriculture, and service value additions. RSG_{it-1} is a lag of growth of the real sector testing for convergence and reinforcing effects as indicated by growth models. X_{it} denotes a set of control variables known to impact the growth of the real sector; PCF_{it} denotes measures of private capital flows, namely, foreign direct investment, portfolio equity and private non-guaranteed debt, as represented by H_{it} in equation 2.6.

Capital Flows Model

The essence of capital (foreign or local) could be deduced from the traditional investment model as proposed by Jorgenson (1963). The model establishes a relationship between the level of capital needed in the form of investment and output (growth). The basic model is as in equation (2.8).

$$K^* = \frac{\beta Y}{\lambda_\kappa^\rho} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(2.8)}$$

Where K^* denotes the level capital, *Y* measures the level of output or growth β is a constant value, λ_κ is the user cost of capital and ρ is the elasticity of substitution. From equation (2.8), we can further establish a long-run relationship between capital and growth, as depicted in equation (2.8) below:

$$\ln(K_t) = \alpha + \beta_1 \ln(Y_t) + \beta_2 \ln(\lambda_t) + \Omega_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots. \text{(2.9)}$$

Equation (2.9) represents the basic model for capital needed for investment, and it shows the traditional determinants of capital stock (investment) where the level of capital stock is a function of economic growth or output. Using the above equation, we could model our empirical capital flows equation as relating to the level of capital stock to a set of capital stock determinants for a set of countries. We thus estimated equation (2.10) below:

$$K_{it} = f(K_{it-1}, Y_{it}, X_{it}) + \Omega_{it} \ldots\ldots.. \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(2.10)}$$

Where K_{it} denotes the level of capital, Y_{it} is a measure of economic growth, X_{it} represents a set of control variables whiles Ω_{it} is the error term, with *i* and *t* denoting country and time specific variables. With no specific mention on the type and form of capital, we could replace the level of capital stock in equation (2.10) with private capital and replace output growth with the growth of the real sector. The effect of growth of private capital could be established in literature both theoretically and empirically[15]. Equation (2.11) thus represents our baseline capital flows model relating to real sector growth and other determinants of private capital flows.

$$PCF = PCF_{it-1} + \Sigma\beta_1 X_{it} + \Sigma\beta_2 \mathrm{RSG}_{it} + U_i + \varepsilon_{it} + \lambda \mathrm{t} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots \text{(2.11)}$$

[15] Theoretical studies by Dunning, (1973,) Hymer, (1976); Dunning, (1981). Empirical works by Chakrabarti (2001), Borensztein et al. (1998).

Where PCF_{it-1} represents the lagged initial levels of private capital flows testing for convergence effect; RSG_{it} is the growth in the real sector; the remaining variables remain as previously defined. Overall, we expected growth in the real sector to impact positively on private capital flows.

2.5.5 Panel Data Estimation

A potential set back to our analysis was issues of endogeneity and the possibility of simultaneous bias that may exist in either estimation. Issues regarding reverse causality and simultaneity may exist because capital flows may impact on the growth of the real sector, while real sector growth may also cause the attraction of capital flows. Overcoming such problems require the application of econometric procedures that are capable of dealing with the threat of endogeneity. The limitations in traditional estimators like the ordinary least squares (OLS) are known to be downwards biased, especially when there are measurement errors with regressors. Again, OLS does not deal with the issues of endogeneity of the explanatory variables. It also does not account for the possibility of unobserved country-specific differences. Estimations by OLS (or GLS) fixed effect indicates that in a standard growth or capital flows equations, there is an assumption of an instantaneous change in the dependent variables if the independent varies changes. However, this assumption may not hold as changes to growth and capital flows may occur slowly from year to year.

Thus, the correct way to estimate such relationship is to estimate a dynamic panel regression by including a lag of the dependent variable as regressors in the main equation to avoid misspecifications (Arellano and Bond, 1991). Dynamic panel data estimations have unobserved panel level effects, which are known to be associated with lags of the dependent variable thereby rendering standard estimators inconsistent. To deal with such inconsistency Arellano and Bond (1991) proposed the GMM estimator which can provide consistent estimations for these models by taking the first difference of the data and using the lagged values of the dependent variables are instruments, this is the basic GMM estimator known as the difference GMM. As noted by Carkovic and Levine (2005), the GMM estimator helps eliminate country-specific bias by taking the difference of equation (2.1), as shown below:

$$y_{it} - y_{i,t-1} = \alpha\left(y_{i,t-1} - y_{i,t-2}\right) + \beta\left(\mathrm{X}_{it} - \mathrm{X}_{i,t-i}\right) + \left(\varepsilon_{it} - \varepsilon_{i,t-i}\right) \ldots \ldots \ldots \ldots (2.8)$$

The purpose of the differencing is to eliminate any potential unobserved country fixed effect. Also Bond (1991) notes the relevance of the instruments used under the GMM estimator. First is the issue of endogeneity of independent variables, and secondly, to resolve potential problems of newly error terms ($\varepsilon_{it} - \varepsilon_{i,t-i}$) being correlated with the lagged of the dependent variable ($y_{i,t-1} - y_{i,t-2}$). Also to avoid further issues of serial correlation of the error terms and independent variables being weakly exogenous, the GMM estimator employs additional moment conditions:

$$\mathrm{E}\left[y_{it-s} \,.\left(\varepsilon_{it} - \varepsilon_{i,t-1}\right)\right] = 0 \qquad\qquad for\ s \geq 2; t = 3, \ldots.T \ldots \ldots \ldots \ldots.(2.9)$$

$$\mathrm{E}\left[\mathrm{X}_{it-s} \,.\left(\varepsilon_{it} - \varepsilon_{i,t-1}\right)\right] = 0 \qquad\qquad for\ s \geq 2; t = 3, \ldots.T \ldots \ldots \ldots \ldots \ldots.(2.10)$$

The moment conditions in equations (2.9) and (2.10) are employed in the GMM estimator to ensure consistent and efficient parameter estimates. The difference GMM is however not immune from limitations. As noted by Arellano and Bover (1995), the use of lagged level as instruments, are weak instruments. Blundell and Bond (1998) also note that the difference GMM also has very poor finite properties when it comes to precision and bias if the independent variables are tenacious overtime. The system GMM as proposed by Blundell and Bond (1998), improves the limitations of the difference GMM as proposed by Arellano and Bond (1991) and the deviation GMM by Arellano and Bover (1995), by providing additional moment conditions to deal with the issue of poor instruments in the difference GMM. Thus, the system GMM relies on the use of appropriate instruments even when the independent variables are highly persistent. The system GMM relies on the use of additional moment conditions. The overall validity of the instruments used is central to the GMM estimator as they ensure consistency (Carkovic and Levine, 2005). To test the validity of instruments used, two specification tests indicated by Arellano and Bond (1991) and Blundell and Bond (1998) must be satisfied. The first is the test for overidentifying restrictions, which analyzes the analogue of the moment conditions employed in the estimation. The sargan test is used for difference GMM while the Hansen J is for the system GMM estimator. The second specification test is to ensure that the error term is not serially correlated, whether in the first order [AR(1)] or the second order [AR(2)]. We used the system GMM two-step estimator which is also robust in dealing with issues of heteroskedasticity and is asymptotically efficient.

2.6 Empirical results

We present the outcome of our analysis. We first presented the descriptive statistics then the correlation matrix. We then presented the empirical results on the impact of capital flow on real sector growth. We further regressed real sector growth and the associated controls on private capital flow using an unbalanced data spanning from 1980 to 2017.

2.6.1 Descriptive Statistics

Table 2.1 illustrates the descriptive statistics for the variables of interest and the set of controls. All variables are presented in percentages and averaged over the period 1980 to 2017. Given the fact that countries in our sample may have varied underlying macroeconomic policies and dynamics, we present values at the 25^{th}, 50^{th} and 75^{th} percentiles. These are to aid in comparison and interpretation of results across samples. Among the measures of real sector growth, except for growth in agriculture value-added which recorded a mean value of

2.964%, there were no vast disparities among the other indicators of real sector growth. The highest mean value comes from the services sector with an average mean of 4.402%. The mean value supports recent claims that the service sector could be important for economic transformation in SSA. Thus, it is no surprise that the services' sector is seen to be driving growth in Africa.

The real sector growth index has a mean of 3.984%. The mean of the index is only higher than that of the agriculture sector. The mean of the real sector growth is very close to the median (3.953%). The mean is, therefore, a fair representation of the data and that variations of real sector growth among countries in the sample are very small. The small variation in the real sector growth across the continent confirms the small value of the standard deviation of 5.674.

Regarding private capital flows, the average levels of FDI, portfolio equity and private non-guaranteed debt are 2.825%, 0.002%, and 0.0084% respectively. These values confirm the low portions of capital flows that flow into Africa. The values show that the preferred mode of private capital flows into SSA is mostly FDI than debt and equity flows. Equity flows largely outweighs that of private non-guaranteed debt. Even though debt flows into Africa has been on the ascendency, these flows are not enough to topple equity flows as the next preferred flows after stable FDI.

Among the control variables, inflation and trade openness seems to have the largest variations with mean values of 59.354% and 68.232% respectively. With both mean recording values higher than their respective medians (7.25% and 60.36%), it suggests the high level of inflation among the countries in the sample and the level of openness regarding trade.

Table 2.2 shows only the correlation matrix between the measures of real sector growth and that of private capital flows as well as the level of significance. Table 2.2 shows that there is no possibility of multicollinearity arising from the regression. Manufacturing value added is highly correlated with the index of real sector growth while foreign direct investment is also highly correlated with total private capital flows. FDI is also significant and correlates positively with all the measures of real sector growth except for agriculture value added. There is an inverse correlation between Portfolio equity and all measures of growth except service value added. There was no issue of multicollinearity among the control variables as well.

2.6.2. Real Sector Growth and Private Capital Flows

We present our core regression results. We estimated a regression relationship between real sector growth and private capital flows through a systems GMM estimator. We included controls that are known to the capital flows – growth literature. We also included the lag of real sector growth and GDP as explanatory variables, consistent with standard growth models and dynamic panel estimations. For the consistency of our results, we maintain these controls throughout our analysis. Table 2.3 shows the results of our analysis.

Columns (1) – (4) show regressing private capital flows and the associated controls on real sector growth. For robustness, we present columns (5) – (8), which shows the results of regressing private capital flows on GDP growth and the associated controls. It is significant to note that the point estimate for all versions of the model shows a strong positive relationship. Columns (1) and (5) show an overwhelming strong positive relationship between total private capital flows and the different versions of growth (real sector and GDP). The results show that high inflows of private capital flows could stimulate the growth of the real sector in SSA.

Table 2.1: Descriptive Statistics

Variable	Observations	Mean	Std. Dev	Pct.25	Pct.50	Pct.75	Skewness	Kurtosis
Agriculture Sector Growth	1414	2.964	9.252	-1.04	3.091	6.470	0.238	9.316
Industry Sector Growth	1405	4.382	9.657	0.087	3.955	8.158	1.2	16
Manufacturing Sector Growth	1274	4.127	9.688	0	3.60	8.155	0.534	9.145
Service Sector Growth	1373	4.402	7.379	1.598	4.704	7.321	0.225	16.798
Real Sector Growth Index	1414	3.984	5.674	1.414	3.953	6.615	-0.279	12.418
Foreign Direct Investment	1488	2.825	5	0.281	1.440	3.656	4.186	33.421
Private Equity Flow	1553	0.002	0.025	0	0	0.006	25.655	34.534
Private Non-Guaranteed Debt	1562	0.0084	0.0106	0	0	0	13.35	37.380
Private Capital Flows	1577	2.659	4.909	0.151	1.213	3.436	4.277	34.661
Broad Money	1472	29.456	20.623	17.426	23.230	33.011	2.563	11.265
Gross Domestic Savings	1427	10.638	14.939	2.152	8.834	18.868	0.290	4.967
Gross Fixed Capital Formation	1417	19.628	10.225	13.481	19.679	23.835	5.935	91.828
Consumer Price Index (CPI)	1365	57.354	932.332	2.900	7.254	13.789	25.219	649.034
Natural Resources	1522	10.794	10.349	4.002	7.676	13.658	1.825	6.907
Trade Openness	1481	68.232	32.507	45.719	60.306	85.132	1.168	4.731
Human Capital	1255	1.574	0.390	1.255	1.499	1.830	0.7203	2.806
Legal Systems	1596	1.594	0.491	1	2	2	-0.385	1.149
Exchange Rate	1542	3.725	3.897	1.952	4.927	6.214	-2.884	18.484

Table 2. 2A: Correlation Matrix among dependent variables

	Agriculture	Industrial	Manufacturing	Services	Real Sector	FDI	Portfolio Equity	Private Debt	Private Capital
Agriculture Growth	1								
Industrial Growth	0.0567**	1							
Manufacturing Growth	0.1188***	0.5651***	1						
Services Growth	0.0820***	0.1907***	0.3056***	1					
Real Sector Growth	0.4988***	0.7241***	0.7675***	0.5350***	1				
FDI flows	0.0117	0.0985***	0.0767***	0.0631**	0.1078***	1			
Portfolio Equity	-0.0147	-0.0170	-0.0117	0.0056	-0.0191	0.0014	1		
Private Debt	-0.0031	0.0041	-0.0081	0.0399	0.0054	0.0067	0.1434***	1	
Private Capital	0.0139	0.0947***	0.0757***	0.0642**	0.1058***	0.998***	0.064	0.0113	1

Table 2. 3B : Correlation Matrix among control variables

	M2	GDS	GFCF	Trade	Fin Open	Nat Res	Inflation	Ex Rate	Hum Cap	Legal	GDP Growth
M2	1										
GDS	-0.0328	1									
GFCF	0.2247	0.3466	1								
Trade	0.3604	0.2461	0.4067	1							
Fin Open	0.1835	0.1589	0.1573	0.1689	1						
Nat Res	-0.2964	0.3390	0.1048	0.0631	-0.1905	1					
Inflation	-0.0395	-0.0275	-0.0796	-0.0173	-0.0364	0.0427	1				
Ex Rate	-0.1928	-0.0579	-0.0433	0.0373	-0.283	0.0215	0.1991	1			
Hum Cap	0.4781	0.4212	0.2919	0.4468	0.2710	0.0268	0.0306	0.0566	1		
Legal	-0.1797	-0.1040	0.0422	-0.1547	-0.2857	0.2371	-0.0033	-0.0303	-0.4868	1	
GDP Growth	-0.0155	0.1226	0.1603	0.1033	0.0664	0.0036	-0.0836	-0.1033	0.0758	-0.0438	1

NB: M2 is Broad Money; GDS is gross domestic savings; GFCF is gross fixed capital formation; Fin Open is financial openness; Nat Res is natural resources; Ex Rate is exchange rate; Hum Cap is human capital.

From column (1), a unit increase in private capital flows will lead to a 0.6 leap in the growth of the real sector, while column (5) shows a high magnitude of a 0.7 leap in GDP growth if there is a unit increase in the flow of total private capital flows over the 37 year span of the study. It thus follows that for SSA, ongoing efforts aimed at attracting private capital flows need to be intensified as an influx of these flows will stimulate growth both in the real sector and gross domestic product. On the gross effect of capital flows on growth; our results are consistent with Bailliu (2000) who found that capital inflows foster higher economic growth. It also agrees with Prasad et al. (2007) who found capital account balances to promote growth among industrialized and transition economies. It also supports Abiad et al. (2007) who found capital flows to enhance the growth of selected European countries. However, the results contradict the findings of Agbloyor et al. (2014) whom initially found capital flows to negatively affect growth in the absence of a developed financial market, as well as Prasad et al. (2007) who found capital accounts to deter growth but only for non-industrialised, non-transition countries.

Specifically, employing our data in column 1 of Table 2.3, a unit increase in the standard deviation of total private flows (std. dev = 4.909; table 2.1) should grow the real sector by approximately 0.878 percentages point [0.179 X 4.909 = 0.878]. Using the regression that employed GDP as growth measure, a unit increase in the standard deviation of total private capital implies 0.471 points increase in the GDP growth. The results thus support the neoclassical growth assertion that where labour and technology are deemed constant, capital inflows is essential for economic growth. From the growth angle, we, therefore, found no evidence of allocation puzzle and total private capital will follow growth in both models in (1) and (5) where we employed composite index of real sector growth and GDP growth as measures of economic growth. Thus, for SSA, the growth of the real sector will be enhanced if more efforts are invested towards the attraction of private capital flows.

Looking at the effect of the control variables on real sector growth and GDP growth in columns (1) and (5), one finds that it is only gross domestic investment and exchange rate that positively affect the growth of the real sector and GDP significantly at 1%. A unit increase in domestic investment leads to approximately 0.3 and 0.33 increase in real sector and GDP growth respectively. The effects of other controls were negative at varied significant levels. The robustness of our systems GMM estimator is confirmed by the validity of instruments as shown by the Hanson J test. The diagnostics as presented in Table 2.3 show that all instruments are correctly specified.

2.6.2.1 Real Sector Growth and Private Capital flow Components

As shown in columns (2) to (4) of table 2.3, foreign direct investment, portfolio equity, and private non-guaranteed debt exhibit positive and significant relationship with real sector growth, over the study period. The results of our study support conclusions of the neoclassical growth theory that economic growth attracts more capital. For foreign direct investment, a unit increase will lead to a 0.642 increase in real sector growth. Similarly, a unit increase in portfolio equity and private non-guaranteed debt will result in 2.7, and 18.1 units increase in real rector growth. The high coefficient for portfolio equity flow and debt could support the growing interest in these forms of capital flows among African countries in recent years.

The results show that the real sector will increase with anticipated increases in any of the components of private capital flows. For robustness check, we also regressed the components of private capital flows on GDP growth as shown in columns (6) to (8). The results show an overwhelming positive association between GDP growth and all components of private capital at 1% significance level. With a unit increase in the flow of foreign direct investment, portfolio equity, and private debt, GDP is expected to grow by 0.8 units, 3.6 units, and 9.2 units respectively.

The benefits of private flows to boost economic growth lies in their ability to provide additional capital transfer of technological know-how, employment, export drive, and positive spillover effects. Our results show that direct channels of private capital into the real sector should be encouraged. The positive association between growth and debt also supports the recent trend of most SSA economies resorting to global markets for debt instruments rather than focusing on aid or ODAs. Debt inflows, unlike aid, are channeled into productive sectors without any restrictions.

In order to provide a better understanding of such cross-country studies, we provide case study examples of countries that are in our sample or on the continent. Among many of SSA large economies (in terms of GDP), issuance of debt securities (i.e., bonds) is on the ascendency for most SSA countries after South Africa in 2006, and Ghana and Nigeria resorted to the bond market in 2007. Bonds issuance grew from US$ 2billion to about US$ 6billion by the end of 2011 after dropping in 2008 due to the global financial crisis.

Table 2.4: Real Sector Growth and Private Capital Flows

Dependent Variable:	**Real**	**Sector**	**Growth**		**GDP**			**Growth**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Constant	39.909 (7.725) ***	37.055 (9.511) ***	47.621 (8.367) ***	43.289 (9.218) ***	50.865 (4.091) ***	50.648 (3.204) ***	37.567 (4.737) ***	35.060 (5.412) ***
Lagged RSG	1.310 (0.158) ***	1.268 (0.168) ***	1.593 (0.125) ***	1.311 (0.154) ***				
Lagged GDP Growth					0.416 (0.151) ***	0.464 (0.111) ***	0.602 (0.086) ***	0.601 (0.131) ***
Aggregate Private capital flows	0.622 (0.179) ***				0.792 (0.096) ***			
FDI flows		0.642 (0.211) ***				0.801 (0.107) ***		
Portfolio Equity			2.733 (1.382) **				3.637 (0.725) ***	
Private Debt				18.078 (5.781) ***				9.239 (2.857) ***
M2	-2.448 (1.145) ***	-1.755 (1.189)	-5.627 (1.214) ***	-4.436 (0.938) ***	-5.410 (1.119) ***	-5.327 (0.845) ***	-4.944 (0.773) ***	-4.592 (1.072) ***
Inflation	-0.646 (0.655)	-0.677 (0.767)	-0.694 (0.787)	-1.087 (0.752)	-1.416 (0.460) ***	-0.956 (0.312) ***	-0.780 (0.295) ***	-1.039 (0.313) ***
Natural Resources	-0.231 (0.789) ***	-0.228 (0.105) **	-0.126 (0.057) **	-0.120 (0.062) *	-0.300 (0.730) ***	-0.303 (0.732) ***	-0.101 (0.046) **	-0.0.60 (0.042)
Exchange Rate	0.009 (00003) ***	0.008 (0.004) *	0.005 (0.003) **	0.005 (0.004)	0.009 (0.002) ***	0.011 (0.001) ***	0.008 (0.002) ***	0.005 (0.001) ***
Gross Domestic Savings	0.253 (0.106) **	0.301 (0.124) **	0.114 (0.059) *	0.156 (0.070) **	0.328 (0.059) ***	0.323 (0.565) ***	0.117 (0.036) ***	0.102 (0.043) **
Trade Openness	-0.750 (0.039) *	-0.063 (0.040)	-3.344 (1.793) *	-2.368 (1.432) *	-0.062 (0.025) **	-0.066 (0.236) ***	-0.008 (0.023)	-0.041 (0.022) *
Human Capital	-2.595 (0.893) ***	-2.589 (1.317) **	-0.180 (2.008)	-2.368 (1.082) **	-3.103 (0.694) ***	-3.021 (0.236) ***	-2.696 (0.683) ***	-0.958 (0.737)
Gross FCF	-0.329 (0.119) ***	-0.495 (.0147) ***	0.057 (0.132)	0.035 (0.159)	-0.296 (0.069) ***	-0.286 (0.075) ***	0.096 (0.643)	0.092 (0.825)
Legal System	-13.530 (3.329) ***	-12.277 (1.069) ***	-13.052 (2.794) ***	-11.877 (2.309) ***	-12.738 (2.063) ***	-13.902 (1.707) ***	-12.236 (2.461) ***	-10.850 (2.042) ***
Diagnostics:								
Observations	695	701	708	717	701	698	702	711
Number of Groups *(n)*	31	31	31	31	31	31	31	31
Number of instruments *(i)*	30	27	28	28	30	30	30	28
Instrument ratio *(n/i)*	1.03	1.15	1.11	1.11	1.03	1.03	1.03	1.11
AR (1): p-value	0.001	0.001	0.001	0.001	0.001	0.001	0.001	0.003
AR (2): p-value	0.345	0.457	0.964	0.560	0.972	0.651	0.277	0.550
Hansen J: p-value	0.171	0.187	0.159	0.104	0.123	0.115	0.165	0.167
Wald Chi: p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

*Note: AR(1) = Test of first order autocorrelation; AR(2) = Test of second order autocorrelation; Hansen J = Test of over identifying restrictions *, **, *** denotes significance levels of 1%, 5% and 10%, respectively. Values in parenthesis represent standard errors.*

While Nigeria issued Eurobond to finance its gas project in 2013, Zambia also issued a US$ 750 million bond to finance infrastructure projects. Between 2006 and 2014, more than 14 SSA countries have issued sovereign bonds with an estimated value of US$ 15billion (Sy, 2015; Massa et al., 2012; Wang et al. 2013).

Whiles the conclusions on FDI confirms earlier assertions of a positive association by Iamsiraroj (2016), Calderon and Nguyen (2015), Alley (2015), Aizenman et al. (2013) and Choong et al. (2010), it also contradicts the findings of Agbloyor et al. (2014). In terms of portfolio equity and debt flows, while our conclusions are in line with Alley (2015), it contradicts that of Calderon and Nguyen (2015), Choong et al (2010) and Agbloyor et al (2014) as well as Aizenman et al. (2013) who found both portfolio equity and debt flows to delay growth or have no growth effects. The results also debunk previous studies that have found both portfolio flows and debt to negatively affect growth or no effect on growth, especially private equity because of its hot money syndrome. While our results on portfolio equity confirm with that of Nyango'ro (2017) and Adegbite et al. (2008), that of debt flows contradicts the conclusions Nyango'ro (2017) and Fosu (1996) when they both found debt flows to deter growth for SSA. Although Fosu (1996) did not distinguish between public and private debt, one can say his prime focus was largely on public debt[16], while we focused on debt accruing to the private sector. Significantly, Fosu (1996) notes that the long run negative effect of debt on growth was non-monotonic and that at a certain threshold, the effect becomes positive, mostly at low investment levels.

Soto (2011) found portfolio equity to positively affect growth significantly while debt flows were found to be insignificantly related to growth. The results show that the effect of capital

[16] The measures of debt employed by Fosu (1996) from the World Debt tables were Debt outstanding and disbursed as a proportion of GNP; Debt outstanding and disbursed as a percentage of exports; Debt service as a percentage of GNP; and Debt service as a proportion of exports.

flows on growth may not be contingent on the type of capital flows being measured as asserted by MacDonald (2015), Aizenman et al. (2013), Itay and Razin (2006) and Durham (2004). The positive effect of portfolio flows (debt and equity) is very reflective. In its recent regional economic outlook on SSA, IMF (2018) confirms that much of the increased capital flows into SSA has been led by large volumes of portfolio flows. The report also noted that these flows were not known to historically associate with growth. Again, the reported notes the increase in the rise of demand and oversubscription of sovereign bonds issued by some countries in the region (Senegal, Angola, and Ghana). This gives a change in the dynamics of the effect of portfolio flows, especially, debt on economic growth in SSA.

Regarding controls, we found M2 to be negative and significant under all columns from (1) to (8), indicating that an increase in money supply could be detrimental to growth. One plausible explanation in the SSA context could be attributable to the fact that most governments have over the years used money supply as short-term measures to control inflationary pressures. Moreover, inflation also exhibits a negative relationship with growth under all regressions and very significant at 1% for GDP growth. For the real sector, the negative effect was not significant. The negative association confirms the damming effect inflation has had on the growth of SSA over the years. Hyperinflation is a common phenomenon in most SSA economies. The average inflation for our sample is 57. 35, a figure Bruno and Easterly (1996) considers as too high. Bruno and Easterly (1996) note that a high inflation country is one with average inflation not less than 40. Within our sample, average inflation for the Democratic Republic of Congo is 1037. 32. Zimbabwe also has average inflation of 777. 65, while Zambia recorded an average inflation of 41. 17. While Congo has been at the center of wars over mineral resources, Zimbabwe has also suffered from many trade sanctions. Also, Sudan and Sierra Leone had averages closer to the Bruno and Easterly Threshold with average inflation values of 38.57 and 31.7 respectively.

Natural resources are inversely related to both real sector growth and GDP growth. While the result may support the long-standing view of the "resource curse," we provide possible explanation to the negative relationship. Many natural resources are subject to variations in prices due to global shocks. When the natural resources component of total trade is large, shocks from global markets are likely to affect growth projections. It is a known fact that most SSA economies are resource-dependent and are thus likely to suffer from external shocks linked to natural resources. Again, where a direct relationship exists between domestic investment and growth, a natural resources boom could lead to crowding out of domestic investment, leading to a dip in growth rates. Where there is a lack of strong institutions, natural resources have led to the incidence of wars and corruption, both of which are detrimental to growth. Lastly, in terms of the real sector, natural resources are only evident in the mining and oil sectors, which are only a small component of the real sector. Thus, any positive impact may be minimal. At varying levels of significance, we also found exchange rate and gross domestic savings to be positively correlated with both growths of the real sector and GDP. Trade liberation may not be a good omen for SSA as we found trade openness to be detrimental to growth in all models from 1, 3, 4, 5, 6 and 8. The assertions could be that SSA may suffer from the dumping of goods and repatriation of profits, which will hamper growth in the long run. The adverse effect could also result from the type of and nature of trade. Where most goods from SSA are exported at the raw stage without any value additions, the benefit from trade openness can be harmful in the long run. Regarding the real sector, the majority of businesses in the sectors are foreign-owned. In Ghana, one of the flourishing sectors is the services sector. However, foreigners control majority of the ownership. Out of the four telecommunication service providers, the proportion of ownership owned by indigenes is minimal. The same situation exists in the banking and manufacturing sectors. This phenomenon is not peculiar to only Ghana, but most economies in SSA.

Significantly negative was also human capital. The negative effect on growth could result from the lack of training required by locals to operate or work efficiently in the sectors such as the manufacturing and industrial. Regarding the agriculture sector, most people are still engaged in sustenance farming. The transformation to mechanized farming will require training and education, adopting new and superior production technologies.

We further assessed the relationship between each component of real sector growth and the components of private capital flows. From Table 2.4, models (1) to (4) shows a significant positive relationship between foreign direct investment and manufacturing, industrial and service sectors' value additions but negatively with agriculture value additions. The positive association with both industrial and manufacturing sectors is at a significant level of 1% while that of manufacturing is weakly significant at 10%. The positive relationship could result from positive spillover effects and technological transfers that host countries enjoy through FDI. Large inflows of FDI could be a strong catalyst for the growth of the industrialization agenda given the positive relationship between FDI and manufacturing and industrial value additions.

The results show that a unit increase in the flow of FDI will lead to a 1.02 unit and 0.37-unit growth in manufacturing and industrial additions. To check the effect with our data, a one standard deviation increase in the flow of FDI (Std. Dev = 5.0, see table 2.1) will grow manufacturing valued added by 5.12 percentages point [coeffecient of FDI in column 1, Table 2.4 x std. dev of FDI in column 3, Table 2.1 ; (1.021 x 5.0 = 5.12)]. Similarly, a one standard deviation increase in FDI will lead to a 1.85 percentage point increase in industrial value additions. We provide a better understanding of our results using data on FDI inflows into Africa from the 2018 FDI report by the Financial Times. The report provides the share of

FDI inflows into The Middle East and Africa[17]. Regarding SSA, the country with the largest share of inflows is Ghana (8%), while the lowest was South Africa (4%). Per our estimation results in Table 2.4, any potential increase in the inflows of FDI from the level of South Africa to that of Ghana will lead to the growth of the manufacturing sector by approximately 4.096 percentages point in the short and long runs by approximately 8.079 percentages point[18]. The growth in manufacturing value added will be appreciated as the average growth of the sector for South Africa over the study period was 1.77%, while that of Ghana was 3.158%.

In terms of industrial value added, using average figures over the study period, an increase in the inflows of FDI from the level of South Africa to Ghana will grow the industrial sector by 0.835 in the short run and by approximately 1.035 percentages point[19]. The higher coefficient for manufacturing suggests that manufacturing as a component of industrial value additions could lead the way for SSA industrialization. Our finding corroborates that of Kodongo and Ojah (2017) who also found FDI flows to positively affect industrial and manufacturing value additions for a set of 19 African countries between 1990 and 2013. They postulate that the positive impact could result from spill-over effects attributable to technological transfers from the originating FDI countries.

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[17] The Top 10 countries and their share of FDI inflows for 2017. Egypt (32%), Ghana (8%), UAE (8%), Sudi Arabia (6%), Mozambique (6), Nigeria (4%), Oman (4%), South Africa (4%), Morocco (3%), Israel (3%), Others (23%).

[18] In the short run, the impact of a change in FDI on manufacturing growth in given as (β x Δ); while the long run effect is estimated as (β x Δ) / (1 – φ). Where β is the coefficient of FDI and φ is the coefficient of lagged manufacturing sector growth. Δ is 4 (8-4); from table 2.4, β = 1.024 and φ = 0.493. Therefore, that short run change is (1.024 x 4) = 4.096; and the long run change is (1.024 x 4) / (1 – 0.493) = 8.079.

[19] Average FDI inflows for Ghana over the study period are 3.158%, while that of South Africa is 0.9006%.

Table 2.5: Components of Real Sector Growth and Private Capital Flows

Dependent Variable:	Manufacturing Value Added	Agriculture Value Added	Industrial Value Added	Service Value Added
	(1)	**(2)**	**(3)**	**(4)**
Constant	-16.512 (7.828) **	-23.799 (3.803) ***	1.561 (3.831)	8.560 (3.001) ***
Lagged Dep. Variable	0.493 (0.081) ***	-0.348 (0.030) ***	0.193 (0.042) ***	-0.092 (0.469) **
FDI Flow	1.024 (0.599) *	-0.817 (0.234) ***	0.370 (0.113) ***	2.011 (0.390) ***
Portfolio Equity	-5.577 (1.080) ***	4.952 (1.137) ***	-5.568 (3.085) *	-5.594 (2.622) **
Private Debt	6.374 (8.983)	-58.184 (15.902) ***	-5.177 (9.022)	-13.174 (4.054) ***
GDP Growth	0.770 (0.753) ***	1.104 (0.871) ***	1.000 (0.909) ***	0.630 (0.067) ***
M2	1.090 (1.309)	5.658 (0.672) ***	-1.601 (0.8000) **	-1.144 (0.574) **
Inflation	0.086 (0.397) **	0.018 (0.007) ***	0.015 (0.009) *	0.001 (0.004)
Natural Resources	-0.206 (0.075) ***	0.450 (0.057) ***	-0.164 (0.056) ***	-0.083 (0.231) ***
Exchange Rate	-0.408 (0.362)	-2.589 (0.414) ***	-0.441 (0.258) *	-0.319 (0.249)
Gross Domestic Savings	0.211 (0.053) ***	-0.275 (0.062) ***	0.115 (0.045) **	0.054 (0.020) ***
Trade Openness	-0.056 (0.199) ***	0.019 (0.029)	-0.080 (0.010) ***	-0.027 (0.137) **
Financial Openness	-0.353 (0.536)	2.405 (0.544) ***	0.165 (0.250)	-0.893 (0.347) **
Legal System	10.213 (2.885) ***	11.493 (1.976) ***	6.594 (1.194) ***	-0.019 (1.346)
Diagnostics:				
Observations	631	689	688	633
Number of Groups *(n)*	35	36	36	36
Number of Instruments *(i)*	30	34	36	30
Instrument ratio *(n/i)*	1.17	1.06	1.0	1.20
AR (1): p-value	0.001	0.206	0.217	0.004
AR (2): p-value	0.173	0.966	0.107	0.180
Hansen J: p-value	0.185	0.173	0.203	0.273
Wald Chi: p-value	0.000	0.000	0.000	0.000

*Note: AR(1) = Test of first order autocorrelation; AR(2) = Test of second order autocorrelation; Hansen J = Test of over identifying restrictions *, **, *** denotes significance levels of 1%, 5% and 10%, respectively. Values in parenthesis represent standard errors.*

Alfaro (2003) also shows the positive impact of FDI on manufacturing, and thus supports the assertion that externalities that emanate from FDI in the form of technological and managerial know-how tend to favour investments in the manufacturing and service sectors.

Our results also support earlier studies that have found positive spillover effects of FDI in manufacturing and at the industry level such as Blomstrom and Persson (1983) on the manufacturing industry in Mexico, Borensztein et al. (1998) on a set of 69 developing economies at the industry level. The results support assertions by UNIDO (2015) and UNCTAD (2016) on the relevance of the manufacturing and industrial sectors to sustained growth in developing countries. The findings go against some propositions that have sought to describe SSA as lacking any industrialization agenda (Gui-Diby and Renard, 2015). Gui-Daiby (2015) postulates that FDI inflows do not have any significant effect on a country's industrialization. They hypothesise that a major contributing factor could be the government's inability to create a conducive environment for FDI to affect industrialization. Other studies have also found FDI to negatively affect or have no significant effect on the growth of the manufacturing and industrial sectors. Some attribute this to the high level of competition from foreign investors which ends up crowding out local firms (Xu and Sheng, 2012; Waldkirch and Ofosu, 2010; Hu and Jefferson, 2002).

On the effect of FDI on the service sector, contrary to Kodongo and Ojah (2017) who found FDI to affect service value additions negatively, we found a strong positive relationship at 1% significant level, with a unit increase in FDI flows leading to a 2.0 unit in the growth of the service sector. It shows the potency of FDI in improving the growth of the service sector in SSA. Our findings also depart from Alfaro (2003) who found an ambiguous relationship. The positive effect on the service sector is likely to be a result of the fact that most foreign investors have realized the growing size of the services sector in the world economy and are thus turning attention to the sector. United Nations (2011) notes a change in the direction of FDI to developing economies from manufacturing to the services sector over the past two decades. By the end of 1989, manufacturing accounted for almost 52% of FDI to developing countries whiles services accounted for only 35%. However, by the beginning of 2008, the services sector FDI had raised to 49% whiles that of manufacturing had dropped to 37% (United Nations, 2011). Also, the higher coefficient gives an indication of the recent direction of FDI into SSA and supports recent assertions that the services sector can lead SSA's growth (AfDB, 2018). The results confirm the supposed interest of foreign investors in the services sector of most SSA or the expansion of existing investors into services in other countries. Inflows of foreign capital in SSA in recent times are evident in telecom, banking, insurance, education as well as transportation. The positive relationship is also an indication that the flow of FDI into the traditional extractive industry could be gradually changing. It is therefore essential that challenges facing the services sector such as infrastructure, logistics, human capital, and financial are resolved on a country level basis, as the sector is deemed essential to the development agenda of the sub-region. United Nations (2011) and Bhinda and Martin (2009) note of a significant shift in the direction of FDI to the services sector. For SSA, they show evidence of FDI flows into banking and tourism in The Gambia, telecommunications and commerce in Uganda, construction in the case of Ghana and tourism for Zambia.

We further found a significant inverse relationship between FDI and agriculture value additions. The effect of a 1% increase in the inflow of FDI will be a decrease of 0.82% in the growth of agriculture value additions. Just like Kodongo and Ojah (2017), the seemingly negative relationship illustrates the type of FDI that is known to flow into SSA. Most foreign investments go into the extractive and natural resources endowed areas of the continent. AEO (2014) notes that more than 95% of FDI that came to Africa went to natural resource-endowed countries. In a continent where most farmers do not own lands to farm, farmlands are likely to be sold for the extraction of natural resources; all may account for the significant negative relationship. Agriculture may therefore not be the right channel to attract foreign capital into SSA. As noted by United Nations (2011), between 1990 and 2007 FDI flows into the primary sector for most developing countries could be found in the mining, quarrying and petroleum sectors, with little or decreasing FDI to the agricultural sector. Bhinda and Martin (2009) notes that the agriculture sector has suffered from underinvestment due to factors such as poor information available to foreign investors in the sector, issues of land rights, lack of credit and infrastructure.

We also found significant relationships between portfolio equity and value addition in all sectors at varied levels of significance with different effects. While portfolio flows seem to enhance growth in agriculture value additions at a 1% significance level, it is inversely related to manufacturing at 1%, services at 5% and industrial value addition at 10% significance levels respectively. The positive relationship with agriculture may be a testament to private investors' interest in the sector. With the springing up of commodity exchanges across the continent, it gives investors' confidence in the agriculture sector. The relevance of such exchanges is dealing in primary rather than manufactured products. Given, that the volume of agriculture activities, most farmers stands to benefit from exchanges in terms of pricing of products, ready market access and assurance of sales in future contracts. Given that portfolio equity investors are much more concerned about higher rates of return, it suggests that investors have realized the potential of the sector and are willing to commit funds into SSA agriculture. It is a positive sign for farmers who have limited access to agriculture financing. The negative relationship with the other sectors may be a testimony of the long period it takes for these sectors to realized returns on investments committed. Given the hot money nature of portfolio equity funds, investors are likely to shy away from the manufacturing and service sectors.

Private guaranteed debt was significant but inversely associated with the growth of agriculture value additions and service additions. The inverse agriculture relationship further compounds the lack of credit to the sector. Debt providers are unconvinced of fixed returns given the issues bedeviling the sector such as land titles, access to markets and fair prices. The negative relationship with the service additions could be due to the growing nature of the sector in SSA. The results give an indication of the use of debt employed by most SSA economies, which has been mainly for infrastructure development and debt service. Although debt positively affected the growth of manufacturing value additions, the relationship was insignificant.

Regarding controls, we found GDP growth to be positive and significant to the growth of all sectors at 1% significant level. The results mean that for SSA if these sectors are to grow and employ more people, the larger economy must also grow concurrently. To the extent that GDP growth is hampered, we do not expect growth in value additions of these sectors. The results thus suggest the direct impact that the growth of the larger economy has on the growth of these sectors at a low level. The least impact is the service sector, where a 1% growth GDP will increase the growth of the sector by 0.63%. The sector that stands to benefit a lot from the growth of the larger economy is the agriculture sector, further confirming the importance of the agriculture sector to economic growth, especially for SSA. We also found that M2 inversely affect the growth of both industry and service, while positively promoting the growth of the agricultural sector. It suggests that increasing financial services to the agriculture and services sectors can stimulate the growth of these sectors. For the agriculture sector, our results encourage financial service providers to look critically at providing tailor-made services for the sector. We found the difference in the effect between manufacturing and industry very striking as these two sectors have some level of dependence. However, the negative effect could be driven by the other components of industrial growth other than manufacturing. Inflation was positive and significant to the growth of all sectors except the service sector. A possible explanation is that the persistent increase in price is a motivating factor for inspiring productivity and output levels in these sectors. Inflation boosts output growth of these sectors. The possibility of natural resources extraction crowding out industrialization was evident as the presence of natural resources endangers growth of all sectors except the agricultural sector. The adverse effect of natural resources on manufacturing and industry may not be surprising as most resources mined in SSA are exported in their raw state without any value additions. The positive relationship between natural resources and agriculture may be due to land reclamation for the use of agriculture in most resources endowed countries and mining regulations and laws enforcement. We also found gross domestic savings to impact the growth of all sectors positively, apart from the agriculture sector. The results show the need to mobilize more financial resources directed towards growing these sectors, especially the agriculture sector. The effects of financial and trade openness were mixed at varied significant levels depending on the sector.

2.6.3 Private Capital Results

We now turn around our analysis and examined the impact of the components of real sector growth on the components of private capital flows. We intended to determine any possibility of a bi-directional relationship between real sector growth and private capital flows. We first discuss the effect on real sector growth on total private capital flows in SSA while controlling for the effect of broad money, inflation, exchange rate, natural resources, gross capital formation, human capital, legal systems, gross domestic savings, and gross capital formation.

We further estimated the effect on each component of private capital flows in varied regressions, introducing a component of capital flows into the equation one at a time. Tables 2.5 and 2.6 show results from our regression.

2.6.3.1 Total Private Capital Flow and Real Sector Growth

We tested for evidence of the existence of allocation puzzle; we regressed private capital flows and its components on measures of real sector growth. Just like MacDonald (2015), Gourinchas and Jeanne (2013), the dependent variable is a measure of foreign capital with measures of growth as independent variables. We thus estimated a panel data regression of growth on private capital flows. Gourinchas (2013) and MacDonld (2015) measured growth using productivity catch-up, we measured growth through the real sector. We first looked at the effect of real sector growth index of total private capital flows. For robustness check, we replaced real sector growth with GDP growth. GDP growth was employed by MacDonald (2015) for the same purpose, while Alfaro et al. (2014) and Prasad (2007) used them as dependent variables as opposed to independent variables. We then looked at the effect of the various components of real sector growth on the attraction of total private capital flows. The results of our regression are in Table 2.5. Models (1) and (5) show regressing real sector growth index and GDP growth on total private capital flows, and models (2) to (4) report results of regressing real sector growth components on total private capital flows.

From Table 2.5, model (1) shows a strong positive relationship between real sector growth and private capital flows. The point estimates indicate that at a 1% significance level, a 1% increase in growth of the real sector will lead to a 0.5% increase in the flow of private capital flows to SSA. The positive correlation does not give support for the existence of the allocation puzzle for SSA. Thus, the conception that high growing countries attract less foreign capital may not apply to SSA. The positive relationship demystifies assertions by

Gourinchas and Jeanne (2013) and MacDonald (2015) of an allocation puzzle at the aggregate levels of private capital flows. The result agrees with the neoclassical theory prediction that over a long period, more capital should flow to countries with higher productivity growth. One observation of our data as plotted in figure 1 depicts the conclusion from our analysis. The implication thus is that, as stated, higher growing countries will need more funds for developmental and investment purposes. The anticipated growth also assures investors of possible returns. The result is very relevant as studies are convinced that Africa's growth hinges on increased inflows of foreign direct investment and aid inflows in addition to improved macroeconomic policies (Fosu, 2012; McKinsey Global Institute, 2012). All things being equal, the results also show that with increased capital flows, the assertion that about 64% of SSA countries would achieve middle-income status is more of a reality (World Bank, 2013). The results are in line with earlier conclusions by Alfaro et al. (2014), and Gourinchas and Jeanne (2013) who found the private component of total capital flows to increase with productivity catch-up or growth. The robustness of our results is confirmed in model (5) with GDP growth, suggesting the result is positive and robust to various measures of growth. Model (5) shows that a 1% increase in GDP growth will attract a 0.34% increase in private capital flows. Again, the findings are robust to various controls of private capital flows. From the point of private capital flows, we found no evidence to support recent claims of "an allocation puzzle" regarding the directional flow of capital flows about growth, especially regarding SSA countries. Thus, the allocation puzzle may be down to either the measure of growth, capital flows or a combination of both.

Regarding controls, model (1) and (5) show a positive relationship between inflation and capital flows, although the coefficients are negligible. However, natural resources, trade openness and gross capital formation were found to promote the inflow of private capital flows strongly. We also found financial openness to enhance growth but only in model (1).

Exchange rate and gross domestic savings were found to strongly deter the inflow of private capital in both models at a 1% significance level.

We then looked at the effect of the components of real sector growth on the major components of private capital growth. The results are in Table 2.6. Model (1) shows the effect of value additions in manufacturing, agriculture, industry, and services on the attraction of foreign direct investment. We found a strong positive relationship between all value additions and the inflow of foreign direct investment. The effect was at a 1% significance level for value additions in agricultural, industrial and services with 10% significance for industrial value additions. The intuition is that when these sectors grow in SSA, they are most likely to attract more foreign direct investment. Their growth is thus bait for foreign investors to inject fresh or additional capital into these sectors and the larger economy. The results show that a 1% increase in the growth of Agric, manufacturing, industry and service sectors will lead to a 0.2%, 0.1%, 0.2% and 0.1% increase FDI flows to SSA respectively.

Although the impact of the sectors on the attraction of portfolio equity is very negligible, the results still show a strong positive relationship with service value additions. This means the growth of the services sector is likely to attract increases in portfolio equity irrespective of the quantum of the flow. Although agriculture had a positive relationship, it was found to be insignificant. We, however, found a negative relationship with manufacturing and industry additions, although that of the former was insignificant. Again, although we found significant relationships between private non-guaranteed debt and growth of real sector components, the effects were negligible due to the quantum of the coefficients. However, we found growth additions in agriculture, industry, and services to aid in the attraction of private debt flows, whiles an inverse relationship was established for manufacturing sector value additions. We thus concur that debt providers are likely to pump money into a sector depending on whether the sector is seen to be growing or not. Significantly, we see a strong positive relationship between service sector additions and all three components of private capital flows. That goes to support recent assertions of an increase in the quantum of capital flows to the sector or an increase in the direction of capital flows to the service sector. We found support for capital flows determinants that were used as controls, although the results are mixed. These results are in Table 2.6.

In all models, the Hansen J-test shows that all conditions relating to orthogonality have been met in all estimations, meaning that our models are properly estimated. AR (2) also shows that conditions relating to second order autocorrelation have been satisfied.

2.6.3.2. Capital flow Components and Real sector growth Components.

Although the gross measures of both real sector growth and total private capital flows do not give support for any allocation puzzle, we regressed real sector growth index on the decomposed measures of capital flows to determine if the positive association is driven by a component of private capital flows or the same relationship exists for all components. We, therefore, regressed an index of real sector growth on foreign direct investment, portfolio equity and private non-guaranteed debt in separate regressions. The results of the analysis are in models (2) to (4) of Table 2.5. For robustness check, we regressed GDP growth on the same capital flow components.

The results based on GDP are in models (6) to (8) of Table 2.5. Models (2) show that there is a strong positive relationship from regressing real sector growth on foreign direct investment, a situation that is in line with the conclusions of the neoclassical growth theory. At a 1% significance level, a 1% increase in growth of the real sector will lead to a 0.4% in the attraction of FDI to SSA. The consistency of our results is supported by model (6), where at a 1% significance level, a 1% increase in GDP growth will lead to a 0.3% increase in the flow of FDI to SSA. Our results confirm conclusions by MacDonald (2015) that growth enhances the attraction of FDI. The coefficient of real sector growth and GDP growth on all other components of private capital flows were all negative and statistically significant, although with very small sized estimates. The negative relationship presents a contradiction to the neo-classical growth theory, in that capital flows (equity and debt) do not flow to growth countries.

The conclusion confirms that of MacDonald (2015) who found FDI to be positively related to growth but found portfolio flows (equity and debt) to correlate negatively with growth. The negative association also contradicts Gourinchas and Jeanne (2013) who assumed that all forms of private capital flows have a positive effect on growth without decomposition. It also differs from Alfaro et al. (2014) who found the private component of debt flows to affect growth positively. Our results throw further light on the distinction between the type of private capital flows that affect growth positively or negatively. While we found no evidence of support for public or private decomposition, our results show agreement with MacDonald (2015) and Goldstein and Razin (2006). They contend that the distinction could merely be based on the liquidity and control of the capital flow. For them, the demand for liquidity could explain the negative relationship between net capital flows and growth in fast developing countries.

Table 2.6: Private Capital Flows and Real Sector Growth

Dependent Variable:	**TPCF**	**FDI**	**PEQTY**	**PNG**	**TPCF**	**FDI**	**PEQTY**	**PNG**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	2.472 (2.968)	-2.292 (1.654)	0.002 (0.003)	-0.005 (0.003)	3.666 (4.320)	-0.428 (1.704)	0.00008 (0.004)	-0.006 (0.003) *
Lagged Dependent Variable	0.173 (0.192)	0.818 (0.067) ***	0.853 (0.009) ***	2.689 (0.0820) ***	0.246 (0.215)	0.549 (0.071) ***	0.839 (0.014) ***	2.724 (0.074) ***
Real Sector Growth Index	0.566 (0.138) ***	0.401 (0.066) ***	-0.00005 (0.0002) *	-0.00007 (0.00002)***				
GDP Growth					0.343 (0.118) ***	0.311 (0.055) ***	-0.00004 (0.00002) **	-0.0002 (0.00004) ***
M2	-0.147 (0.054) ***	-0.075 (0.024) ***	0.0001 (0.0002) ***	0.00003 (0.0002)	-0.151 (0.056) ***	-0.020 (0.020)	0.0002 (0.00003) ***	0.00005 (0.00002) *
Inflation	0.004 (0.0008)***	0.002 (0.0006)***	-0.00028 (0.00002)	-0.00005 (0.00003)	0.002 (0.0005) ***	0.002 (0.0003)***	0.000001 (0.00002)	0.00001 (0.00003)
Natural Resources	0.408 (0.059)***	0.143 (0.035)***	-0.00006 (0.00002)**	-0.00006 (0.00002)**	0.396 (0.041)***	0.203 (0.018)***	-0.0001 (0.00004)**	-0.00007 (0.00003)***
Exchange Rate	-0.007 (0.003)***	-0.006 (0.002)***	0.0000356 (0.000013)***	0.00005 (0.00001)***	-0.007 (0.002)***	-0.001 (0.015)	0.000004 (0.00001)**	0.00006 (0.00001)***
Gross Domestic Savings	-0.600 (0.055)***	-0.257 (0.040)***	0.00005 (0.00003)	-0.00002 (0.00003)	-0.560 (0.422)***	-0.197 (0.021)***	0.00009 (0.00005)*	-0.00004 (0.00003)
Trade Openness	0.112 (0.026)***	0.018 (0.235)	0.00009 (0.00003)***	-2.368 (1.432)*	0.00005 (0.00003)	0.003 (0.023)	0.0001 (0.0.00003)***	0.00009 (0.00004)**
Financial Openness	1.360 (0.562)**	0.459 (0.272)*	0.0002 (0.0003)		-0.0009 (0.0003)***	0.586 (0.247)**	0.0001 (0.0004)	-0.0008 (0.0003)***
Human Capital	-0.173 (1.414)	1.072 (1.102)	-0.003 (0.001)**	-2.368 (1.082)**	0.004 (0.002)**	-1.340 (1.223)	-0.003 (0.002)	0.003 (0.002)*
Gross FCF	0.712 (0.989)***	0.384 (0.088)***	-0.0003 (0.00007)***	0.035 (0.159)	-0.0003 (0.00009)***	0.372 (0.777)***	-0.0004 (0.00008)***	-0.0003 (0.0001)***
Legal System	-7.520 (1.748)***	-1.710 (1.143)	-0.0004 (0.002)	-11.877 (2.309)***	-0.0008 (0.001)	-2.010 (0.984)**	-0.0002 (0.002)	-0.0006 (0.001)
Diagnostics:								
Observations	658	738	734	717	753	729	741	753
Number of Groups *(n)*	31	31	31	31	31	31	31	31
Number of Instruments *(i)*	30	30	29	31	30	30	29	31
Instruments Ratio *(n/i)*	1.03	1.03	1.07	1.00	1.03	1.03	1.07	1
AR (1): p-value	0.001	0.003	0.294	0.001	0.106	0.004	0.290	0.072
AR (2): p-value	0.883	0.384	0.312	0.560	0.235	0.970	0.311	0.223
Hansen J: p-value	0.417	0.126	0.968	0.104	0.269	0.501	0.873	0.172
Wald Chi: p-value	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000

*Note: TPCF = Total Private Capital Flows; FDI = Foreign Direct Investment; PEQTY = Portfolio Equity Flow; PNG = Private Non-Guaranteed Debt. AR(1) = Test of first order autocorrelation; AR(2) = Test of second order autocorrelation; Hansen J = Test of over identifying restrictions *, **, *** denotes significance levels of 1%, 5% and 10%, respectively. Values in parenthesis denote t-statistics.*

About SSA, the allocation puzzle may not exist because the components of debt and equity flow in capital flows are less in comparison to FDI and thus are not likely to drive the negative effect. Another plausible explanation to the positive total flows and private flows could be attributed to both the push and pull factors that the literature has recognised to be a reason for the attraction of capital flows. Regarding push factors, it may be that the dwindling macroeconomic factors and shocks that characterized most developed countries before and after the global financial crisis could be a leading factor for the influx of foreign direct investment and capital flows at large to SSA. At the same time, the pull factors in terms of steady economic growth, policy adjustments, favourable investments climate, investment returns could be a major factor in the flow of external capital to the SSA region.

Further, the high portion of FDI in capital flows shows that investors are willing to take up controls and may not be in a hurry to cut investments as quickly as possible. Overall, the results in Table 2.5 suggest that there is no evidence of the allocation puzzle between total capital flows and foreign direct investment, and growth in SSA. Thus, the more a country grows, the more likely it will be able to attract foreign capital. However, the allocation puzzle exists on the components of private capital flows. The results suggest that private equity and debt will not go to countries that have already achieved a growth status. The negative relationship may exist because countries that have achieved a growth status are not likely to pay high returns on equity or debt instruments, and since these types of investors are in search of high liquidity, they are likely to shy away from such countries. The intuition, therefore, is that for SSA, any evidence of any allocation puzzle may be dependent on the segregation of private capital flows into direct investment and portfolio investment, and those decomposed capital flows that have a positive or negative association with growth.

Table 2.7: Components of Real Sector Growth and Components of Private Capital Flows

Dependent Variable:	Foreign Direct Investment	Portfolio Equity	Private Debt
	(1)	**(2)**	**(3)**
Constant	-10.198 (1.856) ***	0.011 (0.002) ***	-0.007 (0.001) ***
Lagged Dependent Variable	0.480 (0.044) ***	0.494 (0.001) ***	0.217 (0.006) ***
Agricultural Value Added	0.221 (0.040) ***	0.0002 (0.0001)	0.0003 (0.00008) ***
Industrial Value Added	0.172 (0.058) ***	-0.0003 (0.0001) ***	0.0001 (0.000008) *
Manufacturing Value Added	0.058 (0.031) *	-0.00004 (0.00006)	-0.00008 (0.00003) ***
Service Value Added	0.141 (0.053) ***	0.0002 (0.0002) ***	0.0004 (0.0001) ***
GDP Growth	-0.454 (0.144) ***	0.0005 (0.0002) *	-0.0004 (0.0002) ***
M2	0.075 (0.014) ***	0.0002 (0.00003) ***	0.00007 (0.00001) ***
Inflation	-0.0002 (0.0002)	0.000005 (0.000001) *	0.000002(0.000007) ***
Natural Resources	0.065 (0.017) ***	-0.0002 (0.00003) ***	-0.00007 (0.00002) ***
Exchange Rate	0.001(0.0002) ***	-0.000003 (0.000001) ***	0.000003 (0.000004) ***
Gross Domestic Savings	-0.020 (0.018)	0.0002 (0.00005) ***	-0.00005 (0.00003)
Trade Openness	0.042 (0.010) ***	-0.0002 (0.00003) ***	0.00003 (0.000009)
Financial Openness	0.634 (0.237) ***	0.0009 (0.0005) *	-0.00003 (0.0002)
Legal System	3.631 (0.882) ***	-0.003 (0.001) ***	0.0009 (0.0008)
Diagnostics:			
Observations	838	850	862
Number of Groups *(n)*	37	37	37
Number of Instruments *(i)*	37	37	37
Instruments *(n/i)*	1.00	1.00	1.00
AR (1) :p-value	0.031	0.245	0.083
AR (2) : p-value	0.299	0.320	0.191
Hansen J: p-value	0.289	0.795	0.378
Wald Chi: p-value	0.000	0.000	0.000

*Note: AR(1) = Test of first order autocorrelation; AR(2) = Test of second order autocorrelation; Hansen J = Test of over identifying restrictions *, **, *** denotes significance levels of 1%, 5% and 10%, respectively. Values in parenthesis represent t-statistics.*

2.6.4 Reverse Causal Effect or Evidence of bi-directional relationship

In this study we first ascertained the existence of the allocation puzzle regarding private capital flows and real sector growth. Following Agbloyor et al. (2014) and Imasirajo (2016), the study also examined any bi-directional links between private capital flows and real sector growth in SSA in order to provide evidence of a bi-directional relationship or not. We found no evidence for the allocation puzzle on broad measures of private capital flows and real sector growth over the period of the study, either from the growth angle or from the angle of real sector growth as consistent with Alafro et al (2014) and Gourinchas and Jeanne (2013) and inconsistent with MacDonald (2015). Decomposing private capital flows, however, yield varying results, with evidence of an allocation puzzle not existing for FDI but holds for portfolio inflows (i.e., equity and debt). The puzzle is only evident when we regress real sector growth on portfolio flows, and debt flows, as in MacDonlad (2015), however, on regression capital flows on growth; we found no such evidence either at the overall level or at the aggregate level. We attribute the different effects to issues of control and liquidity, which could be the main underlying factors for the behaviour of such flows. A feedback relationship may exist for FDI because such investors have acquired lasting ownership and may be much concerned about aid the growth of the larger economy for them to benefit in the long term. Thus, direct investors will be willing to invest in high growth economies to enjoy prolonged returns on their investments. For portfolio flows, such investors do not have control elements and thus may not have long term ties or commitments. These investors are therefore in search of high liquid investments and quick returns. To the extent that an economy can provide high returns, portfolio investments will increase. However, such flows will dwindle when economies start to pay less than expected rates of return. That explains why growth economies may be attracting fewer amounts of portfolio flows.

In terms of bi-directional associations, the results show some evidence of a feedback relationship in both aggregate and gross levels between measures of real sector growth and components of private capital flows. We first found evidence of a bi-directional relationship between real sector growth and total capital flows. We established a feedback relationship, where real sector growth can cause more inflow of private capital flows and more private capital flows can lead to the higher growth of the real sector. The intuition was that while the growth of the real sector is necessary for the attraction of private capital flows, an increase in the quantum of private capital flows is an essential ingredient for the growth of the real sector in SSA. On decomposing private capital flows, we found similar evidence of a bi-directional relationship between real sector growth and all components of private capital flows, over the study period, but in mixed directions. We found the same directional movements in terms of foreign capital flows. It suggests that to attract foreign direct investment, the real sector must first grow, while inflows of foreign direct investment could lead to the growth of the real sector. Foreign direct investment can jump-start growth of SSA's real sector, and real sector growth can also jump-start the attraction of foreign direct investment.

Regarding portfolio inflows (equity and debt), we found evidence of reverse effect but directional differences. While we found increases in portfolio flows to enhance the growth of the real sector, the growth of the real sector will cause a decline in the attraction of both portfolio equity and private non-guaranteed debt into SSA. Thus, although there is a reverse relationship, the nature of the direction contradicts.

On the decomposed levels of both real sector growth and private capital flows, we found evidence of a bi-directional relationship between foreign direct investment and manufacturing, industry, agriculture, and service value additions. Apart from agriculture value additions where the nature of reverse effect moves in different directions, the rest moved in the same direction. Growth in service, manufacturing, and industrial value additions can lead to the inflow of FDI and inflow of FDI can also inspire the growth of these sectors. However, on agriculture, the nature of reverse effect is that while growth in value additions can attract foreign direct investment, inflows of FDI could hurt the growth of the sector if foreign direct investment is expected to lead the growth of the sector.

For portfolio equity flows, evidence of uniform reverse effect exists regarding industrial value additions. While growth in industrial value additions will attract less portfolio equity, an increase in the inflows of portfolio equity will also hurt the growth of the sector. There is also evidence of bi-directional connection for service additions but in opposite directions, while portfolio equity could hurt the growth of the service sector, growth of the sector can increase the inflow of private equity inflows. We found evidence of a unidirectional relationship for manufacturing and agricultural value additions. We found portfolio equity to enhance growth in agriculture but dampen growth in manufacturing. However, neither of the two sectors is essential for the attraction of portfolio equity. For debt flows, there is evidence of a uni-directional relationship with manufacturing and industrial value additions — moreover, a bi-directional relationship between agricultural and service value additions amid directional differences.

2.7 Policy implications and recommendations

From the results above and the main objectives of the chapter, we provide policy directions and recommendations as a guide for policymakers on private capital flows and growth of the real sector in SSA. Knowing the relevance of capital flows to growth, which largely emanates from the neo-classical growth theory, many economies have instituted policies and regulations aimed at attracting large inflows of capital. Among these measures include a sound macroeconomic environment, political stability, institutional quality, stronger financial system, continental trade agreements, and improvements in business climates, favourable tax regimes, human resources development, improvements in infrastructure and image uplifting campaigns among others. Although studies abound on the relationship between growth and capital flows, we looked at the relationship at a far different level that is at the level of the real sector. Again, against the backdrop that recent empirical studies seem to contradict the theory on the capital flow-growth nexus, we provide evidence in the context of SSA.

Our study has shown consistency growth rates for Africa, where growth has not fallen below 4% since the beginning of 2008. Economic growth has been accompanied by consistent increases in all measures of private capital flows into SSA. On the face value, one would wonder if it is the increase in private capital flows that has led to growth, or it is higher economic growth that is attracting more foreign capital. About the real sector, growth rates have been encouraging for all sectors. Traditionally, SSA is known to be dependent on the agricultural sector. The sector has been deemed to provide the easiest way out of poverty and economic transformation. However, if this is to be realized, it is essential that the many issues bedeviling the sector are eliminated or reduced to the barest minimum. Growth in industry and manufacturing value additions has ignited the industrialization agenda for SSA. Industrialization should also look at other sectors such as construction, mining, and water. Growth rates have rather been phenomenal for the service sector. The sector has enjoyed consistent growth since the early 1990s. As growth rates in Agriculture decline, the view is that the growth of the services sector can lead to the growth of the economies in SSA.

From our studies, we have established that there is no evidence of the allocation puzzle at the overall capital flows and real sector growth levels. To further give credence to our results, we switch the positions of capital flows in a reverse causal analysis. For SSA, our results show that policy makes should not be worried about growing the real sector amidst fears of low inflows of private capital. Our results thus support earlier studies that have recommended that policies be instituted aimed at attracting more inflows of private capital. We also show that the recent efforts made by most SSA countries to issue bonds seem to be a good idea as we found debt flows to impact positively on the growth of the real sector. The onus will lie on the specific sectors that such flows should be direct. We recommend that much of debt flows are directed to the services sector as we found strong positive causal relationships.

On the issue of causality or bi-directional relationship, we have established that there is a causal link between private capital flows and real sector growth at the overall aggregate level, and between FDI and overall growth in real sector. We recommend that existing policies aimed at improving growth of the real sector such as a dynamic and resilient agricultural productivity, modernize and mechanise farming, access to credit by all sectors, vibrant manufacturing and industrial sectors, strong pursuit of SSA's industrialization agenda, increase efficiency in mining and construction, increase government allocations to all sectors, laws to sustain and protect the real sector as well as creating direct linkages among all sectors will enhance the inflow of private capital and especially foreign direct investment to the sub-region. In the same way, policies directed at attracting foreign capital such as capital account liberalization, stable macroeconomic environment (controlled inflation, money supply, exchange rate, and budget surplus), trade and financial openness, human capital development, favourable investment and business climate may go a long way to enhance growth of the real sector.

About portfolio equity and debt flows, although reverse effect exists, policies about those types of flows should be done with caution. It is essential that growth-enhancing policies become the focus of policymakers as it is the growth of the real sector that can induce these types of flows. Growth in manufacturing, improved agriculture, industrialization, and the services hold the key to economic transformation for Africa. It thus enjoins policymakers to propel sector-specific measures to boost the growth of each sector. On the level disaggregation, efforts aimed at improving the agriculture sector such as issues of land, credit, access to markets among others are essential in attracting foreign direct investment. Again, foreign direct investments have a strong positive causal relationship with growth in services, industry, and manufacturing. Moving forward, it is essential that issues affecting these sectors are resolved to help the attraction of more foreign direct investment.

For further studies, we recommend the inclusion of public flows in total flows to provide evidence or otherwise of the puzzle. Public flows were the cause of the allocation puzzle in Alfaro et al. (2014), but not on a study based solely on SSA. The use of productivity catch-up as a measure of growth could also be employed in the case of SSA to determine if a different conclusion is possible. Again, productivity catch-up was the main measure of growth by MacDonald (2015) and Gourinchas and Jeanne (2013). Also, as noted by Prasad (2007), varied reasons may account for the negative relationship between growth and capital flows. We recommend further studies that may look at issues such as the financial sector or institutional development on the attraction of capital flows on the real sector. Lastly, at what point does the allocation puzzle curtail if any? Studies that look at the threshold effect in the growth-capital flows nexus will be appreciated.

2.8 Conclusion

The traditional neo-classical growth posits a positive relationship between growth and capital flows. Thus, the general understanding is that countries that have achieved high growth rates will import excess foreign capital to finance investment and productivity growth. Moreover, that has been the motive for most developing countries opening their economies foreign capital. Yet, recent empirical observation seems to contradict this position, and little is known on SSA about the growing contradictions. Using data on SSA, we provided evidence of the existing contradiction or not to the earlier position. In our study, we proceeded to achieve two main objectives; provide evidence of the allocation puzzle using data on 42 SSA from the period 1980 – 2017. Secondly, to determine if there is any causal link between the growth of the real sector and private capital flows. On the allocation puzzle, we showed that there is a strong positive correlation between real sector growth and private capital flows in the data at the overall measures of real sector growth and private capital flows. The outcome was robust to varied measures of growth, as well as whether growth was the dependent or independent variable.

On employing growth as the dependent variables, we found no allocation puzzle at the overall level or disaggregate levels of private capital flows. Disaggregating total private capital flows, we found all components to positively correlate with real sector growth. The estimations thus show that the traditional neo-classical theory still holds and that growing countries will continue to import more foreign capital to finance growth and investments. At the disaggregate levels of both real sector and capital flows, we found that growth of the manufacturing, industry and services sectors do attract foreign direct investment, whiles growth of the agriculture sector leads to a fall in the inflow of FDI. Significantly, growth in agriculture attracts portfolio equity while growth in other components does not attract portfolio equity flows. We also found that growth in service and agriculture are significant to debt flows but negatively correlated.

Employing capital flows as our dependent variable, we still note the absence of the allocation puzzle, as we observed a strong positive relationship between real sector growth and net private capital flows. However, on decomposing the capital flows, we show that the source of the positive association emanates from the inclusion of FDI. Portfolio equity flows and private debt flows were found to negatively correlate with real sector growth.

While we disregard any evidence of an allocation puzzle in the case of SSA in the attraction of foreign capital flows, we recommend that countries in SSA use real sector growth as a bait to attract private capital flows of all kinds. Foreign investors will be willing to invest in economies that have achieved increases in real sector growth than investing in countries that are now experiencing growth. With this approach, inflows of portfolio equity and debt flows will outweigh the traditional dependence on foreign direct investment, as shown by their high coefficients. Growth may, however, delay if countries in the region would rather want to rely on capital flows to spur growth. On the disaggregation level, we show that growth of the services, industry and manufacturing sectors can attract more foreign direct investment, while inflows of foreign direct investment into these sectors can also jump-start growth of these sectors. Again, we show that the services sector is essential to the attraction of all forms of private capital flows. It is therefore essential that attention is paid to the sector like other traditional sectors like agriculture, given its relevance in attracting private capital. Again, for the growth of the manufacturing and industrial sectors, attention should be on attracting more foreign direct investment than portfolio flows. It also shows at a less aggregate level of growth, the type of private capital matters.

CHAPTER THREE

REAL SECTOR GROWTH AND PRIVATE CAPITAL FLOWS IN AFRICA: DOES FINANCIAL DEVELOPMENT AND INSTITUTIONAL QUALITY MATTER?

"Knowledge is power, Information is liberating. Education is the premise of progress, in every society, in every family". – Kofi Annan

3.1 Introduction

Aside from Africa's impressive growth rates in recent times, return on investments have also been acknowledged as one of the highest[20] (Anyawu, 2015; UNCTAD, 2013). A continent previously branded as "hopeless" and experiencing "anemic growth," is fast-growing such that its constituents are labeled as "lions on the move" or collectively dubbed "Africa on the rise." The narrative on Africa's growth has changed steadily since the 1990s. High growth rates have been consistent over a relatively long period[21]. For instance, close to 33% of countries maintained average growth of 6% between 2012 and 2013, while by the end of 2012, 50% of the topmost ten economies in the world were in Africa, and only second in terms of global growth metrics to East Asia in 2013 (Watkins, 2014; Fioramonti, 2014). Macroeconomic conditions in the region continue to show impressive gains. Economic indicators have been strengthened in many countries, an indication of policy effectiveness. Although growth is not the same across the region, Jayne et al., (2018) posit that various factors account for the current economic transformation, notably, improvement in governance indicators and policy reforms, substantial foreign and local investments, growth in agriculture, rising commodity prices, and increased informal sector employment. Other notable factors include declining inflation and exchange rate stabilization (AfDB, 2019), divergent workforce (Yeboah and Jayne, 2018), grandiose external investment across sectors

[20] Anyanwu (2015) notes that between 2006 and 2011 Africa's return on FDI was at an average figure of 11.4% when compared to global and developed economies figures of 7% and 5.1% respectively.

[21] On the average, growth rates in Africa has not fallen below 4% between 2008 and 2014. Averaged growth rate between 2010 and 2014 was 5% (IMF, 2013; AfDB, 2012).

(ACET, 2017), reduction of fiscal imbalances, external financing options and narrowing inflation rates (IMF, 2018b).

Nevertheless, growth rates have not always been on the ascendency as growth fell by almost 73% between 2015 and 2016 (from 3.7% to 1.7%). The sloping growth was primarily driven by weakening economic fundamentals, fallen commodity prices, and droughts. A more in-depth assessment shows country differences, with some gainers and losers (UNECA, 2017)[22]. However, when skeptics thought Africa's growth was a hoax, projections going into 2017 and 2018 were brighter for the continent. Anticipations were that growth would hit almost 2.6% in 2017 and further to 3.4% by the end of 2018 (IMF, 2017). UNCTAD (2016) also expected growth rates to accelerate to almost 3.2% in 2018, and 3.5% by 2019. AfDB (2019) documents an increased growth of 3.5% for 2018, similar to that of 2017 and almost 66% improvement over the growth rate of 2016. Valid questions remain about the sustainability of the current upsurge in Africa's growth (Fioramonti, 2017; Obeng-Odoom, 2015).

It is essential to note that the recent growth in Africa has not been evident in only commodity-rich countries, but across coastal and land-locked areas, regional blocs and across sectors as well. At the sectoral level, UNECA (2017) notes that growth in real sector components stimulated economic growth in 2016 for two of the four highest growing countries in East Africa. Growth in Rwanda was mainly on the back of agriculture and services, despite fallen coffee and tea prices, while in Tanzania, the demand for manufacturing and services spurred economic growth (UNECA, 2017). It is obvious that one critical component needed to sustain Africa's growth lies in the transformation of Africa's economy, which is unattainable without growth in the expansion of the real sector. The

[22] The United Nations Economic Commission for Africa (2017) report shows dwindling growth in 2016 rates from Nigeria (-1.6%), Angola (0.8%), Egypt (3.4%) and Algeria (2.9%). At the same time, some economies showed positive grows, notably, Cote d'Ivore (8%), Senegal (6.3%), Ethiopia (5.4%), Kenya (6%).

growth of the real sector (growth in agriculture, expansion in manufacturing) linked to productivity is essential for growth in Africa. Grabowski (2006) puts forward the argument that broad-based expansions in agricultural productivity, coupled with political developments, are essential for sustained growth in Sub-Saharan Africa. Loayza and Raddatz (2009) found evidence that growths in agriculture, construction, and manufacturing matter for poverty alleviation. Warr (2001) also found the growth of the agricultural and services sectors as essential poverty reduction tools.

Employing data between 1980 and 2014 for 37 countries, Opoku and Yan (2019) show the relevance of industrial and manufacturing sectors to economic growth in Africa and an antidote to sustainable development and transformation of the region. Opoku and Yan (2019) lauded the initiative of the Government of Ghana on a significant policy initiative (one district one factory) that intends to spur growth in manufacturing and industry. Such policies have direct linkages to job creation, the growth of other sectors, and the entire economy.

On real sector linkages, a shift from low agricultural productivity to high manufacturing productivity and advanced services will help sustain Africa's structural transformation (ECA, 2017). Given the dwindling fortunes of the hitherto vibrant agriculture sector and low employment, UNCTAD (2015a), posits that Africa's transformation can be spearheaded by the growth in the service's sector, as the sector is currently dominant to the growth of most countries. UNCTAD (2015a) further stretches that service sector related activities such as logistics and distribution services could also lead to improvements in agriculture (food production) and manufacturing (processing) productions. Also, infrastructure-related services such as water and energy, telecommunication, transport, and financial services are deemed vital to the growth, social welfare, and transformation of Africa. The report further notes of service sector related growth in specific countries such as education (Ghana and Uganda), air and cargo transportation (South Africa and Ethiopia), banking and financial services (Nigeria and Mauritius) and telecommunication (Egypt). Although Diao et al., (2017) notes slightly weakening within-sector productivity and comment on the relevance of the service sector in enhancing productivity growth and development in Africa, UNCTAD (2015a) acknowledges incredible advancements is regional service trade in the areas of telecommunication, retail, and finance, as well as growth in storage and transport. Overall, UNCTAD (2015) strikes a significant correlation between growth in the service sector and economic growth, whether from the supply or demand angle.

The association between capital flows and growth takes its roots from the broader association or linkage between financial liberalization and economic growth. Theoretical propositions note of a positive association between capital flows and economic growth. However, a meta-analysis of the empirical literature on the capital flows – economic growth nexus, and one will struggle to find a definite answer to a simple question as to whether capital flows do boost economic growth. A simple yes or no answer may ignite an unending academic debate. A yes will suffice because capital flows have the impetus to propel an economy into higher growth as studies have concluded that faster growth of some economies is associated with high private capital inflows (Soto, 2003; Allen et al., 2018). Such flows provide funding for production, resulting in economic welfare gains. The ability to move capital across countries comes with benefits such as consumption smoothing, financing of investment and production activities, risk reduction through diversification. Capital flows also has the impetus to reduce lending rates through competition in the domestic financial market and enhance the growth of recipient countries through technology transfers and human capital development. The presence of foreign capital widens the net of funds available for investment by local firms and helps drive down interest rates to affordable levels.

However, others will point to the instability, currency overvaluation, exchange rate risks, financial crisis, and macroeconomic uncertainties associated with capital flows. Massive flows also encourage reckless and unstainable borrowing, balance sheet maturity mismatch, and fiscal indiscipline. Employing data on 181 countries between 1996 and 2007, Reinhart and Reinhart (2008) acknowledge the possibility of economic and financial crisis emanating from capital flows. Eichengreen (2001) and Prasad (2003) found little evidence of a robust association in favour of growth and capital accounts as they show no support of a positive impact on capital account liberation on economic growth. Still, some are of the view that a yes or no answer is dependent on the availability of specific conduits through which capital flows may or may not affect growth, and that there is an indirect relationship between measures of capital account liberalization and economic growth. On a meta-analysis on 60 empirical studies, Bumann et al., (2013) notes of a weak positive effect of financial liberalization on growth, and that liberalization will be more beneficial to growth when combined with individual factors such as institutional quality, monetary or fiscal policies. Siding with the conclusions of Baumann et al., (2013), Kose et al., (2010) note that any positive impact of capital account liberalization may be conditioned on factors, mostly related to the recipient country. These conditional factors are what Durham (2004) described as "absorptive capacities of host countries". We explored the lack of coherence in the literature and deplored two dominant absorptive characteristics –financial sector development and institutional quality in the capital-growth equation. In this study, we looked at the conditional effect of institutional quality and financial development on private capital flows and the growth of the real sector in Africa.

Despite the abundance of capital flows-growth studies discussed above, and the unending debate regarding empirical stands on economic growth determinants and associated channels, the real effect of capital flows on growth has been mixed and complex. Aside from the differences in sample sizes, methodology, and geographical context, there still exist gaps in the literature. We identified the following gaps which form the basis of our contribution to the literature. First is the measure of growth. GDP growth has been the apparent proxy for growth, as it is the decisive policy goal of every economy or government. Most policymakers are dazed by GDP numbers even when economic conditions hardly reflect realities in the lives of the people. However, as noted by Fioramonti (2017), a complete focus on GDP, which is an aggregate figure, as the ultimate measure of growth will eliminate alternative assessments of development. Other measures of growth and development, especially at a less disaggregate level may be missed or sidelined by government and policymakers. For instance, nineteen out of the twenty countries in Africa with average GDP growth of 4% between 2000 and 2016, experienced a little over 3% growth in agriculture GDP (Jayne et al., 2018). It is also essential to recognize that the dynamics underlying Africa's growth are gradually changing, and much of the growth is linked with growth in real sector components. Data shows that between 2009 and 2012, over a third of all formal jobs in Africa, were service-related jobs. With the inclusion of the informal sector, the numbers will be higher. The sector further accounts for almost two-thirds of all jobs in some countries on the continent. Growth in services is expected to drag along other sectors, which include manufacturing, industry, and agriculture (UNCTAD, 2015a). The UN also recognizes the relevance of industrial and manufacturing growth as a significant component to the attainment of agenda 2030. An aggregate growth picture is likely to hide a wide range of sectoral differences.

Given the relevance of the real sector to Africa's continued economic development, and the benefits that capital flows bring to host economies, we re-visited the growth-capital flows debate-taking cognizance of emerging datasets, concepts, and econometric procedures. We took a swipe of the issue focusing on the association at a disaggregated level of growth. The benefits of capital flows to the growth of such sectors will primarily emanate from technological transfers from multinational corporations. Integration of capital flows at the lower level of growth; there will be the transfer of skills, knowledge diffusion and ultimately, increase in production. Direct linkages between sectors lead to value additions of outputs. The attraction and infusion of capital should lead to employment creation, profit to firms and growth of the sectors, and the economy at large. These sectors are touted as very instrumental to the developmental agenda of any economy; as they have the capabilities to induce economic growth and transformation, reduced unemployment and poverty since ultimately social gains and cost abide with these economic sectors. Kodongo and Ojah (2017) believe that African countries stand to benefit more from capital flows in relief from any financial constraint, economic growth and development when capital flows are aligned adequately to productive sectors that need them most, as they found some flows to propel growth in some sectors but damaging to other sectors. Despite the array of studies, only a few studies, such as Kodongo and Ojah (2017) have focused on the real sector. However, aside from differences in scope and estimation procedure, their paper focused more on cross-border flows with the inclusion of remittances while excluding private debt and portfolio equity flows.

Secondly, we assessed the direct impact of financial sector development and institutional quality on disaggregated economic sectors. Such an assessment allowed us to recognize which sectors benefit from improved financial development and institutional quality. Most importantly, we examined the mediating roles of financial development and institutions on private capital in enhancing real productive sectors in separate regressions. What are the critical levels of financial development and institutional quality that enhance the influx of capital flows to Africa's real sector? On the mediating effect of financial development, our paper may be likened to that of Agbloyor et al. (2014), Choong et al., (2010), Durham (2004) and Alfaro et al., (2004) but we employed a more extensive dataset on Africa, period and different estimations procedure. We also employed datasets that is rarely used regarding Africa in the context of financial development and institutional quality development in mediating the impact of capital flows on real sector growth.

Lastly, we applied a recently developed econometric procedure not yet applied in the capital flows-growth African literature. We test our empirical analysis with an instrumental variable GMM two-step estimator (IV-GMM), that resolves issues of instrument unavailability and insufficiency while producing robust estimates. The model overcomes the limitations of the traditional 2SLS estimation procedure while providing consistent estimates. We further apply an estimation procedure regarding the interpretation of conditional effects and multiplicative interactions in line with Brambor et al (2006), which has rarely applied in the capital flows-growth nexus.

3.2 Contextualizing the linkages between real sector growth, capital flows, financial development, and institutional quality.

Even though theory posits that capital flows convey spill over benefits to recipient countries, the empirics suggest that the benefits from external capital between two countries could hinge on certain domestic conditions. Thus, between two countries receiving the same quantum of capital, the existence or otherwise of certain domestic conditions may dwarf or offshoot the direct benefits of capital flows. The works of Prasad et al., (2005) and (2007), therefore provides two ways in which capital flows may enhance the growth of an economy, either direct or indirect. The direct, which include the transfer of technology, cost of capital, effect through savings, and financial market development, are transmitted through the savings-investment and productivity channels. Delechat et al. (2009) note that capital may flow to an economy when there exist three main channels. These are overvaluation, savings-investment, and institutional development. Edward (2001) shows that the direct effect of capital flows on growth are evident through the savings-investment-productivity channel. The savings channel exists when capital deals with issues of capital account deficit by augmenting domestic savings. In the investment growth channel, the influx of external capital beats down high domestic interest rates arising from scarce capital. The influx of capital also spurs growth by boosting local investment through capital provision (Bosworth and Collins, 1999). Capital flows thus tend to restore domestic interest rates to an acceptable level by restoring investment-savings to equilibrium. With national interest rates down, the cost of capital decreases, investments surges, which culminate into fast economic growth.

However, the direct ramifications of capital flows on growth have been an incessant debate whose end is not in sight. Though researchers acknowledge the benefit of capital flows to economic growth, others are of the view that financial liberation comes with crisis and distortions in economic indicators. Other strands of studies also suggest that the results of capital flows on growth may not be direct but operates through a conduit and that the growth enhancement of capital flows is dependent on factors contingent on host economies (Durham, 2004; Agbloyor et al 204). Which means that in the absence of specific host country characteristics, the repercussions of cross-border flows on growth will be hypothetically insignificant or at worse damaging. Meaning that the quantum of capital inflows may be extraneous to growth unless recipient countries develop qualities that can project the growth benefits of cross border flows. As stated, Durham (2004) classifies these enabling features as host country absorptive capacities. The absence of these absorptive features could derail, or their presence could augment the potential effect of capital flows on growth. For instance, several reasons may account for the upward flow of capital from poor to rich countries.

Among these include weak institutions (Alfaro et al., 2005), the high cost of capital (Caseelli and Feyer, 2007), and default on debt financing (Reinhart and Rogoff, 2004). Thus, on the indirect linkage, although a positive association between capital flows and economic growth might not be robust, studies have shown that capital flows' impact on growth is dependent on factors which act as canals through which capital flows affect growth (Akinlo, 2004; Prasad, 2003). Most of these factors are known to be characteristics of recipient economies or "pull factors". IMF (2018b) notes the relevance of domestic fundamentals in explaining the behaviour of cross border flows and also cushioning risks associated with volatile capital flows. Notable among these fundamentals include macroeconomic stability (Fernandez et al., 2015; The World Bank, 2001), financial development (Agbloyor et al., 2014; Adjasi et al., 2012; Choong et al., 2010; Alfaro et al., 2004), human capital development (De Mello, 1997; Borensztein et al., 1998), institutional quality (Arya et al., 2019; Nyang'oro, 2017; Durham, 2004), and trade openness (Balasubramanyam et al., 1996). It therefore, implies that countries that tend to have better institutions, stable macroeconomic fundamentals, relaxed trade rules, and financial openness attract high volumes of capital flow and less reversal of flows. Alluding to the Lucas puzzle, where less capital seems to move from poor to rich countries, various domestic characteristics could explain the upstream movement of capital. While Lucas (1990) allude to difference in human capital between the poor and rich countries, Alfaro et al., (2008) posit that levels of institutional quality are the leading cause of the upstream movement of capital from less developed to rich countries. Kose et al. (2011) also acknowledge that the direct effect of capital flows on growth cannot be realized unless host countries have attained certain initial conditions, such as financial development and institutional quality. It is when these conditions are in place that the positive impact of capital flows on economic growth will be realized.

The narrative is that the virtues of financial liberalization could only be achieved with the help or presence of certain domestic features, without which the effect of capital flows on growth and investments, both at an aggregate and disaggregate level will be bleak or opaque. We are therefore convinced that from the ensuing discussions, a well-functioning financial sector and institutional environment is likely to attract capital from both domestic and international sources to enhance Africa's real sector.

3.3 Literature Review

3.3.1 Theory: Capital Flows and Growth

Theoretical proponents on economic growth posit that the growth of an economy is dependent on the availability of certain factors or variables. In one of the utmost growth theories, Schumpeter (1911) notes the critical link between finance and growth. The Schumpeterian view of economic growth proposes that economic transformation is a function of a certain level of financial sector development and that countries with increasing financial sector expansions are likely to experience surges in economic growth. Supporting the Schumpeterian view include a host of actors such as Shaw (1973), Greenwood and Jovanovic (1990) as well as King and Levine (1993). Summing up their views, these actors presuppose that finance facilitates growth through lower transaction costs and the redistribution of financial resources to industrious sectors from less industrious sectors. The finance-growth enhancement occurs through capital accumulation, savings improvement, and resource allocation, as well as the provision of quality financial services. On the allocative function of finance: "The financial sector is important because financial intermediaries are responsible for resource allocation. Well-functioning financial intermediaries improve the efficiency of capital allocation, encourage savings, and lead to more capital formation" (Wachtel, 2003, p. 35).

Beck et al. (2000) note the channel through which finance enhances growth to start from savings allocation, which then impacts productivity growth through technological innovation. It is worthy to note that the savings to be allocated could be from either foreign or local sources, especially in a liberal economy. Given the scarcity of domestic capital, the influx of foreign capital aids the process of capital accumulation by local firms, thereby enhancing productivity and economic growth. In a study on the relevance of the Schumpeter analysis on finance and development, Bertocco (2008), provides a set of theoretical benefits of financial development to include; "(i) production of ex ante information about possible investments, (ii) monitoring of investments and implementation of corporate governance, (iii) trading, diversification, and management of risk, (iv) mobilization and pooling of savings, and (v) exchange of goods and services" (Bertocco, 2008, pp. 1162). Expectations are that each factor or a combination of the above factors will impact savings and investment, which may intend lead to economic growth. Empirical affirmation of Schumpeter includes an array of studies (Kendall, 2012; Hassan et al., 2011; Manu et al., 2011; Masten et al., 2008; King and Levine, 1993).

Under the standard neoclassical growth model with a decreasing return to capital, the rate of growth is a function of a country's savings rate and population growth. Treating these two, in addition to technological changes as exogenous to the model, increases in savings and population have different effects on growth. Based on two main inputs, which are capital and labour, the model's steady-state ratio of capital to labour is proportional to favourable rates on savings and inversely to the rate of population growth. Thus, while high savings enhance growth, population growth is considered detrimental to economic growth. For a country to achieve high economic growth, a country should increase its savings rate and reduce the rate of population growth, even though the neoclassical modes does not accurately predict the magnitude of growth effects. Given the theoretical prediction of the Solow model is the effect of savings and population on growth, and the rate of savings increase and population decreases, developing countries are likely to achieve growth convergence and catch-up with worthy countries. (Mankiw et al., 1992).

In an augmented Solow model, Mankiw et al., (1992) explain the relevance of human and physical capital accumulation which do not exhibit a constant return to scale as additional explanatory variables to the growth model. They show a strong correlation between savings rate and population growth with a minimum human capital accumulation. Between two economies, the effect of high savings and lower population growth on income per capita or economic growth correlates with human capital accumulation. Again, without human capital, the repercussions of physical capital and labour on growth will be less. Thus, according to the augmented Solow model, differences in cross country growth is explained by the levels of savings, population, and education (human capital). Therefore, within the framework of the augmented Solow model, the capital, whether foreign or local, should impact economic growth through the rate of savings. However, the growth impact will be magnified, where a country has a certain minimum human capital advancement.

The inability of the standard neoclassical theory to predict growth, in the long run as well as account for variances in international income levels, led to the introduction of the endogenous growth model by economists in the mid-1980s. Proponents of endogenous growth model (Romer, 1986; Lucas 1988) sought to diffuse the idea of diminishing return to capital inputs as contained in the neoclassical theory and to further build a model where growth is determined within the process instead of being exogenous. Leveraging on the neoclassical model, the endogenous model saw the introduction of additional explanatory variables (human capital and R&D) in a bid to broaden the concept of capital. Within this model, the marginal product of capital does not exhibit diminishing but constant returns with no convergence tendencies. Therefore, within the endogenous model, capital flows affect growth positively by supplementing domestic investment rates leading to increased productivity, positive spillover effects, and externalities. Juxtaposing the Solow model with the endogenous, Mankiw et al., (1992), contend that in as much as the Solow model addresses the relevant question it was designed for, endogenous growth models "may provide the right explanation of worldwide technological change" (Mankiw et al., 1992, pp. 409).

3.3.2 Empirical Review

The lack of definite conclusions on the theoretical effect of capital flows on growth has been the basis for unending studies on the capital flows-growth nexus. We looked at empirical studies that have assessed the direct effect of capital flows on growth, and a further look at studies that suggest that the growth effect on capital flows is contingent on specific host country characteristics. We ended our review with a focus on two leading host country absorptive characteristics – financial development and institutional quality.

Utilizing data on Ghana between 1970 and 2014 and employing an auto autoregressive distributed lag (ARDL) approach, Klobodu and Adams (2016) sought to determine the effect of differential capital flows on the growth of the Ghanaian economy. Klobodu and Adams (2016) concluded that both short and long dynamics of FDI, external debt flows, and aid were all detrimental to growth within the period. Furtherance to the above, the ARDL shows that in the long run, the dampening results of aid was the most detrimental to the economy, followed by debt flows. A 1% increase in aid flows is likely to lead to a 4% decline of the economy whiles a 1% increase in debt dampens the economy by some 2.3%. Although remittances had a positive association with growth, the effect was deemed insignificant. Assessing the possibility of a bi-directional relationship between trade, capital flows and economic growth for South Africa between 1995 and 2011, Gossel and Biekpe (2014) found no causal relationship between capital flows and growth as they show a weak causal link between portfolio flows and economic growth. They further hint of economic growth driving the inflow of FDI and not the other way around.

In separate regressions on five different SSA countries, Adams and Klobodu (2018), found that the association between capital flows and growth differs based on the type of flows and the country in question. Employing the ARDL estimation, it shows that while FDI promotes growth in Burkina Faso, it was detrimental to growth in Gabon and Niger. The effect regarding aid was positive for Gabon and Niger and harmful to Ghana’s growth, while the effect of remittances was only beneficial to the growth of Senegal. Finally, they found that the impact of debt flows was adversely related to the growth of all countries. Employing the error correction model to assess the outcome of foreign direct investment in Nigeria, Akinlo (2004) found no growth impact of private capital and FDI between 1970 and 2001. The results thus show that the effect of capital flows on growth may have been overemphasized, especially for single countries.

An Assessment of cross-country studies in the linkages amid private capital and economic enhancement studies yields varying outcomes. Employing data on 57 non-OECD economies, Chanda (2005) notes of an inverse relationship between the two variables. However, over two separate periods, Klein and Olivie (2008) shows a strong positive impact of capital account openness on growth from 1976 to 1995 and between 1986 and 1995. They demonstrate that an open economy is more likely to experience swift economic growth. Kose et al., (2009) found the growth impact of capital flows to largely depend on the type of capital as they established a positive association between FDI and equity flows and productivity growth but found foreign debt flows to correlate with productivity growth adversely. On the assessment of the relationship between lagged capital flows and economic growth, decomposed into FDI, equity and debt flows over a twenty-year period between 1990 to 2010, Aizemann et al., (2013) sought to assess the possibility of structural changes as a result of the global financial crisis by assessing the relationship over two separate periods (2000 – 2005 and 2006 – 2010), on a sample of 100 countries. Their conclusion was not different from that of Kose et al.

(2009) that the type of flow matter. While FDI positively affected growth over the entire period, before the crisis and even up to the crisis period, the effect of equity flows was mild. For equity flows, the impact was negative and significant over the entire period and the same within the crisis period. On debt flows, the effect was mixed with no significant impact on growth within the pre-crisis period but very damaging to growth within the crisis period. Bussiere and Fratzscher (2008) instead found the growth impact of capital flows to vary with time. On a set of 45 emerging and developed economies between 1980 and 2002, they show that capital flows may be beneficial to growth, but only in the short run, with no long and medium-term effects. Bordo et al., (2010) show that debt flows are associated with currency and financial crisis, which leads to long term drops in output growth.

Evaluating the relevance of real sector components to economic growth, De Janvry and Sadoulet (2010) shows the significance of agricultural sector growth in poverty reduction and economic growth while Warr and Wen-Thuen (1999) also confirms the importance on industrial growth to poverty reduction and subsequent growth in GDP per capita. Not many studies have focused on the specific association between capital flows and the real sector, especially with the African context. Employing total value added as a proxy for growth for 12 sectors on six OECD countries between 1980 and 2003, Vu and Noy (2009) found FDI to affect growth positively. However, the effect was not even across sectors and counties. Whiles growth was limited in some sectors; there was no evidence of FDI promoting growth in some sectors. Likewise, using an instrumental variable 2SLS estimation procedure for 29 countries from 1985 to 2000, Alfaro and Charlton (2013) found growth in industry value added is higher for countries with high flows of foreign direct investment. They posit that FDI inflows will lead to increased value additions in sectors with high human capital development and financially constrained. Controlling for the quality of FDI, they contend that the results of FDI on growth is not absolute and might vary depending on the sector, whether manufacturing, primary, or services. In an earlier study, Alfaro (2003) found FDI to enhance the growth of manufacturing positively but at the same time detrimental to industry and unresponsive in terms of service value additions.

With a focus on improving Africa's industrialization drive, Gui-Diby and Renard (2015) assessed the direct relationship between FDI and industrialization, for a set of 47 countries between 1980 and 2009. Industrialization was proxied by the growth rate of manufacturing. After controlling for determinants of growth that included the size of the financial sector, they found no compelling evidence of a positive impact of FDI on the growth of the manufacturing sector over the 29 years of the study. They attributed the insignificant association to a lack of governmental policies regarding FDI attraction and manufacturing growth. Policies should focus on attracting market seeking rather than resource seeking FDI, as well as improvements in the business and political environments.

Contrary to Gui-Diby and Renard (2015), Kodongo and Ojah (2017) expanded the scope of both capital flows and real sector variables in a similar study. On a set of 19 African countries over 23 years between 1990 and 2013, Kodongo and Ojah (2017) sought to argue on the direct association between cross border capital flows (FDI and remittances) and the growth in agriculture, industry, manufacturing, and services. Employing the difference GMM estimator to deal with issues of endogeneity, they concluded on the assertion that the growth impact of cross border flows on sectoral growth is not the same for all sectors. Controlling for financial sector credit, they found support for a positive association between FDI inflows and growth of industrial sector value additions but negative regarding service sector value additions, both at a 1% significant level. Thus, while FDI inflows may enhance Africa's industrial growth, the same flows could be damaging the service sector. The results remain unchanged when financing through the equity market is further controlled for within the model, suggesting the robustness of the damming impact of FDI to the service sector and its overwhelming benefit to industrial growth. Though FDI flows dampen the growth of the agriculture and manufacturing sectors, the association is inconsequential, under all estimations. On the effect of remittances, they found an opposing effect regarding service and industrial value additions, which was robust to both domestic financial sector financing and equity market. Whiles remittances positively support the growth of services; it, however, dampens industrial growth both at 1% significance level. Again, the growth of agriculture and manufacturing were statistically immaterial under all regressions.

Studies have shown a robust and significant association between finance and the real sector, as some suggest that slower growth of the real sector is likely to affect the growth of the financial sector, if the real sector cannot make use of rents and other resources provided by the financial sector (Bolton et al., 2011; Philippon, 2010). Linking the association of the real and finance sectors to the growth of the economy for a set of 101 developing and developed economies over a 40-year period from 1970 to 2010, Ductor and Grechyna (2015) show that the end result of financial sector development on economic advancement depends on the growth of private sector credit relative to the growth of the real sector. Evaluating the effect of financial sector fluctuations on the economy through their effect on the real sectors, using a panel of countries between 1960 and 2005, Aizenman et al., (2013) note that whiles financial contractions adversely affect the growth of the real sector, financial expansions, however, have no positive bearing on the growth of the sector. Acknowledging the interdependence of the finance and real sectors for economic growth, Ibrahim and Alagidede (2018), show that the growth impact of financial development on the economy is tangible only when there is a proportional growth between the real and financial sectors. Relying on dataset of 29 SSA between 1980 and 2014 while applying the system's GMM estimator to deal with issues of endogeneity and proxying the real sector by growth of manufacturing value additions, they conclude that in as much as financial development is relevant to the growth of the economy, the level at which finance may spur growth is dependent on the growth on the concurrent growth of the real sector and financial development.

Although the direct impact of capital flows may not be in doubt, there is a growing harmony in the literature that the robust impact of capital flows is not instinctive and may be dependent on specific absorptive characteristics of host countries. These home features act as complementarities in off shooting any known associated benefits of capital flows to destination countries. Again, these features may distinguish the overall impact of the same quantum of capital flows received by two countries. For instance, Blomstrom and Kokko (2003) note the relevance of domestic conditions in the attraction of FDI by local enterprises. With this hindsight, we focused on a review of studies that follow this trajectory. Specifically, we looked at studies that were conditioned solely on either financial development and, or institutional quality, though the literature acknowledges the impact of other complementarities such as trade, human capital and initial economic development, among others.

3.3.2.1. Capital flows and economic growth: Does financial development matter?

On the relevance of domestic market on capital flows, Biliar et al., (2019) note the importance of domestic financial conditions on the attraction of multinational enterprises. Employing data from the United States, they contend that the level of financial sector development is an incentive for entry of multinational affiliates. They show theoretically that one incentive for the influx of foreign firms lies in the development of the host country's financial sector, which comes about through "a financing effect." The financing effect aids entry and expansion of most multinational enterprises. They show that an increase of private credit from the 10th to the 90th percentile will lead to a 13.9% surge in the number of foreign affiliates to host countries. Striking a chord between one of the spill over benefits of capital flows and financial development, Hsu et al. (2014) note the benefits of a developed financial sector to technological innovation. On a data of 32 developed and emerging economies, they show a strong correlation between the development of the equity market and higher innovation for industries that are known to depend on seeking external financing. However, credit market development was detrimental to technological innovation.

On the empirics, a litany of studies has concluded on an adverse or at best insignificant effect of capital flows (debt, equity, and FDI) on economic growth. However, these studies have primarily shown that in the presence of a sound financial system, the growth-enhancing benefits of capital flows become evident and much convincing. Using cross country data over twenty years between 1975 and 1995, Alfaro et al., (2004) examined the interactive capacity of FDI and financial markets on the growth of real GDP per capita. Employing six different proxies for financial development that included both bank and stock market variables, the initial observation revealed no effect of FDI on growth, even when they controlled for financial development, as financial development did not also correlate with growth. They, however, found the multiplicative term between FDI and financial development to yield good results as the interactive terms were favourable at varying levels of significance. To confirm the relevance of financial development, Alfaro et al. (2004) performed a significance test. The results showed that, although the interactive term was significant for all indicators of financial development, the joint significance showed that the level of commercial bank assets advancement does not matter for the upshot of foreign direct investment on growth. In a follow-up work, Alfaro et al., (2010) assess the effect of foreign direct investment on economic enhancement through backward linkages at both the micro and macro levels. Though the initial assessment showed that FDI had no growth effects and at best negative, FDI provides additional growth in countries that are financially developed but slows growth in less developed financial economies.

Employing data on FDI from the OECD, Durham (2004) assessed the effectiveness of host countries absorptive capacities in moderating the connection between FDI and output growth. Employing stock market capitalization as a proxy for financial development, the direct effects of both FDI and financial development were adverse and even insignificant. However, Durham (2004) found that output growth is increased with the increase of FDI when countries have a developed stock market, as the interactive impact of FDI and stock market capitalization was weakly significant at 10%. He contends that an upsurge from the minimum value of stock market development of 0 to the sample average of 0.32 at the mean value of FDI leads to a 0.41%-point increase in annual growth over the study period. On that basis, Durham (2004) postulates that FDI has an unfettered positive influence on growth, given a minimal increase in stock market appreciation. However, the effect of the interactive term was found to be insignificant when FDI data from IFS was employed. The insignificant association was attributed to the composition of developed countries in the IFS data. It may be that these countries have already attained a certain level of stock market development, where the stock market does not matter anymore in the attraction of FDI.

Durham (2004) further assessed the marginal effect of equity flows from the US on annual output growth conditioned on the extent of stock market development. Initial estimations show a direct positive and momentous outcome of equity flows on growth while the stock market was negative and insignificant. On interacting equity flows and stock market capitalization, the results kow-towed with that of FDI, where the interaction term was positive and significant. The intuition on the face level is that developments of a country’s stock market are necessary to sustain any growth benefits from equity flows. There was however a caveat, as countries can only benefit when the level of stock market achieves a threshold of 41.2%, a level that benefited only eight out of the thirty-nine sampled countries. Thus, Both Alfaro et al., (2004) and Durham (2004) notes the relevance of the development of a country's financial sector to the attraction of FDI and the subsequent positive impact on output growth and GDP per capita.

The work of Choong et al. (2010) examined private capital flows (FDI, equity, and debt) to low-income countries, conditioned on the domestic financial sector. They employed three bank-based indicators of financial development that comprise commercial bank assets, deposit money banks assets and private credit, with data between 1988 and 2006 for a set of 16 developing countries and a systems' GMM estimator. Initial estimation shows that while both debt and equity flows were directly detrimental to growth under all regressions that also included the indicators of the domestic financial sector, FDI was mostly positive (under the bank and private credit). Again, the direct effect of the financial sector on growth was also positive and significant. However, the coefficient of the interaction of capital flows with the indicators of private credit proved to be positive and significant under all estimations. They thus concluded on the relevance of a robust financial sector in the allocation of cross border capital flows to low-income countries. In a similar study, this time with a prime focus on stock market development, Choong et al., (2010) compared how stock market moderates the association between capital flows and economic growth for a set of nineteen developed and thirty-two developing countries between 1988 and 2002. The conclusions for both developed and developing countries were not different from their previous study on low-income countries, although different measures of financial development were employed.

Whiles studies such as Choong et al., (2010), Durham (2004) and Alfaro et al., (2004) included pockets of African countries in their analysis, studies that have turned their lenses on Africa, SSA or individual countries on the moderating role of financial development may not be much and at the same time lack goal congruence. Through the effect of savings and investments, Hassan et al. (2011) note the relevance of domestic financial sector development on economic growth. Thus, most developing economies have instituted policies (minimum capital requirements for banks, corporate governance, central bank independence, stock market development) aimed at improving their financial sectors to enhance growth.

Assessing the conditional effect of the domestic financial market on the capital flows - growth connexion for a set of fourteen countries in Africa, in a study that span over seventeen years between 1990 and 2007, Agbloyor et al., (2014) concluded on a negative effect of private capital flows (FDI, equity and debt) after controlling for varied measures of financial development. An examination of the interactive terms revealed that the positive effect of capital flows based on the relevance of financial development depended on the type of capital flows and the measure of financial development. For instance, they found the interactive term to be positively significant for FDI and market capitalization, FDI and private credit, and FDI and broad money. While the interaction between stock market turnovers was positive but insignificant, that between FDI and bank credit was negative and insignificant. Regarding equity flows, the conditional effect from financial development was only positive and significant under stock market capitalization; while market capitalization was the only variable that had a significant positive interaction with private debt flows. The obvious deduction is that the level and measure of the effect of financial development on the association between capital flows and economic growth is not absolute for all type of capital. Using a set of 22 SSA countries and between 1980 and 2011, Adams and Opoku (2015) note the relevance of regulations on the linkage between economic growth and foreign direct investment. Although neither FDI nor regulations had any significant direct impact on growth, effective regulations can project the growth dynamics of FDI, as the multiplication of the two positively impacted economic growth. Notable, central to the regulations is the credit market, which comprised private sector credit, the extent of interest rate interference and extent of private ownership in the banking sector.

Some limitations observed in most of the studies were the assumption that the conditional impact of financial development is dependent on the sign of the interactive term. Also, most of the above studies sought to interpret the coefficients of the constitutive terms in addition to that of the interactive term, with the assumption that once for example, the initial direction of the constitutive term changes, then that change is a result of the interactive term. Another limitation was the failure to estimate the marginal effects based on the coefficient of the independent and interactive terms. The marginal effect is apposite because according to Brambor et al., (2006), it is possible for the coefficient of the interactive term to be insignificant and still have an effect at certain levels of the conditional variable. Significantly, none of the real sector-capital flow studies have looked at the moderating effect of either financial development or institutional quality, enhancing the growth of these sectors. Within the context of Africa as a capital flow destination, we found the non-existence of such studies quite astounding, especially given the relevance of these variables to Africa's economic growth and trade agenda.

3.3.2.2 Capital flows and economic growth: the role of institutional quality

There is a notion that institutional effectiveness is an essential ingredient for investments, long term economic growth (Barro, 1997; Mauro, 1995), and to efficaciously attain structural revolution in many developing economies (UNECA, 2016). Durham (2004) considers institutional development as critical absorptive capacities in the association between capital flows and economic growth. The difference in the level of the host country's institutional development may account for discrepancies in the quantum of cross border capital inflows.

Indirectly, the level of institutional development in a way assures investors and providers of capital as institutional development aids in strengthening financial systems which intend helps with the savings and allocation function. This means that whether investors will be confident in the bank or equity financial system will depend on the extent of institutional development. Thus, holding all things constant, the influx of external capital will be higher in countries with a minimum threshold of institutional quality. Within these economies, there is the subtle assurance that foreign capital acquired through the financial system will be used efficiently and judiciously, as a robust institutional quality will uphold the right of investors.

According to Okada (2013), the benefit of financial openness in terms of increased external capital inflows is much evident in countries with robust institutions. Significantly, institutional quality is known to play a direct and subtle role in the capital flows-economic growth nexus, especially when empirical results have documented that capital flows may not have any direct repercussions on growth. Starting on the directional flow of capital where less capital flows from rich to poor economies, Alfaro et al. (2007) posit that apart from regulatory, technology and human capital differences; the main driving force is the level of institutional weakness in most poor economies. On an earlier study, Lothian (2006) assessed the flow of capital from developed to less developed countries and the outcome of such flows on economic development. He concluded that among the host of factors underlying the directional flow of capital and even on development included sound institutional factors, proxied by an index of economic freedom. Institutional inefficiency does not assure investors as its absence mostly leads to weak investor protection, arbitrary government decisions, lack of contract and judicial reviews enforcements, oppression of foreigners as well as fear of expropriation. Weak institutions affect the risk-adjusted returns on capital, but strong institutions provide assurance of expected returns on capital invested and increase the volume of flows to developing countries (Prasad et al., 2007). In general, weak institutional frameworks encourage rent-seeking activities by diverting needed resources from industrious to unproductive sectors, thereby stumbling growth and economic productivity (Iqbal and Daly, 2014).

Acemoglu et al. (2005) note that institutional failure can hinder both total factor and long-term growth even when foreign capital abounds. It suggests that institutional quality plays a crucial role both directly and as a conduit in the linkage among private capital and economic advancement. Bokpin (2017) illustrates that institutions' growth in Africa has been vital in the attraction of FDI. Numerous studies have also shown that countries with robust institutional development attract the most capital flows, though much has been on the dominant type of capital flows (FDI). Concerning democracy, Asideu and Lien (2011) found that dwindling democracy will inhibit the inflow of FDI in Africa, whiles Mohammed and Sidiropoulos (2010) contend that issues around investment profiling and corruption matter to foreign investors within the MENA region, and building appropriate institutions will increase FDI inflows.

Employing a host of institutional quality indicator, Gani (2007) notes the substantial impact of regulatory quality, control of corruption, political (in)stability, effective government and the rule of law, in the attraction and retention of capital flows. With a focus on forty-five developing countries that included fifteen African countries, Bissoon (2011) concurred on the importance of institutional quality on FDI inflows. Though institutional quality was found to boost FDI inflows, evidence showed the impact was much higher for the institutional quality index than the individual components because these components complement each other. Thus, the direct involvement of various institutional variables in the attraction of capital flows remains mixed and inconclusive.

More importantly, we turn our lenses to the mediating role of institutional quality in the association between capital flows and economic growth. Knowing that increase in the levels of foreign capital does not always inspire economic growth, and that private capital may have limited ability to inspire economic growth, studies have acknowledged that the level of countries institutional development could be a good boost for foreign investors. Developing a growth model in which capital and the allocation of capital was dependent on the levels of institutional quality, Hall et al. (2010) found that increases in human and physical capital only spur growth in countries with appreciating levels of institutional quality. Based on an index of risk of expropriation, their study showed that in instances of low institutional effectiveness, an increase in capital was detrimental to growth, as the additional capital resulted in rent-seeking and fruitless ventures.

In another study involving a set of 28 emerging countries over the period 1990-2013, Arya et al. (2019) found that the ability of capital flows to have a positive impact on both GDP per capita and total factor productivity was contingent on the threshold level of institutional quality. Splitting the data into Asia and Latin American countries, they found that a higher threshold level is needed in Asia for institutions to have a positive effect on GDP growth, while a higher threshold level was required in Latin America in order for institutions to exert a positive impact on total factor productivity. They also noted that the marginal effect of institutions on growth depended on the type of foreign capital as well as the study area.

Setting a threshold level for institutional quality for a set of developed and developing countries that included 24 African countries, Slesman et al. (2015) note a robust positive relationship between measures of capital flows and economic growth for countries with institutional quality above the threshold level. For 42.5% of the sample whose institutional quality fell beneath the threshold, the effect of portfolio equity and debt flows on economic growth was either insignificant or negative, thus reinforcing the relevance of institutions in the association between capital flows and growth. Investigating the effect of lagged FDI and equity flows on economic growth on a set of 80 countries between 1979 and 1988, Durham (2004) confirms that the insignificant association between these capital flows on economic growth could be resolved when countries have attained a level of institutional quality. Using indicators of institutional quality that include corruption, property right, and business regulation index, the extreme bound analysis shows that any positive connection from FDI to growth is conditioned on property right and business regulation index, when FDI data from OECD is employed. Regarding equity flows, the analysis shows that equity flows impact growth only in the presence of low corruption index. In the same line, Alguacil et al. (2011) also show the relevance of a country's institutions' development in explaining the gains on growth emanating from foreign direct investments.

In the context of Africa, numerous studies have concluded that there is a direct relationship between institutional development and both capital flows and economic growth (Anyawu and Yamego, 2015; Asiedu, 2013; Asiedu and Lien, 2011; Asiedu 2006; Anyawu, 2006). Others have shown that institutions act as better moderators in the capital flow-economic growth nexus. For instance, Egbetunde and Akinlo (2015) argue that the virtues of financial liberalization will be translated into economic growth in the long run if African countries implement stronger institutions and sound economic policies. Employing data on a set of 36 SSA countries between 1996 and 2015, Coulibaly et al., (2018) sort to assess the impact of property rights in the association between foreign capital and economic growth. The study employed an ARDL with the pooled mean group regression method for non-stationary panel data estimation. Assessing the threshold level of property rights at which capital flows impact growth, the study found that a higher threshold level of property right is needed for capital flows to positively affect growth on natural resources endowed countries than non-resource endowed countries. Thus, the long-term benefits of capital flows on the economic growth of African countries can only be attained by upholding property right protection across the continent.

Zghidi et al. (2016) also sought to investigate the possibility of any causal linkages between foreign direct investment, economic, and institutions for a set of four North African countries. The study applied the system GMM estimation technique over a twenty-three-year period between 1990 and 2013. Proxying the strength of institutions by the extent of economic freedom, the study showed that though FDI enhances economic growth, the growth impact from FDI is more pronounced in countries with a more significant level of economic freedom. It thus suggests that the relevance of institutional quality is not only felt when capital flows adversely impact growth, but it can also sustain any initial positive effect of capital flows on growth.

Again, on the use of economic freedom as a proxy for institutional quality, Azman-Saini et al., (2010) investigated the role that institutions play in the link between FDI and economic growth of some developing countries that comprised twenty-five African countries. The study employed the GMM estimator on panel data that spanned between 1976 and 2004. The study concluded that though FDI had no autonomous impact on output growth, countries with greater economic freedom can transform the inconsequential impact into positives, and attract a lot of multinational entities. Agbloyor et al. (2016) also evaluated whether the association between FDI and economic growth was independent of the level of institutional development in SSA. The study employed the system GMM estimator with Weidmeijer standard corrected errors and orthogonal deviations to assess the relationships. On a sample that involved all countries under the study, they found no evidence of a direct association between FDI and economic growth, and between institutions and economic growth. There was also no evidence that the presence of institutions had any favourable impact on the effect of FDI and economic growth. On splitting the sample size based on financial development, they found evidence that institutions moderators as the definite link between FDI and economic growth in countries with less developed financial markets, though the initial impact amongst FDI and growth was insignificant. Again, based on natural resources endowment, the study found a direct positive association between FDI and growth, and between institutions and growth in countries less endowed with natural resources. However, the ability of FDI to positively impact growth decreases as the level of institutional quality increases.

The ensuing reviews have shown that in most instances, a functioning institutional environment is a good starting point for the growth benefits of capital flows to be fully realized. It also suggests that countries with malfunctioning institutional frameworks may not realize the full benefits of financial liberation on economic growth, even though such a dominant position is not always the case. An observed trend in the above studies is the focus on growth only at the aggregate economic level. Again, the marginal effect of institutions in the capital flows-economic growth link, looks hugely untapped, especially in the context of the African literature. The seeming lack of studies on the impact of capital flows at a disaggregated level of growth conditioned on the levels of institutional quality forms the basis for this study. We thus determined the marginal and threshold levels of institutional quality at which private capital flows can stimulate the growth of Africa's real sector, and this is because we do not believe that one cap fits all.

3.4 Data and Methodology

We present the data sources and estimation procedures necessary to achieve the objectives of the study. We provide the primary sources of data, estimation procedures, and limitation of the methodological approaches underlying the study.

3.4.1 Data

We tested the study hypothesis with a panel consisting of thirty (30) countries in Africa. The present study covers 28 years between 1990 and 2017. The inclusion of countries is purely dependent on data availability, especially on institutional quality and financial development. The list of countries is in appendix to the chapter. Aside from data, the choice of the study period is influenced by the fact that financial openness began to expand into most countries by the late 1980s to mid-1990s. Using the financial index component of Aizenman, Chinn, and Ito (2011) de jure index of capital account openness shows that financial openness in Africa had increased by approximately 23% between 1990 and 2016[23]. For our sampled countries, Aizenman et al. (2001) trilemma index shows an increase in capital account liberation from 0.19 to 0.27 over the period. We employed data from varied sources to construct an unbalanced panel data set in order to achieve the objectives of the study. The sources of data include institution variables from the International Country Risk Group (ICRG), Capital flows, and real sector growth from World Development Indicators (WDI) of the World Bank Data Catalog. Data on financial development from the International Monetary Fund and Global Financial Development series of the World Bank. Financial openness and exchange rate volatility from the trilemma indexes. Legal systems origin from La Porta et al., (1999)

3.4.2 Growth – The real sector

The dominant guesstimate of growth common to the literature is at the aggregate level, where most studies either proxy growth by real GDP or GDP per capita. We, however, looked at

[23] The financial openness component of the trilemma index is normalised to lie between 0 (less open) and 1 (most open). The average level of financial openness for all African countries had increased from 0.233 in 1990 to 0.309 in 2016. Within the period, the most opened African economy to cross border capital is Djibouti (0.933) while the least opened is Somalia (0). For our sample the most opened is Uganda (0.77) and the most closed in Guinea (0.08).

welfare gains at a lower level of growth at the real economic level. The growth of these sectors has direct linkages with social costs and benefits that directly affect the populace. Thus, we considered value additions of real sector components as a proxy for economic growth or expansion. We measured the growth of the real sector by employing annual growth of four sectors widely deployed in the literature. These are annual growth in agriculture, services, manufacturing and industrial value additions from WDI. The measures from WDI have been used as proxies for real sector growth (Opoku and Yan, 2019; Ibrahim and Alagidede, 2018; Kodongo and Ojah 2017; and Ductor and Grechyna, 2015). The International Standard Industrial Classification (ISIC), revision 3, defines value-added as the net output of a sector after adding up all outputs and subtracting intermediate inputs. Value added is calculated without making deductions for depreciation of fabricated assets or depletion and degradation of natural resources. Since the WDI do not provide data of gross real sector growth, we constructed an index of the four sectors known as the real sector growth index.

3.4.3 Private capital flows

As stated earlier, we focus on the private component of capital flows. These are foreign direct investment, portfolio equity flows, and private non-guaranteed debt.

According to the WDI, Foreign direct investment (FDI) is the decision by a foreign entity to acquire a lasting interest in another entity other than one in its home country, where such interest usually is not less than a 10% stake. The interest is the accumulation of equity capital, reinvestment of earnings, other long-term capital, and short-term capital, as shown in the balance of payments. FDI is net inflows scaled by GDP.

Net Portfolio Equity (NPE) is the equity securities except for those considered to be direct investments. It embodies shares, stocks, depository receipts (American or global), and direct purchases of shares in local stock markets by foreign investors. NPE is portfolio equity flows as a ratio of GDP.

Private non-guaranteed debt (PNG) is an external obligation of a private debtor that is not backed by a guarantee in terms of repayment by any entity. Net flows received by the borrower during the year are disbursements minus principal repayments. We define long-term external debt as debt that has an original or extended maturity of more than one year, and that is owed to nonresidents by residents of an economy and repayable in currency, goods, or services. It is an external obligation of a private debtor that is not guaranteed for repayment by a public entity. PNG is net flows as a ratio of GDP.

Based on the economic growth – capital flows literature, and earlier works by Alfaro et al. (2014) and Gourinchas, and Jeanne (2013), we envisaged a significant positive relationship between all measures of private capital flows and growth of the real sector. However, consistent with the fickle and skittish characteristics of portfolio equity and the risky nature of private debt flows, a negative effect on growth is most probable. Debt and equity flows have non-controlling interest and therefore lacks longevity. The interest of these type of capital flows is more contractual than a lasting stake or ownership. Providers of such capital are mostly in search of high paying returns and are willing to locate to jurisdictions that can afford to pay huge returns as such providers are more concerned about liquidity in host countries. They are thus very volatile and are susceptible to change over a relatively short period. MacDonald (2015) notes that the negative relationship between international capital flows and productivity catch are a consequence of portfolio investments and not a foreign direct investment. We, however, hypothesize that strong institutions and financial development will mutilate any adverse effect of portfolio investments on real sector growth.

3.4.4 Financial Development

Although there are few cynics, the current trend of literature may be skewed towards the potency of financial development to enhance economic growth, given its pivotal role in an economy. The economy prospers when there is a reliable and fully functioning financial development system as there is a positive correlation between high economic growth and market efficiency and competition. Aside from increasing total productivity growth, financial development helps with the allocation of scarce economic resources and facilitates savings mobilization (Ro et al., 2017; Han and Shen, 2015). The growth of the economy leads to an increase in demand for financial products and services culminating in the growth of the banking and stock markets, thereby establishing a positive feedback relationship. The literature is replete with different indicators of financial development, mostly grouped as either measure of the stock market (turnover ratio, market capitalization ratio) or banking sector development (private credit to GDP, bank credit to GDP, Broad Money). However, the concept of financial development is a multidimensional one and must be approached with an open mind, instead of being confined to a minute aspect of its broadness. Much of the studies have focused on banking sector measures to the neglect of the effect of equally important markets such as insurance, pension funds, bonds, mutual funds and equity markets (Ito and Kawai, 2018). Again, there is much focus in terms of size and depth, which looks at the quantity aspect and ignoring the qualitative aspects of financial development such as liquidity, efficiency, cost-profit performance, diversity and the institutional environment including legal systems (Ito and Kawai, 2018; Hasan et al., 2009). Therefore, we employed a broad-based index of financial development developed by the IMF that overcomes the limitations of single indices and at the same time accounts for its complexities and multifaceted characteristics. According to Svirydzenka (2016), the index looks at financial markets and institutions development in terms of access (i.e., the ability to access financial services), depth (liquidity and size of markets) as well as efficiency (low-cost financial services amidst sustained revenues, and capital market activities). The index has been employed recently as a proxy for financial development (Tchamyou et al. 2019; Khan et al., 2018; Berhane, 2018). For robustness, we employed private credit to GDP as another measure of financial development. Private sector credit is a quantitative measure and an indicator of financial depth. It is credit extended to the private sector by banks and other financial institutions. The measure is appropriate in the sense that growth is much stimulated with the extension of credit to the private sector than to the state or government by financial institutions. As indicated by King and Levine (1993), financial service providers can ensure efficient allocation through its system of controls, checks, and risk evaluation in dealing with the private sector. The indicator has also been used extensively as a proxy for financial development in the growth literature (Ibrahim and Alagidede, 2018; Arcand et al. 2015; Levine, 2005; King and Levine, 1993).

3.4.5 Institutional Quality

Earlier proponents on the determinants of growth found both theoretically and empirically evidence supporting a positive relationship between institutional quality and economic growth (Keefer and Knack, 1997; Barro, 1996; knack and Keefer, 1995; Alfaro et al., 2004; Acemoglu et al., 2005; Le et al., 2016). It suggests that while strong institutional mechanisms lift economic growth, a weak framework will dampen or stagnate growth (Jain et al., 2017). We investigated a direct relationship between the growth of the real sector and institutional quality, as well as the moderating role of institutional quality on capital flows in enhancing the growth of the real sector. We expected a directly proportional relationship between institutional quality and real sector growth, while in the presence of good institutions, a greater impact from the combined effect was expected. Therefore, any puzzling adverse or neutral effect of capital flows on growth was to be partially or completely annulled in the presence of strong institutions.

Varied measures of institutional quality have been employed in assessing its association with growth. Besides the sources, each source has more than one component that can either be used individually or a combination of different components, either as weighted or unweighted averages. For instance, Agbloyor et al. (2016) and Dwumfour and Ntow-Gyamfi (2018) employed all measures of Kaufmann et al. (2012) in separate regressions. Similarly, Buchanan et al. (2012) and Daude and Stein (2007) employed a composite measure of institutional quality from Kaufmann et al. (2012). Zalle (2018) employed seven out of the twelve political risk measures from ICRG in separate regressions, while Hall et al. (2010) used the risk of expropriation from the ICRG. Similarly, Kutan et al., (2018) and (Charron et al. 2010) construct an index of three indicators, while Asiedu (2013) also constructed an index of four components out of the twelve ICRG political risk index. We followed Khan et al., (2018), Kutan (2017), Asiedu (2013) and employed data that is rarely used in Africa from the ICRG as our measures of institutional quality.

The ICRG system presents a comprehensive risk structure for the country with ratings for its overall, or composite, risk, for its political, financial, and economic risk and for the risk components that make up these broad risk categories. For the indicators of institutional quality, we focus on the political risk components of the ICRG. The political risk assessments are made based on subjective analysis of the available information. The political risk measures further provide means of accessing the political stability of countries. Unlike other indicators of governance, each broad indicator covers a set of groups of factors culminating into one broad governance indicator. Each of the sub-factors are assigned weights points to measure the final broad indicator. The lower the total risk points, the higher the risk, and vice versa.

We employed a composite measure, which is an unweighted average of five out of the twelve political risk indicators, one more in addition to those employed by Asiedu (2013) on FDI inflows. The indicators are Government stability, which assesses a government's ability to carry out its declared program(s), as well as a government's ability to stay in office. This indicator is composed of three variables, namely, government unity, legislative strength, and popular support. Investment profile looks at factors affecting the risk to investment. The indicator focuses on issues relating to contract expropriation or viability, delays in payment, and repatriation of profits. Corruption looks at how a political system is perceived to be corrupt. It looks at corruption facing business in the special payments demands, unsolicited payments related to import and export license acquisition, exchange controls, tax assessments, police protection, or loans. The indicator Law assesses the strength and impartiality of the legal system as well as popular observance of the law. Lastly, bureaucracy quality measures a country's strength and expertise to govern without drastic changes in policy or interruptions in government services when there is a change in government.

3.4.6 Other Variables

Consistent with the economic growth literature, we employed additional variables as controls. These variables are widely known to be covariates of growth, and they include GDP growth, GDP per capita, government expenditure, domestic savings rate, financial and trade openness, inflation, institutional quality, and financial development.

We measured the size of government through government expenditure as a percentage of GDP. The variable measures government final consumption or an indication of fiscal policy. While Keynesian shows that government expenditure can be used as a tool to stimulate further growth, the neoclassicals and proponents of the endogenous growth models see no long-run impact of government expenditure on growth, as such expenditure brings about distortions and crowd out domestic investment (Barro, 1991; Solow, 1956). To the extent that government fiscal policy does not lead to crowding out, we hypothesized a positive relationship with the growth of the real sector. We included the rate of inflation as an indicator of macroeconomic instability.

We additionally proxied inflation by the consumer price index. The expectation was that instability in consumer prices will lead to an upsurge in the general price of goods and service, which could be detrimental to growth. We assumed a negative effect on real sector growth. Since the pivotal works of Romer (1990) and Grossman and Helpman (1991), the long-run impact of trade on economic growth has largely been deemed positive. Trade openness brings inherent benefits such as technological spiller overs, access to goods and services, improvements in total factor productivity, dissemination of knowledge (Rivera-Batiz and Romer, 1991). Thus, countries that trade more with other developed countries are likely to grow fast economically. We, therefore, expected trade openness to impact on real sector growth positively. Trade openness is a summation of imports and exports expressed as a percentage of GDP

We explored measures of capital account openness from the trilemma index as a proxy for financial openness. The capital account component of the index is merely a de jure measure and looks at policy intent of countries regarding financial openness. The index is normalized to range between zero and one. A country with a higher value is deemed to be more susceptible to cross-border capital transactions (Aizemann et al., 2011). We expected that a more liberalized economy will benefit from capital account openness. Also, the literature notes the relevance of savings to the growth of an economy (Choong et al. 2010; Agbloyor et al. 2014). We measured savings as the gross domestic savings scaled by GDP. We thus estimated domestic savings as GDP after deducting final consumption. Consistent with the literature, we conjectured a positive relationship with the growth of the real sector.

Growth of the economy is proxied by the rate of GDP growth and GDP per capita. Our prior expectation was a positive impact on the growth of these sectors. Lastly, we explored the relevance of institutional development on growth, as indicated in the endogenous growth model. Proponents of the model are convinced that strong and functions institutions are catalysts for growth and that countries that have attained high levels of institutional development should experience high economic growth (see Alfaro et al. 2004). However, given the lack of institutional development on the continent, we expected an inverse relationship between real sector growth and institutional development, in the financial growth model. We proxied institutions by the level of bureaucratic quality from the ICRG. In the institutional development model, we controlled for financial development proxied by private sector credit.

3.5 Regression model estimation

Our basic model relates to two theoretical models on economic growth, the neoclassicals and the Schumpeter growth theories and subsequent empirical conclusions on capital and growth. The first arm relates to the neoclassical's views on the relevance of capital and labour to economic growth in the presence of exogenous technology. Focusing on capital, the neoclassical believes that differences in capital per worker could account for differences in growth between two countries. Thus, within the framework of the neoclassical, external capital could enhance growth (Solow-Swan, 1956). In the second part, Schumpeter (1911) acknowledges the link between finance and economic growth. Within this model, finance affects growth through savings, capital accumulation, and resources allocation. Based on the theory, the empirical conclusion on the positive effect of financial development on growth is almost a foregone conclusion[24]. The last aspect lies within the framework of empirical studies that have found no direct association between capital flows and growth, and that the association strives on a set of indirect linkages[25]

Our basic model is closely related to the works of Alfaro et al. (2004), Durham (2004), Agbloyor (2014), Slesman, et al., (2015), Agbloyor et al., (2016), Arya et al. (2019). While Alfaro et al., (2004) and Agbloyor et al. (2014) focused on the role of financial development in the association between capital flows and economic growth, Arya et al., (2019), Agbloyor et al., (2016) and Slesman et al., (2015) assessed the conditional effect of institutional quality in the relationship between growth and capital flows. Aside differences in data coverage, scope, estimation procedure, and variable measurements, we sought to, among other things, assess the two in-direct paths through which capital flows enhance growth virtually under the same conditions. Our study is also related to Igan et al. (2017) and Rajan and Zingles (1998). Igan et al. (2017) assessed the effect of capital flows on the real sector with a focus only on industrial growth. However, Igan et al. (2017) did not consider the indirect effect of financial development and institutional quality. Similarly, Rajan and Zingles (1998) looked at the association between industry growth and finance. In both studies, the focus was on growth at an aggregate than disaggregated levels. Additionally, Durham (2004) looked at the effect of various absorptive capacity in the association between capital flows and economic growth. First, Durham (2004) did not account for the effect of private debt flows.

[24] See (Ibrahim and Alagidede, 2017; Arcand et al., 2012; Kendall, 2012; Beck et al., 2000).

[25] See Agbloyor et al., 2014 ; Delechat et al., 2009 ; Prasad et al., 2007; Alfaro et al., 2004 ; Durham et al, 2004.

We specify our initial equation by relating economic growth to a set of determinants that includes capital flows, financial development, institutional quality, and a host of other variables. The compressed model is:

$$Growth_{it} = f(PCF_{it},\ FD_{it}, INST_{it}\ , CONT_{it}) \qquad (3.1)$$

Where, $Growth_{it}$ is a measure of real sector growth for country *i* at time *t*; PCF_{it} is a vector of private capital flows; FD_{it} and $INST_{it}$ are indicators of financial development and institutional quality respectively, while $CONT_{it}$ denotes a set of controls in a standard growth model.

From equation (3.1), we estimated three separate regressions leading to the achievement of the study objectives.

Real sector growth, capital flows, and financial development

We estimated a regression that determines the direct and indirect effects of capital flows and financial development on real sector growth. Our first hypothesis was to test whether capital flows stifles the growth of the real sector. To answer this question, we estimated equation (3.2) below:

$$RSG_{it} = \ \beta_1 PCF_{it} + \beta_2 \mathrm{FD}_{it} + \ \beta_3 X_{it} + U_i + \varepsilon_t + \ \lambda \mathrm{t}_{it} \qquad (3.2)$$

RSG_{it} Measures annual growth in the real sector for country *i* at time *t*. These are annual growth in manufacturing, industrial, agriculture, and service value additions. PCF_{it} denotes private capital flows, decomposed into foreign direct investment, portfolio equity, and private non-guaranteed debt. FD_{it} Is a measure of financial development, X_{it} denotes a set of control variables in a standard growth model. $U_i, \varepsilon_t, \lambda \mathrm{t}_{it}$ signifies country effects, a time-varying idiosyncratic shock with the standard *iid* assumption and a model error term. In equation 3.2, our variables of interest are β_1 and β_2 which tests the direct effects of capital flows and financial development on the growth of the real sector. A prior expectation was a positive impact from both indicators of private capital flows and financial development; however, an adverse effect, especially, regarding equity and debt flows was also a possibility due to their vacillating nature.

We then examined whether an increase in the levels of financial development combined with the quantum of capital flows can alter the growth of the real sector. More importantly, we tested if financial development can mitigate any potential adverse impact of capital flows on growth, or financial development could augment an already existing positive impact of private capital flows on the growth of the real sector. We, therefore, included an interaction term of financial development, and capital flows in equation 3.2 leading to equation (3.3)

$$RSG_{it} = \beta_0 + \beta_1 PCF_{it} + \beta_2 \mathrm{FD}_{it} + \beta_3 X_{it} + \beta_4 (PCF * FD)_{it} + U_i + \varepsilon_t + \lambda \mathrm{t}_{it} \quad (3.3)$$

From equation (3.3) while β_1 and $\beta_2$test the direct effects of capital flows and financial development, β_4 tests changes in real sector growth conditioned on instantaneous variations in both the levels of capital flows and financial development, though we focused extensively on the instantaneous change of financial development. The item of prime interest in equation (3.3) wasβ_4, which enabled us to determine whether the levels of FD was critical in the ability of SSA countries to deplore PCF to their benefit in enhancing the growth of the real sector. To check the marginal impact of PCF on RSG in the presence of FD, we took the partial derivative of RSG with regards to PCF. The partial derivative leads to equation (3.4) below:

$$\frac{d(RSG)}{d(PCF)} = \beta_1 + \beta_4 FD \quad (3.4)$$

In instances where both β_1 and β_4 are non-negative values, then partial increases in both PCF and FD will lead to an immediate increase in the growth of the real sector. We then determined the impact of PCF at various levels of FD at which the highest growth can be attained, however, given the possibility of an adverse impact of PCF and positive of FD, we would evaluate the impact at varying levels of FD. In cases of an adverse effect of PCF on growth, we sought to find the levels of FD at which an adverse effect of PCF on growth can be completely annulled and ascertaining the impact at various percentiles. We did this by setting equation (3.4) to zero resulting in equation (3.5) below:

$$\beta_1 + \beta_4 FD = 0 \qquad (3.5)$$

Real sector growth, capital flows, and institutional quality.

We now turn our focus on the mediating role of institutional quality on the impact of capital flows on the growth of the real sector. We deployed a diverse set of variables as controls under the institution's regression. We began by assessing the direct impact of capital flows and institutional quality at the overall real sector and the various components. From equation (4.1), we again estimated an equation that determines the linkage between PCF and RSG in the presence of INST.

$$RSG_{it} = \beta_0 + \beta_6 PCF_{it} + \beta_7 \mathrm{INST}_{it} + \beta_3 X_{it} + U_i + \varepsilon_t + \lambda \mathrm{t}_{it} \qquad (3.6)$$

Our variables of interest were β_6 andβ_7. A prior expectation was an adverse impact of PCF on growth, while INST will positively enhance growth. The rest were as defined before. We also determined whether INST was an excellent antidote to the stifling growth of the real sector imposed by PCF. We, therefore, adjusted equation (3.6) to accommodate an interaction term of PCF and INST. This is specified in equation (3.7) below:

$$RSG_{it} = \beta_0 + \beta_6 PCF_{it} + \beta_7 \mathrm{INST}_{it} + \beta_8 (PCF * INST)_{it} + \beta_3 X_{it} + U_i + \varepsilon_t + \lambda \mathrm{t}_{it} \qquad (3.7)$$

Again, taking the partial derivate of equation (3.7), we determined the levels of INST that can enhance the growth of the real sector even if the impact of PCF is detrimental or even positive. We ended up with an equation;

$$\frac{d(RSG)}{d(PCF)} = \beta_6 + \beta_8 INST \tag{3.8}$$

Setting equation (3.8) to zero further allowed us to determine the critical levels of institutional quality that may completely eradicate any potential damming effect of PCF on growth. We thus determined the marginal impact at varying levels of institutional quality. We estimated the threshold point when we set the partial derivative in equation (3.8) to zero, resulting in equation (3.9) below:

$$\beta_6 + \beta_8 INST = 0 \tag{3.9}$$

3.5.1 Data estimation procedure

Estimating a relationship between growth and its determinants is often beset with issues of reverse causality, endogeneity, measurement errors, and omitted variable bias. Temple (1999) notes that endogeneity is a common problem in growth studies. Concerning reverse causation, a response variable can affect explanatory variable(s), while at the same time the explanatory variable(s) can also influence a response variable. In our case, strong institutions and financial development could attract significant private capital, which could spur real sector growth, and there was a possibility that growth in the real sector could strengthen institutions and financial sector development to attract private capital. Because of the issues, enumerated estimating such relationships by the application of a traditional OLS or fixed effect could render standard errors inconsistent and biased. It was also possible that our estimation would not account for other variables that were likely to influence the growth of the real sector, leading to situations of omitted variables. The literature has also reported possibility of endogeneity between growth and institutional quality (Prasad et al., 2007; Roderick et al., 2004; Easterly and Levine, 2003), between growth and financial development, between growth and capital flows (Alfaro et al., 2004; Wheeler and Mody, 1992). In order to get consistent and unbiased estimates, the use of economic procedures that deal with the potential issues of endogeneity and omitted variable bias was required. The literature professes the use of instrumental variable (IV) estimations. Beck et al. (2003) employed the IV-2SLS estimator as well as Durham (2004) for sensitivity analysis on the relationship between growth, flows, and financial development. Agbloyor et al., (2014) also employed the panel IV on a study of private capital flows, economic and financial development on a set of 14 African countries.

The standard 2SLS technique deals with the issues of arbitrary heteroscedasticity. Using the IV-2SLS helps in dealing with any potential issues of endogeneity of the capital flows and real sector growth variables, as well as measurement errors, and reverse causality. Employing the IV-2SLS requires the use of instruments which must be relevant and exogenous to the model. On the selection of instruments, Baum (2009) notes that instruments should satisfy certain conditions. Aside from satisfying the conditions on orthogonality, instruments are also valid if they exhibit correlation with the explanatory variable but do not correlate with the unobserved factors (error term) in the equation. Instruments must thus influence the dependent variables, but that must be indirectly done by affecting endogenous repressors. Wooldridge (2009) shows that estimates generated with better instruments (zero correlation with the error term) are more precise than those generated with inappropriate instruments. In the 2SLS, the number of variables employed as instruments should not exceed the length of data points in the case of over-identification. Thus, in order to satisfy conditions for identification, the number of valid instruments should be boiled down to the number of data length, which may end up excluding several instruments. Mileva (2007) contends that due to the problem of weak instruments, estimates provided by 2SLS may be biased and not different from estimates generated with OLS.

Baum (2009) proposes the IV-GMM where a reduction in the number of available instruments is irrelevant as all instruments can be used in the estimator. Aside from dealing with issues of arbitrary heteroscedasticity, the IV-GMM overcomes the problems of over-identification by producing point estimates with smaller standard errors, and more efficient when compared with the IV-2SLS (Baum, 2009). However, the identification of valid exogenous and time-varying instruments can be a daunting task (Baum, 2009; Persson and Tabellini, 2006), given the fact that some variables may be sensitive to certain types of instruments. Millimet and Tchernis (2013) further note that "when subjects self-select into the treatment group on the basis of attributes unobserved by the researcher but correlated with the outcome of interest, the estimation of causal effects becomes difficult. The typical strategy is to rely on an instrumental variable (IV). However, a valid instrument is often unavailable. Moreover, even if one is available, it may identify an economically uninteresting parameter in the presence of heterogeneous treatment effects (Imbens and Angrist, 1994)" Millimet and Tchernis (2013, pp. 982). Mishra et al. (2014) are of the view that "The ideal solution would involve a methodology, which is objective in its approach, is not restricted to the choice of variable collated in a particular survey and is robust to various specifications within a general framework" (Mishra et al. 2014, pp. 12).

If we consider a structural equation in the form:

$$Y = \beta_0 + \beta_1 \mathrm{X}_1 + \beta_2 \mathrm{X}_2 + \beta_3 X_3 \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots + \beta_{\mathrm{T}} \mathrm{X}_{\mathrm{T}} + \Omega \qquad (3.10)$$

Where $\mathrm{E}(\Omega) = 0$; $COV(\mathrm{X}_{\eta},\ \Omega) = 0$ j = 1, 2, 3… T – 1

In equation (3.10) above, X_1, X_2, X_3, ……, X_{T-1} are all exogenous explanatory variables, while X_T is endogenous in the regression equation. The inclusion of X_T requires the use of instrumental variables. As stated earlier, the choice of instruments (z_1) must satisfy certain critical conditions. Aside from meeting the conditions for orthogonality, Z_1 should not correlate with the error term (Ω) such that COV $(z_1, \Omega) = 0$; and lastly, is the projection of the endogenous variable (X_T) on all exogenous explanatory variables. We then express a linear relationship between the instrumental variables and the instrumented variables in equation 3.11 below:

$$X_T = \gamma_0 + \gamma_1 X_1 + \gamma_2 X_2 + \gamma_3 X_3 \dots \dots + \gamma_{T-1} X_{T-1} + H_1 Z_1 + H_2 Z_2 + H_3 Z_3 \dots \dots \dots . + H_N z_N + \nu_T \quad (3.11)$$

Where H denotes parameters for the Instrumental variables; ν_T denotes the error term$E(\nu_T) = 0$. This error term does not correlate with any of the variables on the right-hand side of the equation, meaning $H \neq 0$. According to Wooldridge (2002), equation (3.11) implies that there is a partial correlation between z_N and X_T after netting out all other exogenous variables in the equation, that is X_1, X_1, X_1, ……, X_{T-1}.

By substituting equation (3.11) into (3.10), we can then obtain the reduced form of$Y$. Combining the two equations result in equation (3.12) below:

$$Y = \delta_0 + \delta_1 X_1 + \delta_2 X_2 + \delta_3 X_3 \dots \dots + \delta_{T-1} X_{T-1} + H_1 z_1 + H_2 z_2 + H_3 z_3 \dots \dots \dots . + H_N z_N + \mu \quad (3.12)$$

Where $\mu = \Omega + \beta_T \nu_T$ is the reduced form of the error term;$\delta_j = \beta_j + \beta_T \gamma_j$; and$H_N = \beta_T z_N$. We then estimated an equation in the matrix form that resolves the issues of identification, which is one of the assumptions that IVs must satisfy. The matrix equation is specified in equation (3.13) below:

$$Y_i = \beta^I X_i + \Omega_i \tag{3.13}$$

With *i*th row where X is a $n \; x \; t$ matrix, where n represents the number of observations under the study; while Ω denotes the error term which is *iid* with a mean of zero and a variance-covariance $\sigma^2 I$ denoted by $n \; x \; n$ matrix P. In the current form, the standard 2SLS automatically chooses a matrix of exogenous variables represented by $\mathrm{z} = (1, \mathrm{X}_2, \mathrm{X}_3, \dots \dots . \mathrm{X}_{T-1,} \, \mathrm{z}_1, \mathrm{z}_2, \mathrm{z}_3, \dots \dots \dots \dots \dots \dots , \mathrm{z}_\mathrm{N})$ indicating a $1 \; x \; T$ matrix.

In equation (3.13) above, there was no evidence of a correlation between the error term (Ω) and the explanatory variables (X). We also employed a set of instrumental variables $(\mathrm{z}_1, \mathrm{z}_2, \mathrm{z}_3, \dots \dots \mathrm{z}_\mathrm{N})$ that must be exogenous and also not correlated with the error term, such that $COV(\mathrm{z}_j, \; \Omega_i) = 0 \quad \epsilon \; j = 1, 2, 3, \dots \dots \dots \dots .., N.$ The stated assumptions infer the N observation orthogonality conditions E (z^I, Ω). Multiplying through equation (3.13) by z^I moreover, its expected value, as well as the expected value of the orthogonality condition, leads to:

$$[\mathrm{E}(z^I \mathrm{X})]\beta = \mathrm{E}(z^I \mathrm{Y}) \tag{3.14}$$

Where $[\mathrm{E}(z^I \mathrm{X})]$ is T x T and $(z^I \mathrm{Y})$ is a T x 1 matrix. The above equation represents a system of T direct equations in the β unknows $\beta_1, \beta_2, \beta_3, \dots \dots \dots .. \beta_T$. Next, equation (3.14) produces an exclusive equation when there is full rank. The exclusive equation is as below:

$$\beta = [\mathrm{E}(z^I \mathrm{X})]^{-1} \mathrm{E}(z^I \mathrm{Y}) \tag{3.15}$$

Where the expected values of $[\mathrm{E}(z^I \mathrm{X})]$ and $\mathrm{E}(z^I \mathrm{Y})$ may be estimated through a random sample of (X, Y z). Given that the random sample is in the form $[(X_i, Y_i, z_i): i = j = 1, 2, 3, \dots \dots . N)]$ from the observation, the instrumental variable estimator of β is as specified below:

$\hat{\beta} = (N^{-1} \sum_{i=1}^{N} z_i^I \chi_i)^{-1} \quad (N^{-1} \sum_{i=1}^{N} z_i^I y_i) = (Z^I X)^{-1} Z^I Y$

(3.16)

Where Z and X denotes N x T matrices, while Y is the N x 1 vector on Y_i.

Once the order conditions in equation (3.16) were satisfied, then we expected that the instrumental variable estimator ($\hat{\beta}$) will be under the condition that both the number of instruments endogenous variables are the same. Where the number of instruments and endogenous variables can be matched, then the equation is precisely identified. However, the equation can be either over or under-identified. Over-identification is when the count of instruments exceed endogenous variables. When the opposite occurs, the equation is under-identified. The error matrix is under the presumption of homoscedasticity, where $COV(\Omega\Omega^{\mathrm{I}}) = \sigma^2\mathrm{I}$. Estimation based on homoscedasticity may produce inconsistent standard errors which may be reflected in diagnostic tests for endogeneity weak identification, and over or under-identification restrictions. However, it is appropriate as in all empirical studies that the error matrix should assume heteroscedasticity, that is $COV(\Omega\Omega^{\mathrm{I}}) = \mathrm{P} = \sigma^2\mathrm{I}$.

We, therefore, employed the Lewbel (2012) IV estimator, which relies on heteroscedasticity for identification and produces efficient estimates than the standard IV with smaller standard errors. According to Baum et al., (2013), the Lewbel (2012) IV estimator permits the identification of structural parameters in regression models with regression mismeasurements or endogeneity and is applicable in situations where external instruments do not exist, is challenging to find or insufficient. By employing available regressors, the approach employs model heteroscedasticity for the construction of instruments, that is, the estimator employs a heteroskedastic covariance restriction to construct an IV regression. The estimator can also be used to supplement the available external instruments to enhance the efficiency of the IV estimator. By complementing already selected external instruments, Lewbel (2012) IV estimator allows the performance of the 'Sargan–Hansen' tests of the orthogonality conditions or over identifying restrictions, a procedure that cannot be executed when only external instruments are used as instruments (Baum et al., 2013). By supplementing external instruments with generated instruments, Baum (2013) contends that the Lewbel (2012) IV mimics the dynamic panel data (difference GMM) estimator by Arellano and Bond (1991), as it also employs lagged dependent variables as internal instruments. The strength of the Lewbel IV lies in its ability to augment a precisely identified model to allow for over identifying restriction and at the same time gain efficiency. It is applicable in cases where there is at least one exogenous regressor for an endogenous regressor (Baum et al., 2013). The model could be estimated in the 2SLS or the GMM. We, therefore, made use of the Lewbel IV-GMM two-step estimator as it is known to produce efficient and robust standard errors. The GMM estimator employs the Hansen J to test for over identifying restrictions and orthogonality restrictions. Mishra et al., (2014) contends that estimates from Lewbel (2012) IV are very close to those using conventional valid IVs, though more efficient. The model also employs additional diagnostics in terms of exogeneity, weak and over/under-identification of instruments.

Under the test of exogeneity of additional instruments, the C-statistics test the full set of orthogonality conditions and that any additional instrument is valid. The under-identification test ensures the equation is properly identified, and that any excluded instrument is correlated with the endogenous regressors. A rejection of the null hypothesis signifies that our set of equations are adequately identified. Lastly, the weak identification test ensures that all excluded instruments are correlated with our endogenous variables, but weakly. The Stock and Yogo (2005) weak identification test is employed based on the maximal IV relative bias as the threshold indicator. Using the Kleibergeen-Paap rk F test, all our results surpass at least the minimum threshold of 30% maximal IV relative bias.

3.5.2 Generation of instruments

Given the exertion is deriving valid instruments; we followed the literature as closely as possible in our choice of instruments. On capital flows, Agbloyor et al. (2014) and Wheeler and Mody (1992) contend that the lag of FDI is a valid instrument for FDI because of its reinforcing nature. Thus, for capital flows and its components, we employed their lags as valid instruments. Additional instruments for capital flows are the exchange rate and exchange rate volatility (Agbloyor et al., 2014; Alfaro et al. 2004). These are known to impact cross border capital but may not have direct links with the growth of the real sector.

On institutional quality and instrumentation, the literature strikes a link between foundations of institutional quality and legal origin, geographical disposition, or colonial ties. Mauro (1995) employed ethnolinguistic fractionalization of a country's population to instrument the level of corruption. Patsiurko et al., (2012) shows a direct relationship between different measures of ethnolinguistic fractionalization and economic performance for a set of OECD countries, thus may not serve as valid instruments for institutional quality in a growth model. Ethno-linguistic fractionalization has also been employed by Easterly and Levine (1997), La Porta et al., (1999) and Alesina et al., (2003). Using an index of five measures from ICRG, Hall and Jones (1999) constructed an index of institutions and employed instruments that has linkages with western European influence which included the level at which European languages are used by their colonies as first languages and distance from the equator. Again, on the impact of European colonial influence, La Porta et al., (1999) strikes a link between the legal system of colonial masters and the institutional strength of their colonies as such legal systems were somehow imposed on colonies. They deploy legal systems origin or transplantation as appropriate instruments for institutional quality. The use of legal systems has also been employed by Buchman (2012) as instruments for institutional quality. As an addition to the debate, Acemoglu et al., (2002; 2001) were of the view that the willingness of European to settle among their colonies, coupled with the level of population density of locals in those areas could be directly correlated with the quality of institutions. They contend that in fewer density areas, European settlements were high, and these areas operated on the same form of institutional framework equivalent to that of the European home countries. However, in more densely populated areas where European settlements were not encouraged, explorative, and autocracy underlined institutional quality. Thus, Acemoglu et al., (2002; 2001) employed European settler mortality and the levels of population density as instruments. On settler mortality, Islam (2004) shows that mortality works better as instruments when settler mortality is entered in the log form. However, Gleaser et al., (2004) disagree on the use of the measures by Acemoglu et al., (2004) and that early European settler may not have come along with their institutions but themselves, referencing human capital. They contend that settler mortality will be a useful instrument for human capital development other than institutions.

From the ensuing discussion, we also deployed ethnolinguistic fragmentation or fractionalization from Easterly and Levine (1997), La Porta et al., (1999), Alesina (2003) and recently by Khan et al., (2019) as additional instruments. Combining a set of five indices ranging between 0 and 1. Ethnolinguistic measures the likelihood that two arbitrarily selected individuals will not speak the same dialect, not from the same ethnolinguistic group, speak the same language, the proportion of people not speaking both a commonly known dialect and the official language, and the proportion of speaking the official language. We also followed La Porta et al. (2008; 2000; 1998) and employed legal system origin as instruments for institutional quality. According to La Porta et al., (1998), the distinction between legal systems is basically influenced by "(1) the historical background and development of the legal system, (2) theories and hierarchies of sources of law, (3) the working methodology of jurists within the legal systems, (4) the characteristics of legal concepts employed by the system, (5) the legal institutions of the system, and (6) the divisions of law employed within a system [Glendon, Gordon, and Osakwe 1994, pp. 4–5]"(La Porta et al., 1998, pp 1118). Since the countries in our sample have either British or French origin, we employed dummies for common law (1=British; 0=otherwise), civil law (1=French; 0=otherwise). The last instrument is the lag of institutional quality. Legal origin and ethnic fractionalization have previously been used by Borrmann et al., (2006), while the legal origin and the lagged institutions were used by Buchanan et al., (2012) as instruments. We employed both legal origin and ethnic fractionalization in addition to the lags of institutions as instruments.

On financial development, we employed lags of the financial development index and private sector credit as instruments. For additional instruments for financial, we follow Beck et al., (2003) as well as Levine et al., (2000) by employing legal system origin as an instrument. As stated by La Porta et al. (2000; 1998), a robust connexion exists between the strength of a countries financial sector and its legal environment. Moreover, the legal environment is also strongly correlated with legal systems origin as theories, and the shaping of laws mimic that of most colonial rulers. Given that financial development is vigorously achieved when there are laws in place, using legal origin as instruments are in the right direction. The systems of laws governing lending, borrowing, and the operation of financial markets and institutions have some historical antecedents. The legal origin may also help protect the right of investors, enforce judicial rules, as these will boost the confidence of investors and attract large sums of foreign investment. For instance, La Porta et al. (1998) posit that the financial markets are far advanced in most common law countries than civil law countries. Again, investors seem to have many affiliations to common law countries as they have strong investor protection laws than those of civil law. Thus, the improvement of laws enhance the attraction of external capital such as FDI, equity, and debt flows. On capital flows and growth, Buchanan et al., (2012) also employed legal system origin as instruments for financial development.

3.6 Empirical Results

3.6.1 Descriptive

We present values of the 25th, 50^{th,} and 75th percentiles in addition to the mean and standard deviations over the period 1990 to 2017. The percentile values are to help in comparison and analysis of results, given the variations in growth across countries in our sample. For the measures of capital flows, the high mean value still supports the assertion that countries in Africa prefer FDI as the utmost form of private capital to others, with a mean figure of 3.03%. Further observations showed slightly higher average figures for debt flows (0.07%) and equity flows (0.144%), an indication that despite the recent surge in demand for debt instruments (bonds) by most countries, equity is still a better option after stable FDI. This preference of equity over debt may be due to the level of development across equity-related stock markets in Africa. However, debt flows recorded high standard deviation than equity, a testament of the risk that is mostly associated with debt flows in the form of high-interest payments.

The manufacturing sector recorded the highest mean value among the real sector components, with an average growth of 5.5%, and slightly followed by the industrial value additions. The combination of manufacturing and industrial is a good omen for industrialization in Africa. The sector with the least growth over the period was the agriculture sector, with a mean of 4.5, which was slightly below the service sector growth of 4.6%. The relative lower standard deviation of the service sector among all components reflects the low level of risk in the sector, as a better option to drive growth in Africa. The mean value of the financial development index of 0.143% confirms the slow growth of the financial sector, regarding access, depth, and efficiency within the region. As confirmed by Svirydzenka (2016), Africa's financial market is underdeveloped when compared to countries like China and Russia as of 2013. While Ibrahim and Alagidede (2017) suggest that legal system origin may explain the disparities in financial development within the SSA region, Ghura et al., (2009) admits that the relatively low growth of the financial sector in Africa is because of the relatively lower levels of institutional effectiveness across the continent. The above assertions may not be surprising, given that only one-third of countries in our sample obtained averages higher than the average sample in terms of the financial development index. Even worse was private sector credit, where only 26.7% recorded averages above the sample mean of 19.67%. The mean value of the institutional quality index (4.3) shows gradual improvements in the institutional effectiveness in Africa. The low standard deviation supports the slight improvements in institutions. It only suggests that though institutions may be reasonably weak on the continent, Africa has chopped some gains in terms of political stability, democracy, freedom of the press, among others. The average financial openness value shows that regardless of financial reforms and liberalizations, most countries on the continent remain fair closed. The average GDP value may confirm the recent stagnated growth across the continent when compared to the average growth rate of 5% over the recent past. Many have attributed the drop-in growth to falling commodity prices. The continent is much open to trade, with an average value of 63% of GDP. However, how much of the volume of trade is intra-continent? Price instability seems to be a worrying feature of many African economies. With an average inflation value of 56%, the continent is deemed to be in hyper-inflation. Savings is improving with a mean rate of 16%. This surpass the average of 9.6%, 10.3%, and 5.7% experienced between1996 and 2010, 1974 and 1980, and 1991 and 1996 (Agbloyor et al., 2016; Musila and Sigue, 2006).

Table 3.2 Bivariate correlation matrix of variables

Variable	RSG	SVA	MVA	AVA	IVA	FDI	PEF	PNG	FinD	Inst	PSC	GDP	GDPC	GEx	Inf	FinP	Trade	GDS	BuQ
RSG	1																		
SVA	0.304	1																	
MVA	0.799	0.056	1																
AVA	0.556	0.070	0.182	1															
IVA	0.570	0.080	0.213	0.070	1														
FDI	0.139	0.113	0.041	0.014	0.141	1													
PEF	-0.030	-0.043	-0.020	-0.018	-0.049	-0.69	1												
PNG	0.003	0.031	-0.019	-0.045	-0.004	0.038	0.042	1											
FinD	-0.108	0.039	-0.102	-0.104	-0.130	-0.029	0.426	0.055	1										
INST	-0.035	0.144	-0.058	-0.146	-0.048	0.121	0.124	0.037	0.440	1									
PSC	-0.108	-0.037	-0.087	-0.104	-0.119	-0.030	0.506	0.052	0.875	0.369	1								
GDP	0.446	0.559	0.095	0.271	0.467	0.156	-0.028	0.028	0.035	0.246	-0.049	1							
GDPC	0.433	-0.001	0.311	0.477	0.185	0.029	0.112	-0.010	-0.148	-0.280	-0.092	-0.124	1						
GExp	-0.122	0.043	-0.100	-0.142	-0.099	0.094	0.112	-0.007	0.389	0.412	0.391	0.033	-0.162	1					
Inf	0.034	-0.049	0.054	0.049	-0.004	-0.038	-0.052	-0.004	-0.024	-0.185	-0.148	-0.156	0.149	-0.08	1				
FinOp	0.020	0.123	-0.010	-0.070	0.012	0.014	-0.046	0.201	0.097	0.194	0.006	0.105	-0.049	0.058	-.024	1			
Trade	0.002	0.017	0.016	-0.046	-0.017	0.394	-0.040	0.010	0.153	0.294	0.132	-0.004	-0.004	0.360	-.038	-.028	1		
GDS	0.028	0.029	0.067	-0.019	-0.102	-0.009	0.016	0.079	0.170	0.196	0.059	-0.008	-0.043	0.047	-.019	.086	0.323	1	
BuQ	-0.209	-0.059	-0.162	-0.149	-0.152	-0.121	0.125	0.012	0.391	0.370	0.350	-0.006	-0.245	0.262	-.029	.135	0.080	0.084	1

Note: RSG is Real sector growth; SVA, MVA, AVA and IVA are Services, Manufacturing, Agriculture, and Industrial value additions, respectively. FDI is foreign direct investment; PEF is portfolio equity; PNG is private non-guaranteed debt; FinD is financial development index; INST is institutional quality; PSC is private sector credit; GDP is GDP Growth; GDPC is GDP per capita; GExp I government expenditure; Inf is inflation; FinOp is financial open; GDS is gross domestic savings; BuQ is Bureaucratic Quality

Table 3.1: Descriptive Statistics

Variable	Obs.	Mean	Std. Dev	Pct.25	Pct.50	Pct.75	Skewness	Kurtosis
Real sector growth index (RSG)	840	4.260	6.467	0.980	3.629	6.004	4.409	57.019
Service value additions (SVA)	739	4.593	5.172	2.553	4.830	7.040	-0.144	10.353
Manufacturing value added (MVA)	675	5.554	17.312	0.626	3.842	7.604	14.605	309.404
Agriculture value additions (AVA)	761	4.485	10.861	0.526	3.390	6.990	1.293	10.881
Industrial value additions (IVA)	760	4.944	10.799	1.014	4.210	7.627	3.577	44.672
Foreign direct investment (FDI)	810	3.028	4.606	0.693	1.965	3.629	4.308	32.061
Portfolio equity flow (PEF)	620	0.144	0.632	0	0.003	0.067	5.472	47.326
Private non-guaranteed debt (PNG)	812	0.067	0.914	0	0	0	10.588	163.493
Financial development index (FinD)	810	0.143	0.103	0.084	0.110	0.171	1.994	7.565
Institutional Quality Index (INST)	840	4.311	0.868	3.768	4.366	4.850	-0.346	3.762
Private sector credit (PSC)	795	19.696	24.309	6.609	12.032	21.342	2.988	13.273
GDP Growth (GDP)	840	3.821	4.357	2.187	4.186	6.093	-1.020	11.623
GDP Per Capita	840	10.757	55.084	-0.090	1.833	3.699	6.520	47.669
Government expenditure (GExp)	814	14.142	5.243	10.638	13.895	17.285	0.321	3.281
Inflation	757	56.050	883.261	2.337	6.098	12.051	25.788	689.231
Financial openness (FinOp)	801	0.267	0.252	0.166	0.166	0.283	1.857	5.618
Trade openness	832	63.904	24.890	46.828	58.754	78.058	0.967	4.280
Gross domestic savings (GDS)	814	16.163	14.875	6.213	13.764	21.293	0.841	4.015
Institutions (Bureaucratic Quality)	840	1.406	0.841	1	1	2	0.108	2.777

The bivariate correlation matrix indicates that there were no issues of multicollinearity in our analysis. Regarding the real sector, manufacturing shows the strongest contemporaneous correlation with the real sector index, while services growth exhibits the least, with both agriculture and industry having almost the same correlation. The less correlation between industry and manufacturing means that the manufacturing sector is just a little fraction of industrial growth and shows the relevance of other sectors such as mining, construction, oil and gas, water and electricity to industrial growth in Africa. There was also a strong correlation between the financial development index and private sector credit. There was no evidence of higher correlation among our controls.

3.6.2 Regression analysis of results - On the real sector, FDI and financial development

We present results for the three different components of capital flows on the growth of the real sector. We first looked at the direct effects of capital flows and financial development on the real sector, and further looked at the interactive impact of private capital and financial development. Given that real sector growth is an index of four variables, we ascertained the above effects on each of the four decomposed measures of the real sector. In all regressions, (A) and (B) examines the direct effects of capital flows (FDI, PEF, and PNG) and our primary measure of financial development, and their interaction of real sector growth and its components. For robustness check, regressions (C) and (D) ascertain the direct and interactive effects of capital flows (FDI, PEF, and PNG) and private sector credit of the components of real sector growth. Consistent with the literature of capital flows, we employed lagged capital flows, exchange rate, and exchange rate volatility as instruments[26]. Regarding financial development, the instruments used are the lagged values and legal

[26] These were used as instruments by Agbloyor et al., (2014), Alfaro et al., (2004), Wheeler and Mody (1992).

system origin. For private sector credit, we followed Agbloyor et al., (2014) and deplored deposit rate as additional instruments.

We began our economic analysis with that of foreign direct investment. We show our results in Table 3.3A and 3.3B. We first estimated equation (3.2), where on a set of selected controls, we ascertained the direct impact of both FDI and financial development on the growth of the real sector. First, we found no evidence of a significant direct effect of foreign direct investment (model 1) at the overall level of the real sector. Accordingly, empirical support for FDI as a growth enhancer seems feeble, possibly at a different measure of growth. The insignificant effect persists after controlling for measures of financial development (model 2A and 2C), as the presence of financial development could not reverse the already established insignificance of FDI. Subsequently, financial development also has no direct growth effects at the overall level, although the relationship was inverse. The results bring into question the theoretical position of positive and significant spill over benefits of FDI on growth. An intuitive deduction may be that perhaps the growth effects of FDI is likely to be concentrated at the aggregated level of economic growth with no trickling down effect to other economic sectors. Thus, the spill over benefits of FDI regarding growth in terms of employment transfer of technology, improved export, and competition, maybe theoretically sound at an aggregate level of GDP growth. In addition, the direction of FDI to Africa may play a role. For instance, although UNCTAD (2014) notes that much (55%) of Greenfield FDI in 2014 went to Africa, most were towards the quarrying, mining, and petroleum sectors. Policymakers have not focused on growth at the lower level in the attraction and retention of FDI in Africa. For the duration of the study, it may be credible to allude that theoretical pronouncement of FDI enhancing growth may only be limited to growth but not at the level of the real sector, as well as empirical studies on the significant effect may have lost sight of lower-level growth and FDI. Overall, our results point to the direction of earlier studies that found no direct connection between FDI and growth (Alfaro et al., 2010; Herzer et al., 2008; Carkovic and Levine, 2005; Durham, 2004; Alfaro et al., 2004; Lipsey, 2002). It is also not askew to the direction of studies that have found capital flows to be damaging to growth, such as Chanda (2005) for a set of 57 non-OECD countries.

The outcome is also consistent with Alvarado et al., (2017) who report of an insignificant connexion between foreign direct investment and economic growth of 19 Latin American economies at the aggregated level of development. On FDI to Africa, Nnadozie and Osili (2004) found no robust impact of FDI on GDP per capita. However, it contradicts Agbloyor et al., (2014) who found FDI to affect growth adversely for a set of fourteen African countries. We can justify our results given the data size and span of our study. Our data set consists of 30 countries over twenty-eight years, while Agbloyor et al. (2014) deployed 14 countries over seventeen years. The insignificant relationship supports the recent admonishing by Tyson and Beck (2018) about the changing dynamics of FDI. Though FDI is traditionally known to affect economic growth positively, "however, emerging evidence is that FDI can also be pro-cyclical, and there is mixed evidence on the relationship between FDI and productivity in different sectors" (Tyson and Beck, 2018, pp. 7). Again, our conclusion supports an earlier observation by Durham (2004) on the supposed positive impact of FDI, "However, more extensive studies with augmented growth specifications generally do not report significant unqualified statistical relations between FDI flows and real variables" (Durham, 2004, pp. 287).

Given that the measure of real sector growth is a composite index of four variables, we further ascertained the direct impact of FDI on each of the components. We aimed to find out if the insignificant effect is because of one or more variables that make up the composite index. This time, we assessed both the direct impacts of FDI and financial developments concurrently in single estimations.

Regarding manufacturing sector growth, the insignificant effect of FDI persists even when we controlled for financial development (see models 3A and 3C). The results might not be surprising when compared to the overall real sector growth, as table 3.2 shows a high correlation between manufacturing growth and the real sector growth index. The inability of FDI to impact on manufacturing growth may reflect the lack of policy divergent regarding channelling FDI inflows to the manufacturing sector in Africa. GAFT (2017) contends that the inflows of manufacturing sector FDI are likely to increase by 3.2% if policies regarding trade are to improve by just 1%. The results further uncovered the assertion that FDI to Africa has been more of resource-seeking than partnering local industries engaged in the production of goods and services. The results may not be astonishing if one considers the relatively small proportion of Africa's share of global manufacturing. By 2016, Africa accounted for only 4.4% of global manufacturing, as compared to 76% for the Asia Pacific region (UNIDO, 2017). The insignificant effect could also emanate from the gradual drop in the manufacturing component of FDI both globally and in Africa. Global trends show a drop-in manufacturing FDI from 41% to 26% between 1990 and 2012 (UNCTAD, 2015). Flows to Africa are likely to experience a nosedive because of the global drop. According to GAFT (2017), South East Asia accounts for much of manufacturing FDI, with manufacturing constituting a mere 5% of total FDI to Africa. Our results confirm the conclusions of Gui-Diby and Renard (2015) who also found no outcome of FDI on manufacturing growth for a set of African countries. They believe that policymakers have not been forthcoming with policies to drive the African industrialization, thereby losing touch on the dynamics between FDI and manufacturing sector growth. Assessing the sectoral conduits through which FDI may contribute towards economic growth, Opoku et al., (2019) resolved that although FDI influences growth positively, its effect through the manufacturing sector growth was mostly negative and insignificant. Further support to our findings is the studies by Adesina (2016), Xu and Sheng (2012) and Waldkirch and Ofosu (2010) who found no growth effect of FDI flows on manufacturing sector growth.

Although, manufacturing is a significant component of industrial growth, given the lower correlation between growth in manufacturing and industry, the initial expectation was that the relationship between FDI industrial growths might be different and may not be driven by the manufacturing component. Controlling for our primary measure of financial development, we found FDI to promote the growth of industrial value addition at 5% significance level (see model 4A). Statistically, a 1% increase in the flow of FDI will lead to industry growth by 1.31%. The increase in the industrial FDI could result from high commodity prices that the extractive sector enjoyed for most of 1990 and early 2000 until the onset of the global financial crisis in 2008. There was, however, a gradual increase in commodity prices from 2009 until 2014 when prices experienced a nosedive (UNCTAD, 2016). According to UNCTAD (2016), the “commodity super cycle” led to surges in minerals, ores, metals, and oil prices to unprecedented heights. The results confirm the assertion that most FDI into Africa is directed towards the extractive industry and corroborates the revelation that over half of Greenfield FDI into Africa for 2014 were industrial value related, that is mining and petroleum FDI (UNCTAD, 2014). Although the composition FDI is gradually changing since 2005, Anyanwu (2015) transcripts that much of FDI in Africa has been concentrated in industrial sectors mainly, minerals, natural gas, and coal. Kedir et al., (2011) contend that aside been market seeking, FDI into Africa is also directed towards oil economies. Our result of a positive association corroborates earlier conclusion by Kodongo and Ojah (2017) and Borensztein et al., (1998) that FDI has the impetus to enhance the industry growth of 19 African countries and 69 developing economies. It, however, contradicts Opoku et al., (2019) who could not find industrial growth as a channel through FDI which could enhance the growth of 38 African countries between 1960 and 2014.

Contrary to our expectation, we found overwhelming support of an inverse relationship between FDI, and agriculture value additions, in the presence of other controls (see models 5A and 5C). The antagonistic relationship further tells of the type of FDI to Africa; largely, foreign investors have shown little or no interest in Africa's agriculture sector. The inverse association may be because of a change in the growth dynamics of Africa's economy that was once led by a large share of agriculture in GDP. However, given a decline in agriculture share of both employment and output, while at the same time, services and manufacturing output seems to be increasing (UNCTAD, 2015a), investors are not willing to commit a lasting stake of not less than 10% in the growth of the sector. Most agriculture lands are family owned and operated on subsistence basis. Vast lands for large-scale commercial farming are virtually minimal on the continent. Issues of land litigation, irrigation, and mechanized farming have made the sector less attractive to foreign investors. At worse, farmlands are likely to be sold for mining exploration. The sector also seems detached from other sectors such as manufacturing and industry. Accordingly, the sector's lack of attractiveness to foreign investors stuns from issues relating to land rights, and poor infrastructure (Bhinda and Martin, 2009), low productivity, lack of access to farm produce, mechanized farming, food security, and storage, (ACET, 2017; Meyer, 2015). Statistically, a 1% increase in the flow of FDI will derail the growth of the agriculture sector by 1.38% (model 5A) and 0.86% (model 5C), respectively.

Table 3.3A: Real Sector Growth, Foreign Direct Investment, and financial development

Dep. Variable	**RSG**	**RSG**	**RSG**	**RSG**	**RSG**	**MANVA**	**MANVA**	**MANVA**	**MANVA**	**INVA**	**INVA**
	(1)	**(2A)**	**(2B)**	**(2C)**	**(2D)**	**(3A)**	**(3B)**	**(3C)**	**(3D)**	**(4A)**	**(4B)**
FDI	0.219	0.229	0.071	0.006	0.007	-0.040	-0.229	0.051	-0.037	1.131**	0.935**
	(0.246)	(0.251)	(0.246)	(0.017)	(0.010)	(0.239)	(0.186)	(0.219)	(0.168)	(0.585)	(0.342)
Financial Dev Index		-0.163	-0.404			3.654	2.112			0.588	-0.293**
		(1.138)	(1.145)			(2.651)	(2.133)			(1.009)	(0.142)
Private Credit				-0.003	-0.003			-0.142*	-0.148**		
				(0.007)	(0.006)			(0.075)	(0.075)		
Interaction Terms			9.836***		0.006***		0.876**		0.693**		-0.042*
			(2.965)		(0.002)		(0.375)		(0.218)		(0.023)
GDP Growth	0.151***	0.153***	0.157***	0.150***	0.160***	0.632***	0.587**	0.546**	0.597**	0.093***	0.126***
	(.013)	(0.012)	(0.013)	(0.022)	(0.018)	(0.194)	(0.187)	(0.246)	(0.225)	(0.199)	(0.024)
Gov't Expenditure	-0.018)	-0.020	0.019	-0.014	-0.019	0.380**	0.510**	0.578**	0.564**	-0.021	0.010
	(0.013)	(0.013)	(0.013)	(0.019)	(0.016)	(0.191)	(0.173)	(0.193)	(0.186)	(0.077)	(0.020)
Financial Openness	-0.260	0.263	-0.168	-0.080	-0.077	-5.327**	3.272	-0.613	-0.299	-0.206	-0.568***
	(0.184)	(0.199)	(0.197)	(0.213)	(0.196)	(2.509)	(2.152)	(2.494)	(2.531)	(0.305)	(0.153)
Domestic Savings	0.018***	0.017**	0.017**	0.168**	0.015**	0.288**	0.236**	0.234**	0.163	0.012	-0.021
	(0.007)	(0.006)	(0.007)	(0.008)	(0.007)	(0.119)	(0.090)	(0.108)	(0.099)	(0.011)	(0.013)
Institutions	-0.183*	-0.211*	-0.222**	-0.260*	-0.150	0.296	-0.496	-1.690	-1.919	0.207	0.056
	(0.110)	(0.109)	(0.108)	(0.149)	(0.136)	(1.558)	(1.310)	(1.773)	(1.655)	(0.140)	(0.134)
Diagnostics:											
Observations	515	515	515	384	360	522	522		407	471	434
Kleibergeen-Paap rk LM test	35.723	45.099	57.943	45.757	44.626	29.798	32.981	42.723	49.365	22.572	35.275
[p – value]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.008]	[0.009]	[0.000]	[0.000]	[0.068]	[0.004]
Kleibergeen-Paap rk Wald F test	22. 550	14.793	13.613	9.675	10.163	8.599	8.981	6.458	8.514	4.677	5.427
OID (Hansen J) test;	4.295	6.982	12.876	17.923	13.356	8.878	15.807	6.535	10.246	15.803	13.048
[p-value]	[0.745]	[0.859]	[0.536]	[0.210]	[0.575]	[0.782]	[0.395]	[0.9512]	[0.854]	[0.260]	[0.599]
Orthog – option: (Hansen J)	2.754	5.150	11.617	6.679	6.997	4.547	4.269	4.841	6.754	7.267	9.017
[p-value]	[0.600]	[0.742]	[0.312]	[0.572]	[0.726]	[0.804	[0.934]	[0.9512]	[0.749]	[0.508]	[0.531]
Exogeneity (C) test	1.541	1.832	1.259	11.244	6.359	4.331	11.539	1.694	3.493	8.536	4.031
[p-value]	[0.673]	[0.767]	[0.868]	[0.081]	[0.273]	[0.503]	[0.042]	[0.946]	[0.745]	[0.129]	[0.545]
F (Prob >F)	24.33	22.82	22.93	9.01	13.17	3.39	4.03	3.14	4.05	5.27	9.56
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.001]	[0.000]	[0.003]	[0.000]	[0.000]	[0.000]
F – Stats for Financial			11.00		11.98		7.63		12.94		5.38
Development [Prob>F]			[0.0041]		[0.0025]		[0.0220]		[0.002]		[0.068]
F – Statistics for FDI			12.20		11.06		5.63		10.16		8.11
[Prob>F]			[0.0022]		[0.0040]		[0.059]		[0.006]		[0.017]

*Note: RSG is Real sector growth; MANVA is manufacturing; INVA is industry value additions. Standard errors are presented in parenthesis. Kleibergeen-Paap rk LM = Test of under identification; Kleibergeen-Paap rk Wald F = Test of weak identification; C – Statistics = Test of Exogeneity / orthogonality of suspect instruments; Hansen J = Test of over identifying restrictions. *, **, *** denotes significance levels at 1%, 5% and 10% respectively. Regarding the components of real sector, all models under B is an interaction of FDI and the financial development while D is an interaction of FDI and private sector credit.*

Table 3.3B: Real Sector Growth and Foreign Direct Investment

Dep. Variable	**INVA**	**INVA**	**AGVA**	**AGVA**	**AGVA**	**AGVA**	**SERVA**	**SERVA**	**SERVA**	**SERVA**
	(4C)	**(4D)**	**(5A)**	**(5B)**	**(5C)**	**(5D)**	**(6A)**	**(6B)**	**(6C)**	**(6D)**
FDI	0.536	0.423	-1.380***	-1.356**	-0.858***	-0.709**	0.317***	0.276**	0.307***	0.609*
	(0.390)	(0.413)	(0.248)	(0.257)	(0.285)	(0.335)	(0.074)	(0.078)	(0.059)	(0.365)
Financial Dev Index			-0.270**	-0.253***			0.171	0.107		
			(0.113)	(0.097)			(0.105)	(0.093)		
Private Credit	0.001	-0.006			-0.285**	-0.049***			-0.020***	-0.146*
	(0.009)	(0.010)			(0.138)	(0.011)			(0.006)	(0.087)
Interaction Terms		0.010**		0.057***		0.014*		0.035**		0.007***
		(0.005)		0.018		(0.008)		(0.017)		(0.002)
GDP Growth	0.169***	0.161***	0.061***	0.058***	0.037**	0.030*	0.081***	0.084***	0.060***	0.080***
	(0.025)	(0.024)	(0.017)	(0.019)	(0.017)	(0.016)	(0.013)	(0.013)	(0.014)	(0.014)
Gov't Expenditure	0.038*	0.054***	0.023	0.017	0.022	0.039*	0.043***	0.042***	0.049***	0.049***
	(0.021)	(0.020)	(0.023)	(0.022)	(0.021)	(0.223)	(0.011)	(0.011)	(0.012)	(0.012)
Financial Openness	-0.172	-0.140	0.591**	0.553*	0.191	0.535*	0.176	0.085	0.564***	0.834***
	(0.290)	(0.321)	(0.298)	(0.295)	(0.299)	(0.310)	(0.218)	(0.215)	(0.202)	(0.215)
Domestic Savings	0.009	0.014	0.007	0.008	0.006	1.970	0.006	0.007	0.007	0.009
	(0.007)	(0.011)	(0.008)	(0.008)	(0.008)	(0.008)	(0.006)	(0.006)	(0.006)	(0.006)
Institutions	0.139	0.117	0.166	0.118	0.237*	0.017	-0.249*	-0.270**	-0.357***	-0.386***
	(0.160)	(0.167)	(0.147)	(0.146)	(0.136)	(0.150)	(0.127)	(0.120)	(0.102)	(0.095)
Diagnostics:										
Observations	349	343	442	442	340	334	465	465	352	358
Kleibergeen-Paap rk LM test [p – value]	37.112 [0.001]	36.945 [0.003]	47.024 [0.000]	49.980 [0.000]	36.487 [0.001]	33.093 [0.011]	23.491 [0.053]	27.267 [0.038]	30.074 [0.011]	38.856 [0.002]
Kleibergeen-Paap rk Wald F test	6.395	4.923	7.620	8.288	7.211	4.055	3.691	3.422	4.617	5.545
OID (Hansen J) test; [p-value]	13.202 [0.511]	17.691 [0.342]	20.602 [0.0812]	20.964 [0.138]	24.623 [0.039]	18.451 [0.298]	7.764 [0.859]	11.040 [0.667]	8.884 [0.838]	17.785 [0.337]
Orthog – option: (Hansen J) [p-value]	9.560 [0.297]	13.811 [0.182]	7.587 [0.475]	9.682 [0.469]	17.495 [0.025]	11.921 [0.290]	2.622 [0.955]	9.294 [0.505]	4.714 [0.788]	15.453 [0.116]
Exogeneity (C) test [p-value]	3.642 [0.725]	3.881 [0.693]	13.015 [0.023]	11.282 [0.046]	7.127 [0.309]]	6.529 [0.367]	5.142 [0.398]	1.746 [0.883]	4.170 [0.654]	2.332 [0.887]
F (Prob >F)	9.20 [0.000]	7.96 [0.000]	8.54 [0.000]	10.87 [0.000]	3.29 [0.002]	8.82 [0.000]	15.35 [0.000]	13.67 [0.000]	11.33 [0.000]	14.58 [0.000]
F-Stats for Financial Development [Prob>F]		4.79 [0.0912]		21.17 [0.000]		21.10 [0.000]		4.84 [0.089]		13.07 [0.0014]
F – Statistics for FDI [Prob>F]		8.62 [0.0134]		38.93 [0.000]		5.42 [0.0667]		17.07 [0.0002]		12.52 [0.0019]

*Note: INVA is industrial value additions; AGVA is Agriculture value additions; SERVA is Service value additions, respectively. Standard errors are presented in parenthesis. Kleibergeen-Paap rk LM = Test of under identification; Kleibergeen-Paap rk Wald F = Test of weak identification; C – Statistics = Test of Exogeneity / orthogonality of suspect instruments; Hansen J = Test of over identifying restrictions. *, **, *** denotes significance levels at 1%, 5% and 10% respectively. Regarding the components of real sector, all models under B is an interaction of FDI and the financial development while D is an interaction of FDI and private sector credit.*

Our a-prior expectation of a direct positive association between FDI and growth of the real sector is evident in the service sector (see models 6A and 6C). Thus, although we found no evidence of an association at the overall level of the real sector, a decomposition shows contradicting evidence regarding service growth. At a 1% significance level, we see a growth rate of approximately 0.32% and 0.35% in the growth of service value additions with a 1% surge in FDI flows to Africa. The positive relationship may be on the back of gradual increments in the service related FDI flows to Africa. UNCTAD (2015) shows a continuous increment in global share of service sector FDI from 49% in 1990 to 63% by close of 2012.

UNCTAD (2011) transcripts a shift in the dynamics of FDI to developing economies from hitherto manufacturing and primary sectors to services. They contend that over twenty years, service sector FDI had risen from 35% in 1989 to 49% by 2008, while within the same period, the manufacturing share of FDI dropped from 52% to 35%. Data for 2012 shows that the service sector share of global FDI was pegged at 63%, almost double that of manufacturing, with the primary sector controlling less than 10% of total FDI. Recent evidence shows that in 2014, close to 64% of global FDI stocks reside in the service sector. Data shows that the service sector FDI in Africa quadrupled between 2001 and 2012. By 2012, the services sector controlled 48% of FDI stock to Africa, while the primary and manufacturing sectors controlled 32% and 20% respectively. By 2014, FDI to Africa consisted of 51% services, 20% manufacturing, and 28% primary sector (UNCTAD, 2016; 2015). These show that the positive relationship is not a fluke and may continue for long. The statistical relevance of our results shows that in the presence of financial development, 1% rise in the influx of FDI directed toward the service sector will lead to 0.32% and 0.31% growth of the sector respectively (models 6A and 6C). Data from Burundi shows a significant surge in service sector growth between 2009 and 2012, which is attributable to increased FDI inflow because of the liberalization of the mobile-telephone sector of services. Within the same period, reductions in the service sector growth of Djibouti by almost 4.3% between 2001-2004 and 2009-2012 resulted from postponements of service-related foreign direct investments (UNCTAD, 2015a). Our results are supported by conclusions of Opoku et al. (2019) that the service sector is one of the essential pass-through channels that FDI can exert on the broader economy. Our findings refute that of Kodongo and Ojah (2017) that FDI leads to a plunge in the service sectors of 19 African economies between 1990 and 2003.

Equation (3.2) further tests the direct association between the financial sector and growth. Based on the theory, we postulated a direct positive relationship between the growth of the real sector, its components, and financial development. However, our empirical estimations proved otherwise, where the relationship was mostly insignificant and at best, negative. For both our primary and robust measures of financial development, its effect at the overall level of the real sector was insignificant (see models, 2A and 2C). Hence, at best, financial sector development, whether the index or private sector credit has no direct association with the overall growth of the real sector. The results throw light on the concentration of earlier studies, which have focused more on finance-growth at the utmost level of growth.

Further decompositions show an insignificant effect regarding growth in manufacturing (models 3A), industry (4A and 4C), and services (6A). Again, the results relating to manufacturing and the overall index may not be surprising given the high bivariate correlation between the two. Regarding growth in agriculture, the association is derogatory, as increases in both financial development indicators erode growth of the sector (see models 5A and 5C). The adverse impact on agriculture could be a result of lack of confidence of financial service providers in the sector. Provision of financial services have not favoured the sector, and this may be due to a lack of assurance about earning ability of the sector. As noted by Meyer (2015) and Mhlanga (2010), among the host of issue derailing the growth of the agriculture sector, are lack of financial access and high interest to most farmers. We also found that private sector credit adversely affects growth in the manufacturing and service sectors (3C and 6C).

Principally, the antagonistic and largely insignificant relationship between finance and the real sector contradicts the Schumpeterian theoretical propositions on the assumption that provision of financial services are essential to the long term growth of an economy, and brings to the fore how Africa's financial sector seem uncorrelated with growth at a disaggregated level. Financial resources geared towards these sectors have not been beneficial. Perhaps financial institutions are not confident of gains from the sector, and more importantly, because most firms in these sectors are mainly micro in nature issues of collateral, information asymmetry, adverse selection, and moral hazard may be an issue for financial service providers. Furthermore, the high interest on borrowing is a likely cost to most firms in these sectors and possibly the reason for the adverse relationship. Overall, financial service providers consider the extension of credit at a lower level of growth a risky venture.

The insignificant association may also be an indication of possible forms of finance that may not pass through the financial system such as borrowing from friends and family relations. The insignificant direct effect of financial development corroborates conclusions of Alfaro et al., (2004) who found the same conclusion on a cohort of financial development variables that included private sector credit, bank credit, liquid liabilities of central banks, central and commercial banks assets, stock market liquid and capitalization. Employing stock market capitalization to GDP as an indicator of financial development, Durham (2004) also found the association to be positive but insignificant. Similarly, in the presence of foreign direct investment, Agbolyor et al., (2014) found no relationship between stock market turnover and economic growth in Africa. Regarding the real sector, Kodongo and Ojah (2017) concluded that Africa's financial sector, proxied by private sector credit, domestic credit, market capitalization and market value traded, have no significant direct growth impact on all components of the real sector. The only significant effect was even damaging between private sector credit and industrial value additions.

Even though most private capital comes along with one form of seed money or capital from the destination countries, the presence of the domestic financial system is crucial for the integration of the new capital. At worst, the new capital must pass through the domestic financial system. The integration automatically draws in the domestic financial sector into the spill over effects of any benefits that capital flows might have on growth. It is when the local financial system is developed that the views of Schumpeter and his cohorts on the allocative function of the financial system will be realized. A developed financial system will be encouraging and boost the confidence of foreign investors in hedging against risks associated with foreign exchange risk, especially in cases where the costs of production, sales, and returns are locally denominated. To the extent that financial systems are ill developed, the spill over benefits from capital flows will be detrimental to growth. Therefore, using financial development as a conduit, we tested the conditional effect of financial development, and capital flows on the growth of the real sector. Accurately, we tested whether the association between the growth of the real sector and foreign direct investment is conditioned on the level of financial development. We employed the multiplicative term of FDI and financial development, in addition to the two individual variables and estimate equation (3.3). As stated by Brambor et al., (2006), in an interactive model such as equation (3.3), although the effect of the constitutive terms making up the multiplicative terms is not the prime focus, the correct specification is to include all constitutive terms in the model. Again, including the constitutive terms ensure that the multiplicative term is not taken as a proxy for either of the constitutive terms (that is, the inflow of foreign direct investment or the extent of financial development).

From equation (3.3), the main item of interest was the coefficient of the interactive term (β_4). According to Brambor et al. (2006), in a model that consists of an interactive term, the constitutive terms are of no relevance and should not be interpreted as absolutes. Brambor et al. (2006) contend that the presence of the constitutive terms in the model is for the moderator to provide grounds for the effect of the treatment variable on the outcome variable. Tables 3.3A and 3.3B show positive and significance estimates for all models that employ the interaction term. At the overall level of the real sector, the interaction term is statistically significant at 1% for both financial development index and private sector credit (see models 2B and 2D). The significant estimate means that the effect of FDI on Africa's real sector is unambiguously positively correlated with increases in the development of the financial sector. Thus, conditioned on the evolution of the financial sector, foreign direct investment will have a contemporaneous positive impact on the overall growth of the real sector. Thus, although FDI may be insignificant or stifle growth at the disaggregated level, countries with an efficient and well-functioning financial system will benefit from FDI spill over effects in an environment of an efficient financial system. The results confirm the allocative function and the relevance of the domestic financial sector in integrating external capital, to spur growth at a disaggregated level. At the overall level, the results uphold proponents of the indirect impact of capital flows on growth on the relevance of absorptive capacities in the capital flows-growth nexus and supports conclusions by Agbloyor et al., (2014), Alfaro et al., (2010), Choong et al., (2010), Alfaro et al., (2004), Durham (2004).

Again, we looked at the interaction effect at the decomposed level of the real sector. Under manufacturing, the interaction of FDI and the financial development is significantly positive at 5%, the same as between FDI and private sector credit, just that the coefficient for the former is high than the latter (see models 3B and 3D). Regarding the growth of agriculture, while the interaction between FDI and the financial development index was positive and significant at 1%, the interaction between FDI and private credit was positive and significant at 10%, with the effect being higher for the index (see models 5B and 5D). Similarly, for service sector growth, the interaction effect of FDI and financial development index was significant and positive at 5%, while that of FDI and private credit was significant at 1% (see 6B and 6D). Although the interaction effect was significant at 5% under industrial growth, the effect was in the opposite direction among the indicators of financial development. While the interaction effect of FDI and financial development index was negative, the interaction between FDI and private sector credit was positive (see models 4B and 4D). Broadly, the positive and significant effects of the interaction terms at the decomposed level concur those absorptive capacities in the form financial development matter for the spill over benefits of FDI such as technological transfer, skills training, employment generation, and human capital development.

Overall, the results bring into relevance the benefits of FDI and the role of financial sector advancement in enhancing growth. Although the quantum of FDI into Africa is acknowledged as minimal, the development of the financial sector is crucial in ensuring the growth benefits of FDI is not concentrated only at the aggregate level of growth but trickles down to all components of the real sector. By tackling issues regarding corporate governance, creditworthiness, information asymmetry, moral hazard, and adverse selection, financial development enables the allocation of scarce FDI into Africa. Thus, although FDI on its own may be detrimental or uncorrelated with growth, the inverse or the uncorrelated effect can be overturned when financial systems are developed and efficient.

Test of joint significance and marginal effect analysis

Although, the interaction exhibits a strong positive significant relationship in the growth of the real sector and its components, Brambor et al., (2006) contends that merely looking at the coefficients of the interaction presents limited results on the impact and association between a multiplicative term and an outcome variable, especially, where the moderating variable is at zero. As stated by Brambor et al. (2006) and Ai and Norton (2003), the assessment of the conditional effect of a moderating variable cannot be determined solely from the coefficient of the interaction term. The coefficient of the interactive terms presents minimal information on any relationship between a response variable and the effect of an independent variable in the presence of a moderator, as one cannot tell an accurate picture by merely looking at the magnitude and significance of the interactive terms' coefficients. Again, it may be possible for the coefficient of an interactive term to be insignificant and still have an effect. They posit that there could be an effect even when the coefficient of the multiplicative term is insignificant. Unlike addictive terms, where the effect of an independent variable on a dependent is constant, interactive models are concerned with the effect of an independent variable on a dependent variable at practically meaningful values of the moderator variable. We could then determine the significance or otherwise at the various meaningful values from their standard errors and p-values. Such assessment will provide policymakers the extent to which the effect of the independent variable will persist based on the presence of the moderating variable.

There was, therefore, a need to conduct two additional tests to validate the effect of an interactive term. The first was the joint test of significance, which tests whether one or both sets of constitutive terms in conjunction with the multiplicative term are useful explanatory variables in predicting an outcome variable (Alfaro et al., 2004). The other was the marginal effect analysis (Brambor et al. 2006).

3.6.2.1 Test of joint significance and marginal effect analysis – FDI

Thus, consistent with Alfaro et al., (2004), Table 3.3 (A and B) presents the joint significance test of FDI with the multiplicative term; and the joint significance test of financial development with the multiplicative term. Based on our moderator variable of financial development, we, reject the null hypothesis that the coefficients of both the interaction between financial development and FDI and financial development are zero. The joint significance was at 1% (see 2B, 2D, 3D, 4B, 5B, 5D, and 6D), 5% (3B) and 10% (4D and 6B) under both indicators of financial sector development. Thus, the joint significance test, under financial development, confirms the relevance of financial development in enhancing the growth impacts of FDI at both the overall and decomposed levels of real sector growth.

A hypothetical question will be, so how does a one standard deviation increase in financial development enhance FDI impact on the growth of the real sector for countries with the mean value of FDI? Based on the financial development index, a one standard deviation increase will grow the real sector by 3.07% points over the study period[27]. Also, employing private sector credit, a one standard deviation increase in the level of private credit for a country that received the average FDI will see its real sector grow annually by 0.41% points. We employed two samples from our study to estimate the impact of FDI on the real sector conditioned on the expansion of the financial sector. We used Guinea and South Africa to emphasize our results. The average financial development for Guinea over the period 1990 to 2017 is zero (0) with an average FDI of 2.702%. Given the financial development average, the effect of FDI conditioned on financial development will be zero. However, assuming

[27] The estimation takes the form of (B4 x meanFDI x stdFdindex) = [9.836*0.03028*0.103=3.067%].

financial development of Guinea increases to the level of South Africa (0.48), and at the average FDI, Guinea's real sector will grow by approximately 12.76% points [9.836*0.02702*(0.48-0)]. The magnitude of the impact is even more profound if the average FDI value for Guinea increases to the sample average, the growth impact of FDI conditioned on financial development increase to14.29 by point [9.836*0.03028*0.48], increasing approximately 1.53% points. Employing private sector credit, an increase in the average of Guinea (2.69) to the level of South Africa (119.4) at the current average FDI for Guinea will lead to a growth in the real sector by 1.48% points [0.006*0.02702*119.4]. Again, the impact is much higher should Guinea attract the sample average FDI inflow while maintaining the level of private sector credit consistent with South Africa, as Guinea's real sector will expand by 2.17% points annually over the study period [0.006*0.03028*119.4]. We have thus established the relevance of the conditional effect that financial development has on the growth-enhancing effects of FDI at the overall level of the real sector.

Now, consistent with Brambor et al., (2006) and Hainmuller et al., (2019), it was essential to determine the marginal effect of the conditional effect at various levels. Unlike additive models that assume that the impact of the primary independent variable on the outcome variable is constant, multiplicative models assess the impact of the independent variable on the outcome variable at varying levels of the conditioning variables. Therefore, the marginal effect should be assessed at essential variables of the conditional variable. Consequently, to ascertain the marginal effect of FDI on growth at various levels on financial development, we estimated equation (3.4), which is an indication of the degree to which financial development may augment the impact of FDI on the real sector.

We determined the marginal effect of FDI on growth at different percentile levels (25^{th}, 50^{th}, $75^{th,}$ and 90^{th}) of financial development. Table 4.4A shows the marginal results for the financial development index, evaluated at the 25th (0.084), 50th (0.110), 75th (0.171), and the 90th (0.270) percentiles. All the results are significant at a 1% significance level. Regarding growth at the overall real sector, the marginal effect supports the earlier submission of a robust positive relationship with FDI conditioned on financial development, as a 1% increase in FDI inflows will grow the real sector by 0.897%, 1.153%, 1.753% and 2.727% at the 25th, 50th, 70th and 90th percentiles of financial development index respectively. The same deduction is valid for the growth of the industry and the service sector, as we observe a significant positive effect at all percentile levels of the financial development index. It should be noted that for industrial sector growth, the marginal effect is at a negligible decreasing rate of the financial development index. A 1% rise in the flow of FDI will lead to a 0.931%, 0.930%, 0.928% and 0.924% expansion of the sector at the 25th, 50th, 75th and 90th percentiles of the financial development index respectively. Again, a 1% increase in the quantum of service sector related FDI would spur the growth of the sector by 0.279%, 0.280%, 0.282% and 0.285% at the 25th, 50th, 75th and 90th percentiles of the financial development index respectively.

Table 3.4A: Marginal Effects of FDI on real sector growth and its components at varied levels of financial development index

Fin. Development index at	25th (0.084)	50th (0.11)	75th (0.171)	90th (0.27)	Source
Real sector growth index	0.897*** (0.047)	1.153*** (0.040)	1.753*** (0.039)	2.727*** (0.074)	Model 2B, Table 4.3A
Manufacturing sector growth	-0.155*** (0.067)	-0.133*** (0.057)	-0.079*** (0.051)	0.008*** (0.089)	Model 3B, Table 4.3A
Industrial sector growth	0.931** (0.012)	0.930** (0.002)	0.928** (0.024)	0.924** (0.038)	Model 4B, Table 4.3A
Agriculture sector growth	-1.351*** (0.057)	-1.350*** (0.048)	-1.346*** (0.047)	-1.341*** (0.090)	Model 5B, Table 4.3B

Service sector growth	0.279*** (0.039)	0.280*** (0.034)	0.282*** (0.031)	0.285*** (0.054)	Model 6B, Table 4.3B

The results on the growth of the manufacturing sector show that the impact of FDI on the sector is not decisive, as indicated by the coefficient of the interaction term. The marginal effect indicates that there is an initial adverse effect of FDI which decreases at the 25th, 50th and 75th percentiles of the financial development index, as a 1% increase in the flow of FDI will derail manufacturing sector growth by 0.155%, 0.133%, and 0.079% respectively. However, at the 90th percentile, a 1% increase in FDI inflows will lead to a 0.008% increase in the growth in manufacturing value-added. Thus, the growth impact of FDI on manufacturing value additions is attainable at a threshold level of the 90th percentile of financial development index. The strong intuition is that, although FDI has an initial damming effect on manufacturing value additions, improvements in financial development can ease the initial adverse effect at high levels of financial development. Thus, continuous improvements in the financial service provisions such as access to credit, lower interest rates, strong institutional governance will go a long way in the attraction and retention of foreign direct investment into the manufacturing sector.

Regarding agriculture value additions, the marginal effects show that although improvements in financial development can enhance the growth effect of FDI on the sector, it cannot wholly eradicate or defuse any initial adverse effect of FDI. Though the initial adverse effect decreases at increasing rates of financial development, the marginal effect remains negative and significant even at the 90th percentile of the financial development index. A 1% increase in FDI will dampen the growth of the agriculture sector by 1.351%, 1.350%, 1.346% and 1.341% at the 25th, 50th, 75th and 90th percentiles of the financial development respectively. Therefore, for the agriculture sector to benefit from financial development, a lot of efforts and financial strategies must be enforced. Perhaps services are rolled out just for the sector time agriculture-related finance. Just like the continent have a development bank (AfDB) and export-import bank, it is time Africa leaders set up a continental agriculture bank.

Table 3.4B: Marginal Effects of FDI on real sector growth and its components at varying levels of private sector credit

Private Sector Credit at	25th (6.609)	50th (12.032)	75th (21.342)	90th (46.779)	Source
Real sector growth index	0.047*** (0.052)	0.079*** (0.051)	0.135*** (0.052)	0.288*** (0.051)	Model 2D, Table 4.3A
Manufacturing sector growth	4.523*** (0.0752)	8.301*** (0.0751)	14.753*** (0.0750)	32.381*** (0.074)	Model 3D, Table 4.3A
Industrial sector growth	0.489*** (0.067)	0.543*** (0.066)	0.636*** (0.0664)	0.891*** (0.0662)	Model 4D, Table 4.3B
Agriculture sector growth	-0.616*** (0.0643)	-0.541*** (0.0642)	-0.410*** (0.0641)	-0.054*** (0.063)	Model 5D, Table 4.3B
Service sector growth	0.655*** (0.040)	0.693*** (0.041)	0.758*** (0.0401)	0.936*** (0.040)	Model 6D, Table 4.3B

The results from private sector credit as a proxy for financial development confirm the consistency and robustness of our results. Table 3.4B indicates that at higher levels of private sector credit, FDI can enhance growth at the overall growth of the real sector. At high percentiles of private credit, the marginal effect indicates higher effects of FDI regarding growth at the overall level, manufacturing, industry, and service sector value additions. Significantly, Table 3.4B shows that private sector credit to the agriculture sector is still underdeveloped as the negative impact of FDI on the sector are evident at all percentiles of private credit, though at a decreasing rate. With a 1% increase in FDI to the sector, the growth impact at the 25th, 50th, 75th and 90th percentiles of private credit, dips by 0.616%, 0.541%, 0.410%, and 0.054% respectively.

Analysis at the marginal effect thus presents us with the role of financial development and more importantly, the threshold levels in moderating the association between growth at a disaggregated level and the attraction of foreign direct investment.

3.6.3 Regression analysis of results - On the real sector, PEF, and financial development

We turn our attention to the direct impact of portfolio equity flows on the growth of the real sector and then account for the conditional effect of financial development. We began our analysis at the overall real sector level and a further look at the association at the decomposed levels manufacturing, industry, agriculture, and services. The results are reported in Tables 3.5A and 3.5B.

At the overall level of the real sector, we found portfolio equity flows to have a direct adverse impact on the growth of the real sector, but principally insignificant, when we controlled for only the baseline determinants of economic growth (see model 1). The effect remains predominantly insignificant even in the presence of both financial sector development indicators (see model 2A and 2C). In as much as the association between growth and equity flows may be germane to the growth literature, our study presents a different dimension regarding the indicators of growth. On the general notion of the equity flow-growth nexus, our result supports the conclusions of Durham et al., (2004) that lagged equity flows have no unmitigated significant positive impact on growth but contradictory studies have either found portfolio equity to enhance growth (Durham 2004) or those that have found equity flows to negatively affect growth (Agbloyor et al., 2014; Choong et al., 2010). Perhaps, one distinguishing feature is that these studies assessed the impact at an aggregate level of growth (GDP growth) and that Africa's real sector on its own has been unattractive to providers of external capital, especially, equity. Again, regarding Africa, we explored a more extensive data set and period relative to other studies. The outcome supports acknowledgment by IMF

(2018b) on the assertion that, unlike FDI, equity flows have not been historically known to have a strong positive correlation with economic growth and investment in Africa. We can confidently allude that although equity flows may not directly enhance growth, equity flows may also not be associated with macroeconomic imbalances, uncertainty, and financial crisis as primarily suggested because of their unpredictability. Their lack of certainty is more likely to have no growth effect than to be damaging to growth, and more importantly, at a disaggregated level of growth. Due to their lack of permanence and search of high returns, equity providers are likely to withdraw their investment at the least turbulence, thereby lacking the long duration negative impact as suggested by earlier studies. WIR (2018) confirms that portfolio flows are "relatively unstable because of the speed at which positions can be unwound" (WIR, 2018, pp. 29). Therefore, the whimsical and instability nature of equity flows may also make them less attractive to those who seek external funds and hence may have no growth impact at the overall level of the real sector. The insignificant effect may also result from the relatively low share of equity flows as a proportion of total external finance to developing countries. Data shows that between 2002 and 2017, portfolio equity commanded the least proportion of all global flows, as well as to developing economies (WIR, 2018). On its own, equity flows may be potentially unreliable to either enhance or damage growth at the overall level of the real sector.

With the intuition that the development of the financial sector is an essential ingredient for growth based on the views of Schumpeter, we assessed the growth impact of equity flows at the overall level of the real sector, contingent of the levels of financial development. We did this by the inclusion of an interaction term of portfolio equity and measures of financial development. Consistent with Brambor et al., (2006), we refrained from the explanation of the constitutive terms in our interaction equations, although the coefficients of portfolio flows remain statistically insignificant. On the assumption that a developed financial sector combined with the inflows of external capital is a catalyst for economic growth, we see a validation of this assertion to be factual even at a disaggregated level of growth.

Table 3.5A: Real Sector Growth, Portfolio Equity Flows and financial development

Dep. Variable	**RSG**	**RSG**	**RSG**	**RSG**	**RSG**	**MANVA**	**MANVA**	**MANVA**	**MANVA**	**INVA**	**INVA**
	(1)	**(2A)**	**(2B)**	**(2C)**	**(2D)**	**(3A)**	**(3B)**	**(3C)**	**(3D)**	**(4A)**	**(4B)**
Portfolio Equity	-0.033	0.626	0.956	-0.003	-0.031	1.386*	0.192	-0.075	-0.464	0.189	0.102
	(1.211)	(1.379)	(1.111)	(0.083)	(0.110)	(0.817)	(0.668)	(0.116)	(0.885)	(0.209)	(0.092)
Financial Dev Index		8.649**	10.625***			-1.346	-0.873			7.890**	10.371**
		(4.182)	(4.014)			(2.730)	(2.816)			(3.796)	(4.504)
Private Credit				-0.460**	-0.133			0.262	0.151		
				(0.225)	(0.094)			(0.173)	(0.166)		
Interaction Terms			4.751**		0.518*		3.503**		0.122		7.496***
			(2.247)		(0.288)		(1.711)		(0.188)		(2.847)
GDP Growth	2.583 ***	2.580***	2.633***	0.378***	0.142***	2.209***	0.436**	0.322***	0.026	0.179***	0.177***
	(0.289)	(0.365)	(0.363)	(0.073)	(0.023)	(0.544)	(0.208)	(0.100)	(0.027)	(0.028)	(0.028)
Gov't Expenditure	-0.729***	-0.785**	-0.827***	0.006	0.045***	-0.213	1.263	-0.060*	-0.058*	-0.028	-0.028
	(0.190)	(0.306)	(0.300)	(0.018)	(0.017)	(0.173)	(1.755)	(0.033)	(0.032)	(0.024)	(0.029)
Financial Openness	- 4.786***	-4.825***	-4.931***	0.510*	-0.182	-4.524*	-2.70**	-0.746**	-0.734**	-0.387***	-0.462**
	(1.093)	(1.305)	(1.331)	(0.276)	(0.312)	(2.492)	(1.053)	(0.365)	(0.345)	(0.125)	(0.219)
Domestic Savings	2.020**	0.556	0.336	0.033***	0.029**	-0.320	1.178	0.050	0.137**	0.011	0.012
	(0.949)	(1.577)	(1.585)	(0.010)	(0.011)	(0.094)	(1.452)	(0.071)	(0.054)	(0.015)	(0.018)
Institutions	2.374	4.125**	3.266*	-0.091	0.192	0.027	-0.128	0.015	0.107	0.097	0.366*
	(1.454)	(1.190)	(1.809)	(0.179)	(0.158)	(1.140)	(1.320)	(0.177)	(0.135)	(0.152)	(0.220)
Diagnostics:											
Observations	430	409	409	353	368	342	327	252	267	370	326
Kleibergeen-Paap rk	15.749	39.657	42.246	38.071	34.843	31.166	41.668	25.189	32.483	20.518	48.013
LM test [p -value]	[0.046]	[0.000]	[0.000]	[0.001]	[0.007]	[0.005]	[0.000]	[0.033]	[0.009]	[0.083]	[0.000]
Kleibergeen-Paap rk	6.888	10.638	13.314	8.215	7.463	6.113	13.455	11.513	14.147	6.290	8.526
Wald F test											
OID (Hansen J) test;	6.334	17.207	18.968	10.190	24.028	17.814	22.881	11.927	14.327	14.220	10.643
[p-value]	[0.501]	[0.190]	[0.215]	[0.678]	[0.089]	[0.165]	[0.087]	[0.534]	[0.501]	[0.287]	[0.778]
Orthog – option:	0.957	5.773	10.758	8.217	9.289	10.824	10.596	5.718	8.452	3.009	5.096
(Hansen J) [p-value]	[0.916]	[0.673]	[0.377]	[0.413]	[0.505]	[0.212	[0.390]	[0.679]	[0.585]	[0.934]	[0.885]
Exogeneity (C) test	5.377	11.434	8.209	1.972	14.739	6.991	12.285	6.209	5.875	11.211	5.546
[p-value]	[0.146]	[0.043]	[0.145]	[0.853]	[0.022]	[0.221]	[0.0311]	[0.286]	[0.319]	[0.024]	[0.353]
F (Prob >F)	28.86	9.80	9.47	6.31	7.53	3.95	1.86	3.91	2.20	14.99	8.62
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.066]	[0.001]	[0.028]	[0.000]	[0.000]
F – Statistics for FD			10.01		15.27		5.10		1.18		7.30
[Prob>F]			[0.007]		[0.000]		[0.078]		[0.056]		[0.026]
F – Statistics for PEF			4.58		1.50		4.90		3.60		13.39
[Prob>F]			[0.1010]		[0.2237]		[0.0864]		[0.166]		[0.001]

*NB: Standard errors are presented in parenthesis. Kleibergeen-Paap rk LM = Test of under identification; Kleibergeen-Paap rk Wald F = Test of weak identification; C – Statistics = Test of Exogeneity / orthogonality of suspect instruments; Hansen J = Test of over identifying restrictions. *, **, *** denotes significance levels at 1%, 5% and 10% respectively. Regarding the components of real sector, all models under B is an interaction of Portfolio equity flows and the financial development while D is an interaction of Portfolio equity flows and private sector credit. RSG is real sector growth index; MANVA is manufacturing value additions; INVA is industrial value additions.*

Table 3.5B: Real Sector Growth, portfolio equity and financial sector development

Dep. Variable	**INVA**	**INVA**	**AGVA**	**AGVA**	**AGVA**	**AGVA**	**SERVA**	**SERVA**	**SERVA**	**SERVA**
	(4C)	**(4D)**	**(5A)**	**(5B)**	**(5C)**	**(5D)**	**(6A)**	**(6B)**	**(6C)**	**(6D)**
Portfolio Equity Flows	0.267	-1.873**	0.136	0.121	0.200*	-0.032	-0.284	-0.037	-0.060	-0.136**
	(0.165)	(0.931)	(0.248)	(0.744)	(0.106)	(0.651)	(0.335)	(0.326)	(0.037)	(0.056)
Financial Dev Index			-0.544	-0.595			10.609**	11.120***		
			(0.397)	(0.394)			(4.189)	(3.730)		
Private Credit	-0.417***	-0.295***			-0596**	-0.705***			-0.039	0.048
	(0.142)	(0.111)			(0.272)	(0.224)			(0.080)	(0.092)
Interaction Terms		0.454**		0.799***		0.004		7.879*		0.653***
		(0.208)		0.287		(0.145)		(4.442)		(0.225)
GDP Growth	0.099***	0.101***	0.045*	0.042	0.026	0.015	0.073***	0.080***	0.358***	0.286***
	(0.025)	(0.026)	(0.024)	(0.026)	(0.020)	(0.02)	(0.018)	(0.017)	(0.075)	(0.074)
Gov't Expenditure	0.308*	0.030*	0.284*	0.056**	0.310*	0.086***	0.400***	0.292***	0.025*	0.257***
	(0.180)	(0.016)	(0.146)	(0.028)	(0.186)	(0.032)	(0.069)	(0.074)	(0.014)	(0.119)
Financial Openness	0.043	0.276	-0.093	-0.283	0.222	0.152	-0.315	-0.423*	-0.202*	-0.034
	(0.233)	(0.270)	(0.396)	(0.412)	(0.333)	(0.313)	(0.241)	(0.250)	(0.104)	(0.083)
Domestic Savings	0.026***	0.141***	-0.012	-0.024*	-0.011	-0.007	0.016**	0.007	0.011*	0.005
	(0.010)	(0.053)	(0.015)	(0.014)	(0.011)	(0.011)	(0.007)	(0.008)	(0.007)	(0.008)
Institutions	-0.102	-0.025	0.458**	0.286*	0.306*	0.310*	-0.064	-0.412	-0.057	-0.319***
	(0.139)	(0.145)	(0.228)	(0.173)	(0.184)	(0.162)	(0.135)	(0.135)	(0.079)	(0.093)
Diagnostics:										
Observations	340	325	320	315	306	306	382	364	319	319
Kleibergeen-Paap rk LM test [p – value]	25.135	24.470	26.952	24.067	36.26	51.858	23.340	38.774	24.454	53.643
	[0.033]	[0.079]	[0.020]	[0.088]	[0.002]	[0.000]	[0.055]	[0.001]	[0.075]	[0.000]
Kleibergeen-Paap rk Wald F test	6.729	4.713	7.496	5.521	10.297	11.621	7.560	5.293	4.566	6.180
OID (Hansen J) test; [p-value]	12.028	14.128	16.981	14.259	20.987	26.546	13.175	17.349	16.391	15.019
	[0.525]	[0.516]	[0.200]	[0.506]	[0.102]	[0.050]	[0.434]	[0.298]	[0.290]	[0.523]
Orthog – option: (Hansen J) [p-value]	8.285	10.675	5.147	5.322	12.987	14.608	7.178	10.838	7.766	6.762
	[0.406]	[0.383]	[0.742]	[0.869]	[0.112]	[0.147]	[0.518]	[0.370]	[0.457]	[0.748]
Exogeneity (C) test [p-value]	3.743	3.453	11.834	8.937	8.000	11.938	5.177	6.512	8.626	8.257
	[0.587]	[0.631]	[0.037]	[0.112]	[0.238]	[0.063]	[0.307]	[0.260]	[0.196]	[0.220]
F (Prob >F)	7.79	5.05	8.54	2.50	2.05	2.33	14.14	9.59	7.73	9.85
	[0.000]	[0.000]	[0.000]	[0.012]	[0.049]	[0.019]	[0.000]	[0.000]	[0.000]	[0.000]
F–Stats for Financial Development [Prob>F]		8.93		8.77		10.96		9.30		19.49
		[0.0115]		[0.013]		[0.004]		[0.009]		[0.000]
F – Statistics for PEF [Prob>F]		7.58		7.76		0.01		4.49		9.18
		[0.0226]		[0.020]		[0.996]		[0.106]		[0.0102]

*NB: Standard errors are presented in parenthesis. Kleibergeen-Paap rk LM = Test of under identification; Kleibergeen-Paap rk Wald F = Test of weak identification; C – Statistics = Test of Exogeneity / orthogonality of suspect instruments; Hansen J = Test of over identifying restrictions. *, **, *** denotes significance levels at 1%, 5% and 10% respectively. Regarding the components of real sector, all models under B is an interaction of Portfolio equity flows and the financial development while D is an interaction of Portfolio equity flows and private sector credit. INVA is industrial value additions; AGVA is agriculture value additions; SERVA is service value additions.*

We found the coefficient of our multiplicative term to be statistically positive and significant, for both the financial development index (see model 2B) and private sector credit (see model 2D). Thus, even though providers of equity capital may be sceptical about the growth prospects of Africa's real sector as a whole, and seekers of external capital may not be confident about the permanence and hot money nature of equity flows, a well-developed financial sector can subdue the fears of both players in attracting equity flows to enhance the growth of the real sector. Thus, financial sector development in terms of markets and institutions will help in resolving matters bothering on access, depth, and efficiency, while curbing the risks associated with financial integration, moral hazards, information asymmetry, and providing liquidity to deficit units and appropriate returns to surplus units, through the attraction of equity capital. Though, it may be challenging to interpret the magnitude of the impact of capital (equity) flows, contingent on the extent of financial development, our results, at face value skew towards earlier propositions of equity flow enhancing growth due to the conditional effect of financial development (Agbloyor et al., 2014; Choong et al., 2010a; 2010b; Durham, 2004).

Cognizant of the fact that the aggregate growth of the real sector index may not tell a full story, we sought to assess the impact of portfolio equity at a further disaggregation of the real sector. We sought to determine if the initial insignificant but adverse effect of equity flows at the overall level of the real sector was the same across all sectors or was driven by some of the components. Moreover, we assessed the conditional effects of financial development on each component. In the presence of the financial development index and private sector credit, the initial insignificant relationship still exists for growth in industry (see model 4A and 4C), and services (see 6A and 6C). We, however, found a positive fringe relationship between portfolio equity flows and growth in manufacturing (see, model 3A). At a 10% significance level, a 1% increase in portfolio equity will expand the manufacturing sector by 1.39%. The positive direct association is an indication of possible alternative source of financing for Africa's industrial growth, as some studies have consistently shown that FDI as a source of financing correlated negatively with the growth of manufacturing in Africa (GUI-by and Reinhert, 2015). However, in the presence of private credit, the effect of equity on growth of manufacturing remains mostly negative and insignificant (see model 3C). Again, whiles the private equity was found to enhance the growth of agriculture in the presence of private sector credit; the association remained insignificant when we controlled for the development index (see model, 5A, and 5C). The results suggest that the insignificant initial association between growth at the overall level of the real sector and equity flows may not be different within the decomposed sectors.

Again, we tested the conditional effect of financial development in the connection between portfolio equity and each of the compositions of the real sector. Will the insignificant direct impact be eliminated while reinforcing the positive impact? On the interaction between portfolio equity and the financial development index, we found the coefficient of the interactive term to be robust and positive across all sectors. While the effect on industrial growth was at a 1% significance level, that of manufacturing and agriculture growth was at a 5% significance level, with growth in services at 10% respectively. Thus, on the face value, the presence of a strong financial sector is an excellent catalyst for the attraction of equity flows for growth enhancement of Africa's real sector and its components. With the development of tailor-made financial services, these sectors can attract the right quantum of equity flows to aid growth, thus just like the over level of the real sector, issues of moral hazard and information asymmetry could be eliminated paving the way for investors of equity flows to channel funds to these sectors. Concerning private sector credit, our results show that such form of finance may be only beneficial to industrial and service sectors' growth, as we found the coefficient of the interactive terms to be only positive and significant for these sectors at 5% and 1% significant levels (see models 4D and 6D). Overall, our studies show the relevance of financial sector development in the association between the growth of decomposed real sectors and the attraction of equity flows. The coefficient of the interaction terms shows that, with the right level of financial development, growths in agriculture, industry, manufacturing, and services can be enhanced with the attraction and retention of portfolio equity flows.

3.6.3.1 Test of joint significance and marginal effect analysis – PEF

Ai and Noorton (2003) suggest that conclusions born out of only the coefficients of the multiplicative term are very inadequate to draw valid conclusions. Thus, we estimated the various thresholds and level of significance of the interaction term between the portfolio equity flows and the measures of financial development, on the growth of the real sector and its components. We assessed various percentile levels of the financial development index (see Table 4.6A) and private sector credit (see Table 4.6B).

We evaluated the effect of portfolio equity on growth at the overall real sector, manufacturing and agriculture value additions at the 25^{th} (0.084), 50^{th} (0.110), 75^{th} (0.171), and the 90^{th} (0.270) percentiles of the financial development index. We then evaluated the growth of services and industrial value additions conditioned on the log of financial development at the 25^{th} (0.034), 50^{th} (0.045), 75^{th} (0.066), and the 90^{th} (0.103) percentiles. From table 3.6A, the analysis shows that a 1% increase in portfolio equity flows will grow the overall real sector by 1.355, 1.479, and 1.768 at the 25^{th}, $50^{th,}$ and 75^{th} percentile financial development index respectively. While the marginal effect is significant at a 5% significance level at the 25^{th} and 50^{th} percentiles, that of the 75^{th} percentile is at a 10% significance level (Column 1, Table 3.6A). The intuition is that at increasing levels of financial development, the growth impact of portfolio flows at the overall level of the real sector increases up to the 75^{th} percentile.

Beyond the 75th percentile, any additional increases in financial development have no bearing on the growth impact of equity flows at the overall real sector. The effect is slightly different when we proxied financial development by private sector credit, as we observed increasing effect of portfolio equity on the overall level of the real sector at increasing rates of private credit, even up to the 90th percentile, where the effect is significant at a 1% significance level (Column 1, Table 3.6B). Though our marginal effect supports the positive coefficient of the interaction term, increases in private sector credit have enduring impacts than the financial development index.

Table 3.6A: Marginal Effects of Portfolio flows on real sector growth and its components conditioned on levels of financial development

Fin. Development index at	25th (0.084)	50th (0.110)	75th (0.171)	90th (0.270)	Source
Real sector growth index	1.355**	1.479**	1.768*	2.29	Model 2B,
	(0.686)	(0.709)	(0.761)	(0.853)	Table 4.5A
Manufacturing sector	0.486**	0.577**	0.791*	1.138*	Model 3B, Table
growth	(0.426)	(0.440)	(0.475)	(0.536)	4.5A
Industrial sector growth	0.357**	0.439**	0.597**	0.874**	Model 4B, Table
	(0.153)	(0.203)	(0.297)	(0.464)	4.5A
Agriculture sector growth	0.188*	0.209**	0.258**	0.338***	Model 5B, Table
	(0.619)	(0.783)	(1.209)	(1.939)	4.5B
Service sector growth	0.231***	0.318***	0.483***	0.774***	Model 6B, Table
	(0.127)	(0.167)	(0.246)	(0.054)	4.5B

At the decomposed level of the real sector, a 1 % increase in portfolio equity flows will spur growth of the manufacturing value additions by 0.486%, 0.577%, 0.791% and 1.138% at the 25th, 50th, 75th and 90th percentile of the financial development index at 5% and 10% significant levels respectively (see column 2, Table 3.6A). The marginal effect shows that as the level of financial development expands, growth in manufacturing also expands from equity flows. However, our marginal effect analysis shows no effect of equity flows conditioned on private sector credit, though the initial adverse effect decreases at increasing private credit (column 2, Table 3.6B). At a 5% significance level across all percentiles, a 1% rise in portfolio equity will spur the growth of industrial value additions by 0.375, 0.439, 0.597 and 0.874 at the 25th, 50th, 75th and 90th percentiles of the financial development index respectively. Thus, increases in financial development will also lead to inflows of equity flows leading to industrial sector growth (column 3, Table 3.6A). However, the conditional effect regarding private credit shows that increase in private credit can reduce any initial harmful effect of equity flows on industrial growth, but cannot eliminate the effect, even to the 90th percentile, where the effect is at a 1% significance level (see, column 3 Table 3.6B). The same observation exists regarding growth in agriculture and portfolio flows, conditioned on private sector credit, where increases in private credit are yet to attain a threshold level where the conditional effect will be positive (See column 4, Table 3.6). We also noticed the increasing effects of financial development index combined with increasing inflows of private equity flows would increase the growth of both agriculture and service value additions, respectively. A 1% rise in equity flows leads to a 0.1888, 0.209, 0.258 and 0.338 growth in agriculture value additions at the 25th, 50th, 75th, and 90th percentiles, at 10%, 5% and 1% significance levels (see column 4, Table 3.6A). Regarding services, at a 1% significance level, 1% increase in equity flows lead to 0.231, 0.318, 0.483 and 0.774 increases in services sector growth at the 25th, 50th, 75th and 90th percentiles of the financial development respectively (see, column 5, Table 3.6A). The same deduction holds in terms of private credit, where at 1% significance level, the marginal effect is positive across all percentile levels (see column 5, Table 3.6B).

Table 3.6B: Marginal Effects of portfolio equity on real sector growth and its components at varied levels of private sector credit

Private Sector Credit at	25th (1.888)	50th (2.288)	75th (3.061)	90th (3.845)	Source
Real sector growth index	0.947*** (0.061)	1.258*** (0.073)	1.555*** (0.098)	1.961*** (0.125)	Model 2D, Table 4.5A
Manufacturing sector growth	-0.234 (0.313)	-0.185 (0.379)	-0.091 (0.507)	0.005 (0.637)	Model 3D, Table 4.5A
Industrial sector growth	-1.016*** (0.209)	-0.834*** (0.253)	-0.483*** (0.339)	-0.127*** (0.426)	Model 4D, Table 4.5B
Agriculture sector growth	-0.024** (0.151)	-0.022** (0.189)	-0.020** (0.265)	-0.017 (0.343)	Model 5D, Table 4.5B
Service sector growth	1.097*** (0.051)	1.489*** (0.062)	1.863*** (0.086)	2.375*** (0.110)	Model 6D, Table 4.5B

Broadly, the results indicate that financial development reinforces the association between portfolio flows and growth of the real sector and its components. Conditioned on the financial development index, increases in portfolio flows will lead to growth at the level of the overall real sector and all its components at the 25th, 50th, 75th and 90th percentile of the financial development. Regarding private sector credit, conditional increases on the effect of portfolio equity flows are at increasing rates for growth at the overall level of the real sector, and growth of services value-added, at 25th, 50th, 75th, and 90th percentiles of private sector credit. Though increases in private credit are beneficial to the growth enhancement of portfolio flows on the growth of industry and agriculture, private sector credit has not reached that threshold needed to curb an adverse or insignificant effect of equity flows. Perhaps, the reason for the unresponsiveness of equity flows to these sectors could be attributed to the fact that equity inflows are more inclined to the stock market than banking type of financial development. For instance, Agbloyor et al., (2014) found a positive interaction between stock market turnover and portfolio equity flows but no significant relationship for the interaction between equity flows and both the private sector and bank credit. Although Durham (2004) did not account for bank-based measures, the interaction of equity flows and stock market capitalization was positive and significant.

Though the index shows that increases in financial development are a necessary condition for the growth effect of portfolio flows on the growth of the real sector and its components, the private sector was found to be most beneficial to service sector growth in the association between portfolio flows and economic growth. Though it benefits both agriculture and industrial growth, it is yet to attain that beneficial threshold level. The development of Africa's financial sector can, therefore, not be overlooked in the attraction and retention of portfolio equity, especially at the level of the real sector.

3.6.4 Regression analysis of results - On the real sector, private debt, and financial development

Turing our attention to debt flows; we also explored the direct association between private debt flows and real sector growth both at the overall and decomposed levels. We then extended our analysis to ascertain the conditional effect of the association at levels of financial development. Tables 3.7A and 3.7B capture the results on debt flow, and the growth of the real sector at the overall level, we found a strong negative direct association between the growth of the real sector and private debt flows. Thus, the influx of debt flows is damaging to the overall growth of Africa's real sector. We found a significant and adverse relationship between growth at the overall level of the real sector and the private flow debt into Africa (see model 1). At a 5% significance level, a 1% increase in private debt will decrease the growth of the overall real sector by 0.06%. The strong adverse significant association further persists when we controlled for financial development, proxied by the financial development index (see model 2A), as 1% influx of debt flows leads to a 0.067 fall in real sector growth at 1% significant level. Our results differ from the conclusions of Alfaro et al. (2014), and Gourinchas and Jeanne (2013) that taking away the "sovereign to sovereign" component of total debt flows, there exists a positive correlation between productivity catch-up or growth of the economy and private debt flows. However, it confirms assertions by the International Monetary Fund that portfolio investments, which includes debt flows, have not been associated with growth enhancements in the past (IMF, 2018). Perhaps, one distinguishing feature of our study was the assessment of the associated relationship at a disaggregated level of growth. It could be possible the fixed interest payments associated with debt capital makes it unattractive to seekers of funds and such funds come along with issues of insolvency and potential liquidation. The strong adverse relationship between debt flows, and growth supports earlier works by Nyango'ro (2017), Calderon and Nguyen (2015), Agbloyor (2014), Tchereniet al. (2013) and Fosu (1996) that debt flows dissuade economic growth in Sub Saharan Africa. Also employing our data, we assessed the degree of the negative effect of debt flows at the overall level of the real sector. Specifically, employing our data in model 1 of Table 3.7A, a one standard deviation surge in private debt (std. dev = 0.914; table 1) will result in decline growth of the real sector by approximately 0.051 percentages point [-0.056 X 0.914 = -0.051]. The magnitude of the decline is even stronger in the presence of financial development, wherein model 2, a one-standard-deviation increase in debt flows to Africa, will lead to a 0.061 percentage decline in growth of the real sector [-0.067 X 0.914 = -0.061]. Thus, our data shows that on the growth of Africa's real sector, the direct impact of private debt flows in deemed detrimental and thus interest in such flows should be minimal if not discouraged. Employing another indicator of financial development further confirms the adverse impact of debt flows at the overall real sector growth level, as we found a negative relationship between debt and private sector credit, though the effect was insignificant (see model 2C).

Table 3.7A: Real Sector Growth, Private Debt Flows and Financial development

Dep. Variable	RSG	RSG	RSG	RSG	RSG	MANVA	MANVA	MANVA	MANVA	INVA	INVA
	(1)	**(2A)**	**(2B)**	**(2C)**	**(2D)**	**(3A)**	**(3B)**	**(3C)**	**(3D)**	**(4A)**	**(4B)**
Private Debt Flow	-0.056**	-0.067***	-0.077***	-0.252	-0.205	-0.534*	-0.306	-0.218	-0.189***	-0.097**	-0.274***
	(0.024)	(0.012)	(0.028)	(0.390)	(0.222)	(0.038)	(0.257)	(0.138)	(0.064)	(0.019)	(0.072)
Financial Dev Index		1.694	-4.859***			-1.757	-3.212**			0.528	-3.266**
		(1.147)	(1.191)			(2.191)	(1.560)			(1.447)	(1.538)
Private Credit				0.225	0.512***			0.456*	0.494***		
				(0.149)	(0.102)			(0.232)	(0.177)		
Interaction Terms			0.060		0.002		1.047*		0.046***		0.880**
			(0.206)		(0.00)		(0.634)		(0.015)		(0.466)
GDP Growth	0.152***	0.145***	0.116***	0.128***	0.651***	0.071***	0.080***	0.057**	0.039	0.094***	0.155***
	(0.016)	(0.016)	(0.014)	(0.017)	(0.078)	(0.018)	(0.019)	(0.028)	(0.026)	(0.017)	(0.021)
Gov't Expenditure	-0.014	-0.026**	-0.025**	-0.257***	-0.136**	0.022	0.025	-0.017	-0.026	-0.023	0.188*
	(0.012)	(0.012)	(0.011)	(0.018)	(0.064)	(0.018)	(0.019)	(0.027)	(0.025)	(0.015)	(0.111)
Financial Openness	-0.184	-0.286	-0.136	-0.420**	-0.543***	-0.078	-0.081	-0.307**	-0.306**	0.047	0.016
	(0.165)	(0.190)	(0.102)	(0.202)	(0.208)	(0.354)	(0.106)	(0.130)	(0.122)	(0.262)	(0.109)
Domestic Savings	0.017***	0.012**	0.002	0.050	0.006	0.021**	0.025***	0.002	0.001	0.018**	0.163*
	(0.006)	(0.006)	(0.005)	(0.048)	(0.047)	(0.009)	(0.008)	(0.012)	(0.010)	(0.017)	(0.086)
Institutions	-0.261**	-0.334***	-0.368***	-0.303**	-0.090	-0.461***	-0.251**	-0.568***	-0.575***	-0.186*	-0.186
	(0.109)	(0.109)	(0.103)	(0.120)	(0.112)	(0.143)	(1.36)	(0.171)	(0.169)	(0.104)	(0.115)
Diagnostics:											
Observations	492	492	459	444	441	375	369	387	387	446	410
Kleibergeen-Paap rk	22.877	65.985	36.580	34.297	26.919	24.985	24.904	29.556	36.695	32.458	47.166
LM test [p – value]	[0.007]	[0.000]	[0.006]	[0.005]	[0.042]	[0.050]	[0.096]	[0.006]	[0.001]	[0.003]	[0.000]
Kleibergeen-Paap rk Wald F	130.110	47.861	23.015	4.60	28.975	4.565	6.577	4.349	6.662	6.413	17.347
OID (Hansen J) test;	10.935	12.463	13.796	21.313	21.565	8.092	16.135	14.127	16.197	22.637	23.890
[p-value]	[0.205]	[0.490]	[0.682]	[0.127]	[0.120]	[0.885]	[0.444]	[0.293]	[0.302]	[0.046]	[0.092]
Orthog – option:	4.199	7.699	8.171	18.961	9.092	3.260	9.620	9.172	10.207	15.292	5.555
(Hansen J) [p-value]	[0.380]	[0.463]	[0.612]	[0.015]	[0.523]	[0.917]	[0.474]	[0.328]	[0.423]	[0.054]	[0.851]
Exogeneity (C) test	6.737	4.764	5.625	2.352	12.473	4.832	6.515	4.956	5.990	7.345	18.335
[p-value]	[0.151]	[0.445]	[0.584]	[0.938]	[0.029]	[0.566]	[0.368]	[0.292]	[0.200]	[0.196]	[0.010]
F (Prob >F)	21.06	42.46	42.90	14.72	16.88	4.52	5.37	2.96	5.02	12.01	14.65
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.005]	[0.000]	[0.000]	[0.000]
F-Stat for Financial			16.73		29.46		5.31		16.09		6.58
Developm't [Prob>F]			[0.000]		[0.000]		[0.070]		[0.000]		[0.037]
F – Statistics for PNG			25.46		1.39		4.24		11.57		27.36
[Prob>F]			[0.000]		[0.499]		[0.120]		[0.003]		[0.000]

*NB: Standard errors are presented in parenthesis. Kleibergeen-Paap rk LM = Test of under identification; Kleibergeen-Paap rk Wald F = Test of weak identification; C – Statistics = Test of Exogeneity / orthogonality of suspect instruments; Hansen J = Test of over identifying restrictions. *, **, *** denotes significance levels at 1%, 5% and 10% respectively. Regarding the components of real sector, all models under B is an interaction of Private debt flows and the financial development while D is an interaction of Private debt flows and private sector credit. RSG is real sector growth index; MANVA is manufacturing value additions; INVA is industrial value additions.*

Table 3.7B: Real Sector Growth and Private Debt Flows

Dep. Variable	**INVA**	**INVA**	**AGVA**	**AGVA**	**AGVA**	**AGVA**	**SERVA**	**SERVA**	**SERVA**	**SERVA**
	(4C)	(4D)	(5A)	(5B)	(5C)	(5D)	(6A)	(6B)	(6C)	(6D)
Private Debt Flows	-0.096	0.106	0.002	0.114	0.053	-0.262	-0.001	-0.038	-0.293**	-0.109
	(0.101)	(0.095)	(0.010)	(0.095)	(0.067)	(0.213)	(0.007)	(0.025)	(0.037)	(0.116)
Financial Dev Index			-4.513***	0.882			-1.969**	-2.740**		
			(1.475)	(1.064)			(0.630)	(1.329)		
Private Credit	-0.370***	-0.126			0.037	-0.617***			0.817***	0.756***
	(0.142)	(0.112)			(0.089)	(0.162)			(0.123)	(0.117)
Interaction Terms		-0.173		-0.206		0.020**		0.298**		0.003
		(0.020)		(0.279)		(0.008)		(0.150)		(0.022)
GDP Growth	0.783***	0.650***	0.034**	0.481***	0.395***	0.336***	0.094***	0.112***	0.122***	0.119***
	(0.113)	(0.101)	(0.016)	(0.062)	(0.096)	(0.111)	(0.013)	(0.015)	(0.014)	(0.013)
Gov't Expenditure	0.045**	0.027	0.176	0.137**	0.141*	0.326***	0.034***	0.030**	-0.070***	-0.065***
	(0.020)	(0.111)	(0.122)	(0.069)	(0.072)	(0.100)	(0.009)	(0.012)	(0.017)	(0.016)
Financial Openness	-0.120	-0.178	0.658**	-0.730***	-0.660**	-0.231	0.488***	0.655***	-0.108	-0.120
	(0.107	(0.122)	(0.312)	(0.246)	(0.279)	(0.318)	(0.180)	(0.237)	(0.081)	(0.080)
Domestic Savings	0.221**	0.217**	0.105*	0.005	0.004	0.041	0.010**	0.022	-0.005	-0.005
	(0.085)	(0.096)	(0.0634)	(0.005)	(0.005)	(0.059)	(0.005)	(0.049)	(0.006)	(0.006)
Institutions	-0.098	-0.011	-0.127	-0.077	0.047	-0.111	-0.417***	-0.428***	-0.176*	-0.175*
	(0.120)	(0.126)	(0.126)	(0.105)	(0.125)	(0.126)	(0.076)	(0.097)	(0.099)	(0.098)
Diagnostics:										
Observations	416	416	388	473	474	358	467	429	484	484
Kleibergeen-Paap rk LM	33.884	26.517	52.965	55.250	23.326	53.534	23.133	34.620	34.527	37.853
test [p – value]	[0.001]	[0.047]	[0.000]	[0.000]	[0.016]	[0.000]	[0.058]	[0.010]	[0.001]	[0.001]
Kleibergeen-Paap rk Wald	6.022	6.527	44.793	25.768	12.923	12.859	89.408	4.268	6.044	5.620
F test										
OID (Hansen J) test; [p-	6.485	14.320	19.702	20.663	9.785	17.674	15.689	19.974	11.675	22.560
value]	[0.890]	[0.501]	[0.103]	[0.080]	[0.460]	[0.410]	[0.266]	[0.276]	[0.471]	[0.068]
Orthog – option: (Hansen	5.117	9.116	11.271	16.583	5.676	9.402	12.294	8.489	9.109	17.387
J) [p-value]	[0.745]	[0.521]	[0.187]	[0.084]	[0.684]	[0.494]	[0.139]	[0.581]	[0.333]	[0.066]
Exogeneity (C) test [p-	1.368	5.204	8.430	4080	4.110	8.272	3.394	11.485	2.566	5.173
value]	[0.850]	[0.392]	[0.134]	[0.253]	[0.128]	[0.309]	[0.639]	[0.119	[0.633]	[0.270]
F (Prob >F)	15.55	12.19	3.30	17.00	14.33	4.97	17.15	15.97	16.07	484
	[0.000]	[0.000]	[0.002]	[0.012]	[0.000]	[0.019]	[0.000]	[0.000]	[0.000]	[0.000]
F – Statistics for FD		2.34		1.24		14.87		5.88		43.76
[Prob>F]		[0.310]		[0.537]		[0.001]		[0.053]		[0.000]
F – Statistics for PNG		1.24		1.14		6.77		4.00		1.89
[Prob>F]		[0.539]		[0.485]		[0.034]		[0.135]		[0.389]

*NB: Standard errors are presented in parenthesis. Kleibergeen-Paap rk LM = Test of under identification; Kleibergeen-Paap rk Wald F = Test of weak identification; C – Statistics = Test of Exogeneity / orthogonality of suspect instruments; Hansen J = Test of over identifying restrictions. *, **, *** denotes significance levels at 1%, 5% and 10% respectively. Regarding the components of real sector, all models under B is an interaction of Private debt flows and the financial development while D is an interaction of Private debt flows and private sector credit. INVA is industrial value additions; AGVA is agriculture value additions; SERVA is service value additions.*

On decomposing the real sector, our results show that the initial adverse impact of debt flows is mainly related to growth in industry and manufacturing. We found that at a 5% significance level, a 1% increase in debt flows will daunt growth of industrial value additions by 0.097% (see model 4A) while at a 10% significance level, a 1% rise in debt flows will lead to a 0.534% fall in the growth of manufacturing value additions. We employed certain countries as part of the sample to ascertain the short-run effects of the negative association between debt flows and growths in industry and manufacturing value additions. Within our sample, the country with the most massive average inflow of PNG debt is Zambia (1.331), and the least is Niger (-0.422). Using the results from model 3A of Table 3.7A, an increase in the quantum of debt flows from the level of Niger to that of Zambia, all things being equal, means that growth in manufacturing value additions will fall by approximately 0.936 percentage points[28]. Concerning the effect on growth in industry value additions, an increase in debt flows from Niger to the level of Zambia will lead to a drop in industrial value additions by 0.17 percentage points. The effect of the drop is very significant as Africa tries to improve its lack of industrialization. It goes to suggest that, debt flows is not an option when it comes to the drive towards industrialization in Africa. Though we found a negative association between growth in services and debt flows, the relationship was insignificant just like that of growth in agriculture value additions. We found consistent results of either an adverse or insignificant effect of private debt flows on the various decompositions of the real sector in the presence of private sector credit. While our results show that private debt is detrimental to the growth of service sector value additions in the presence of private sector credit (see model 6C), debt flows does not affect growths in manufacturing, industrial and agriculture value additions (see model 3C, 4C, and 5C). The seemingly insignificant and

[28] In the short run, the effect of a change in PNG on manufacturing growth in given as (β x Δ). Where β is the coefficient of PNG and Δ is 1.753 (-0.422 – 1.331); from table 2.4, $\beta = 0.534$. Therefore, that short run change is (0.534 x 1.753) = 0.936.

adverse effect presents a challenging menace to the desire of players in these sectors on the search for external financing, mainly private debt flows, as these are known to dampen the growth of these sectors or at best have no direct growth impact.

We have shown that the presence of private debt flows undermines growth at the overall level of the real sector and its components, especially manufacturing and industrial growth. We ascertained if the initial adverse impact of debt flows on the growth of the real sector and its components could be mitigated and eliminated in the presence of strong financial institutions. Thus, will the advancement of Africa's financial sector reduce the adverse impact from private debt flows? Proxied by the financial development index, our initial estimations at the overall real sector found the coefficient of the interaction between private debt and financial development to be positive but insignificant (see model 2B). Therefore, our initial results suggest that advancement in financial development may not be an antidote to the adverse impact of private debt on the growth of the real sector in Africa. Thus, in as much as private debt flows on their own may not be advantageous to the overall growth of the real sector, the influx of these flows combined with a developed financial sector is still not adequate to overturn the adverse or insignificant impact into positive gains. Our results are further confirmed when deploying private sector credit in place of the financial development index, as we still found an insignificant coefficient of the interaction between private sector credit and real sector growth (see model 2D). Therefore, our assertion based on just the coefficient of the interactive term may suggest and disagree with earlier studies that have found financial development as a mitigating variable in the association between economic growth and capital flows. Studies such as Choong et al., (2010) and Durham (2004), all found the coefficient of the multiplicative term between debt flows and the financial development index to be significantly positive. However, our outcome tilt towards Agbloyor et al., (2014), who apart from stock market capitalization, found the multiplicative term between private debt flows and stock market turnover, bank credit and broad money to be insignificant. The robustness of our results is confirmed when we deployed private sector credit as a measure of financial development, where the coefficient of the interaction term was found to be positive but insignificant. The results of private sector credit are in line with that of Agbloyor et al. (2014) when they also found the coefficient of the interaction between private credit and debt flows in Africa to be positive but insignificant. Again, we give the caveat that our assessment is at a disaggregated level of growth. However, irrespective of whether growth is at an aggregate of disaggregate level, financial development may not be helpful in the association between debt flows and growth.

We further assessed the conditional effect of financial development at the various measures of the real sector to determine if the positive but insignificant coefficient of the interactive term at the overall real sector is the same across all sectors. At the decomposed level, we found mixed results regarding the coefficient of the interactive terms and the ability of debt flows to enhance the growth of these sectors, conditioned on financial development. The results at the overall levels seem to be primarily driven by growth in agriculture value additions as we found consistent results with that at the overall level. We found no significant relationship between growth in agriculture and debt flows conditioned on financial development, as the coefficient of the interaction term was negative and insignificant (see model 5B). However, the coefficient of the interactive terms regarding growth in manufacturing, industry and service value additions were found to be positive and significant at 5% significance for industry and services (see model 4B an 6B) and marginally at 10% significance level regarding manufacturing value additions (see model 3B). Therefore, we can conclude that in situations where countries found debt flows to be detrimental or uncorrelated with growth at a disaggregate level, the development of the financial sector could be an essential tool in reinforcing the growth benefits of capital flows, especially regarding growths in services and growth in manufacturing and industry. Again, our robust indicator of financial development shows consistency regarding the positive effect of the coefficient of the interaction term on growth in manufacturing. However, our analysis shows that private debt flows could spur the growth of the agriculture sector in the presence of private sector credit, while at the same time, the coefficient of the interaction terms for industrial and service sector growth shows no significant effects.

3.6.4.1 Test of joint significance and marginal effect analysis – Private Debt Flow

Consistent with the other measures of capital flows and the literature on the interpretation of estimates from interaction models, we ascertained the marginal effect and the significance of these effects at the 25th, 50th, 75th, and 90th, percentiles of the financial development index. As stated earlier, the direction of the coefficient of the interactive term presents limited information and should not be treated as one of the constitutive terms. We, therefore, carried out a threshold analysis between measures of private debt flows and financial development, both at the overall level of the real sector and its components. Given the initial relationship between indicators of real sector, growth and private debt flows were either negative or insignificant, the marginal effect was carried out to determine the point of levels of financial development at which the initial adverse and insignificant effects could be either eliminated or wholly eradicated. Table 3.8A displays the analysis of the marginal effect at the overall level and the various decompositions conditioned on the financial development index. At the overall, at 1% significance level, a 1% upsurge in the level of private debt flows will decrease growth at the overall level by 0.072%, 0.070%, 0.067% and 0.061% at the 25th, 50th, 75th and 90th percentiles of financial development respectively. The marginal effect shows a gradual fall in the decreasing rate in the adverse impact of private debt flows at increasing rates of financial development. However, the adverse impact persists even at the highest percentile.

Table 3.8A: Marginal Effects of Private Debt flows on real sector growth and its components conditioned on levels of financial development index

Fin Development index at	25th (0.084)	50th (0.110)	75th (0.171)	90th (0.270)	Source
Real sector growth index	-0.072*** (0.100)	-0.070*** (0.131)	-0.067*** (0.204)	-0.061*** (0.321)	Model 2B, Table 4.7A
Manufacturing sector growth	-0.218** (0.131)	-0.191** (0.172)	-0.127** (0.267)	-0.023** (0.421)	Model 3B, Table 4.7A
Industrial sector growth	-0.200** (0.129)	-0.177** (0.169)	-0.124** (0.263)	-0.036** (0.415)	Model 4B, Table 4.7A
Agriculture sector growth	0.097 (0.089)	0.091 (0.117)	0.079 (0.182)	0.058 (0.287)	Model 5B, Table 4.7B
Service sector growth	-0.013** (0.112)	-0.005** (0.146)	0.013** (0.227)	0.043** (0.359)	Model 6B, Table 4.7B

Our results at the overall level are further confirmed by private sector credit as the insignificant impact of debt flows on the growth of the sector could only be reduced at high levels of private credit, but the adverse impact could not be eliminated. From Table 3.8B, a 1% increase in debt will lead to a 0.201%, 0.2%, 0.199% and 0.197% fall in overall real sector growth at the 25^{th}, 50^{th}, 75^{th} and 90^{th} percentiles of private sector credit, at a 5% significance level. Thus, though financial development may be a useful variable in mitigating the adverse effect of debt flows on growth at the overall level of the real sector, financial development has not reached an appreciable level where it can completely overturn any adverse or insignificant effect into positive. At the decomposed level, the marginal effects show the same conclusion for growths in industry and manufacturing value additions, similar to that at the overall level (see Table 3.8A). Financial sector development may only reduce the negative effect of debt flows on the growth of these sectors but cannot wholly eradicate the adverse effect. From Table 3.8A, a 1% rise in the flow of private debt will lead to a

0.218%, 0.191%, 0.127% and 0.023% reduction in the growth of manufacturing value additions at the 25th 50th, 75th and 90th percentiles of the financial development index at a 5% significance level. Similarly, at 5% level of significance, a 1% increase in private debt flows leads to a 0.2%, 0.177%, 0.124% and 0.036% reduction in the growth of manufacturing value additions at the 25th 50th, 75th and 90th percentiles of the financial development index respectively.

Table 3.8B: Marginal Effects of private debt flows on real sector growth and its components at varied levels of private sector credit (log)

Private Sector Credit at	25th (1.888)	50th (2.288)	75th (3.061)	90th (3.845)	Source
Real sector growth index	-0.201**	-0.200***	-0.199***	-0.197***	Model 2D, Table
	(0.193)	(0.233)	(0.312)	(0.392)	4.7A
Manufacturing sector	-0.102***	-0.084***	-0.048***	-0.012***	Model 3D, Table
growth	(0.334)	(0.404)	(0.541)	(0.680)	4.7A
Industrial sector growth	-0.221	-0.290	-0.424	-0.559	Model 4D, Table
	(0.212)	(0.257)	(0.344)	(0.431)	4.7B
Agriculture sector growth	-0.224***	-0.216***	-0.201***	-0.185***	Model 5D, Table
	(0.307)	(0.372)	(0.497)	(0.625)	4.7B
Service sector growth	-0.103***	-0.102***	-0.099***	-0.097***	Model 6D, Table
	(0.220)	(0.267)	(0.357)	(0.449)	4.7B

The same applies to private sector credit, where there is increase in reducing the adverse impact of debt flows on all sectors (Table 3.8B). Concerning the agriculture sector, financial development had no mitigating effect even at the lowest percentile. For services, the insignificant relationship is only resolved and wholly eradicated at the 75th and 90th percentile of the financial development index, at 5% significance levels respectively. Perhaps these confirm the assertion that Africa's financial sector is still under-developed, and it is unable to perform its allocative function of channelling funds to productive sectors that need them, especially at a lower level of growth. Svirydzenka (2016) notes that Africa's financial market is underdeveloped relative to economies such as Russia and China. Issues of moral hazard, information asymmetry and perhaps nepotism may be at play in the advancement of debt capital to those that need it most. As noted by Honohan and Beck (2007) the slow growth of the financial sector could be because of macroeconomic instability, lack of regulatory independence, weak governance structures and the substantial informal nature of most economies.

3.7 Effect of controls – under financial development

We looked at the effect of our control variables. We did this with a focus on the impact of these controls at the overall level of the real sector, and then at the decomposed levels of the real sector. In all the regressions, we noticed that GDP growth has a significant impact on the overall growth of the real sector as we found a robust positive relationship under all regressions. The results emphasise the point that growth of the economy is a necessity for the combined growth of all other sectors. To the extent that the broader economy suffers, the adverse impact will likely affect all other sectors. However, an appreciating GDP growth will invariably influence positively on the growth of the combined real sector. At the decomposed level, we found that GDP growth mostly (10/12) has a significantly positive relationship with the growth of manufacturing value-added. However, the effect on industrial value additions was utterly positive and significant across all regressions. This gives an indication that growth of the broader economy is one essential ingredient for Africa's industrialization agenda. For growth in agriculture (10/12) and service value additions (12/12), again, the growth of GDP is essential as the impact was found to be positive and significant. We can thus confidently say that, on the growth of the real sector and its component, the direct impact of GDP growth cannot be neglected as we found a robust positive relationship under most regressions (59/63). At the overall level of the real sector growth, we found that government expenditure mostly (7/15) hampers growth. At the decomposed level, the most substantial impact of government expenditure was towards the services sector, as we found a strong and positive impact under most of the service sector regressions (10/12). Again, government expenditure seems to matter for the growth of agriculture value additions as we could strike a positive relationship in most (8/12) regressions. Regarding strides towards industrialization, government expenditure had a positive and significant impact on 50% and 33.3% of all regressions under industrial and manufacturing value additions, respectively. Thus, though government expenditure may seem to deter growth at the overall growth of the real sector, it has a robust positive impact mostly at the decomposed levels, especially regarding service and agriculture growth. The results may also imply that the government may use its expenditure to help growth specific sectors it deems fit. Financial openness enters the analysis as hurting growth at the overall growth of the real sector (5/15), as we found a significant negative relationship. The adverse impact of financial development is even more significant undergrowth in manufacturing (8/12) and marginally undergrowth in industrial value additions (3/12). Perhaps, the benefits of financial liberalization are yet to trickle down to these sectors. However, we also found financial liberalization to have a significant positive impact on agriculture (8/12) and service sector (4/12) growth under most regressions. These sectors are to benefit from different financial products and low cost of capital to finance their activities. Our analysis further shows that countries that have higher savings rate mostly grow quicker than countries with lower savings. Higher savings provide countries and firms with available funds for investment, which will lead to growth. At the overall level, domestic savings have a strong and positive impact on growth (10/15). At the decomposed level, domestic savings are relevant for the growth of all sectors, especially for manufacturing (6/12) and industrial growth (6/12) and marginally for growths in service (3/12) and agriculture (2/12) value additions. These sectors can, therefore, inject their savings to finance their growth. Lastly, we found that the quality of institutions proxied by bureaucracy hinders growth at the overall level of the real sector (8/15), services (9/12), and manufacturing value additions (4/12). As long as many countries in Africa continue to exhibit negative tendencies regarding the processing of documents, traumatic government changeovers associated with the change of policies and direction, growth at the disaggregated level stifles. The adverse thus support earlier empirics that institutions augment growth (Acemoglu, 2004).

3.8. Regression analysis on the real sector, capital flows and institutional quality

The next arm of our study was to determine if institutions can replace financial development in the capital flows-growth equation. Earlier empirics have suggested that one reason for the Lucas Puzzle, which is, why so little capital flow from the rich to the poor is due to weaknesses in institutional quality. Again, another reason why growing countries also seem to attract less capital is due to deficiencies in institutional quality (Alfaro et al., 2007). We, therefore, sought to determine if we could find answers to the above proclamations, especially by looking at the role of institutional quality in the association between capital flows and growth, however growth at a disaggregated level and also looking at the issue about Africa as a capital flow destination. We sought to ask three significant questions: Do all private capital flows hinder the growth of the real sector; Can institutional quality project the growth effects of private capital on the real sector, and what is the level at which the growth impact of capital flows conditioned on institutional quality achievable? We posed these questions concerning foreign direct investments, portfolio equity, and private debt flows.

3.8.1 The real sector, FDI and institutional quality

We began with a question that may already have been answered in the first part of this study. Nevertheless, it was relevant to ask it again. We posed the question as to whether FDI stampedes Africa's real sector growth in the presence of other determinants of growth. In order to critically evaluate such assessment, we specified equation (3.1), we ascertain the impact of (FDI) on real sector growth after controlling for other determinants of growth that includes institutional quality. We employed controls that were different from those deployed in the financial development analysis, which includes growth rate of inflation, government expenditure, trade openness, GDP per capita and financial development proxied by the private sector credit. The results of our analysis are in Table 3.9.

In line with our earlier results, foreign direct investment has no statistical significance on growth at the overall level of Africa's real sector. The magnitude of the results is very significant as we sought to employ different control variables to act as enabling environments but still arrived at the same conclusion (model 1). Perhaps earlier studies that have confirmed the growth ability of FDI may have lost sight of its impact beyond the aggregate level. The insignificant adverse impact of FDI on the growth of the overall real sector persists even after controlling for institutional quality (model 2). Thus, one can conveniently allude that at lower disaggregation of growth, we find little evidence to support the widespread assertion that FDI leads to growth. However, our conclusion of no association also corroborates earlier empirics that have also found that FDI does not affect either economic growth or total factor productivity (Carkovic and Levine, 2002; Konings, 2001). It is worthy to note that the direct impact of institutional quality was found to be positive and significant at 1% significant level (model 2). From our analysis, a one-unit increase in the level of institutional effectiveness will lead to 2.84 units in the growth of the real sector. The positive association confirms the previous assertion on the role of quality institutions on economic growth. At the lower level of growth, we are of the view that strong institutions will aid in the fair distribution and allocation of scarce resources. It is when there are strong institutions that local firms can compete fairly with multinationals. Strong institutions will ensure that growth trickles down to those at the end of the growth ladder. Strong institutions are the bedrock for economic growth and transformation.

Table 3.9: Real Sector Growth, foreign direct investment, and institutional quality

Dep. Variable	**RSG**	**RSG**	**RSG**	**MANVA**	**MANVA**	**INVA**	**INVA**	**AGVA**	**AGVA**	**SERVA**	**SERVA**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
FDI	-0.026	-0.353	0.048	-0.106	-0.287**	-0.093**	0.618	-0.423***	-0.525***	0.081**	1.145*
	(0.685)	(0.389)	(0.730)	(0.216)	(0.132)	(0.036)	(1.207)	(0.092)	(0.082)	(0.039)	(0.658)
Institutional Qua Index		2.846***	2.745*	0.380	0.231*	0.250*	1.875	0.164*	0.396***	-0.008	1.388***
		(0.995)	(1.467)	(0.389)	(0.138)	(0.144)	(1.167)	(0.086)	(0.138)	(0.079)	(0.500)
Interaction Terms			0.949*		0.059**		-0.203		0.023***		-0.272*
			(0.488)		(0.028)		(0.247)		(0.005)		(0.150)
GDP Per Cap	0.206***	0.209***	0.278***	0.067***	0.004	0.004**	0.047***	0.002	0.003*	0.004*	0.053***
	(0.049)	(0.047)	(0.079)	(0.014)	(0.003)	(0.002)	(0.012)	(0.002)	(0.002)	(0.002)	(0.018)
Gov't Expenditure	-0.439	-0.857***	-0.409	-0.040	0.029	-0.022	-0.028	0.037*	0.039*	0.061***	0.054
	(0.315)	(0.319)	(0.402)	(0.123)	(0.023)	(0.021)	(0.150)	(0.021)	(0.022)	(0.014)	(0.095)
Trade Openness	0.226**	0.166**	0.041	0.072**	0.011**	0.007	0.102**	0.011**	0.005	0.004	0.073**
	(0.089)	(0.083)	(0.102)	(0.029)	(0.005)	(0.008)	(0.050)	(0.005)	(0.005)	(0.006)	(0.029)
Inflation	-0.060**	-0.083***	0.139***	-0.001	0.006	-0.003**	-0.021**	-0.001	0.0001	-0.004***	-0.014**
	(0.029)	(0.025)	(0.041)	(0.009)	(0.002)	(0.001)	(0.008)	(0.003)	(0.002)	(0.001)	(0.006)
Private Sector Credit	-0.047	-0.110	-0.057	-0.051*	-0.007	0.002	-0.123**	0.004	0.007	0.007	-0.026
	(0.110)	(0.088)	(0.219)	(0.025)	(0.007)	(0.009)	(0.048)	(0.010)	(0.010)	(0.007)	(0.030)
Diagnostics:											
Observations	593	593	536	511	407	424	407	409	365	454	504
Kleibergeen-Paap rk LM	18.773	40.691	43.104	38.960	41.814	33.416	29.664	35.407	29.920	25.511	28.312
test [p – value]	[0.043]	[0.002]	[0.002]	[0.003]	[0.003]	[0.010]	[0.020]	[0.002]	[0.038]	[0.084]	[0.078]
Kleibergeen-Paap rk Wald F test	6.641	6.191	8.462	5.702	5.043	6.062	5.264	4.572	5.267	5.631	4.194
OID (Hansen J) test;	8.073	19.662	15.491	13.970	22.013	18.314	13.646	20.449	16.267	12.447	23.411
[p-value]	[0.527]	[0.292]	[0.691]	[0.669]	[0.2836]	[0.306]	[0.553]	[0.117]	[0.505]	[0.713]	[0.175]
Orthog – option:(Hansen	1.581	5.062	8.253	5.587	11.369	3.987	6.967	14.538	10.100	4.228	11.210
J) [p-value]	[0.812]	[0.751]	[0.604]	[0.693]	[0.330]	[0.858]	[0.729]	[0.069]	[0.432]	[0.836]	[0.341]
Exogeneity (C) test	6.492	14.600	7.238	8.383	10.643	14.328	6.680	5.911	6.167	8.220	12.201
[p-value]	[0.261]	[0.103]	[0.612]	[0.496]	[0.301]	[0.074]	[0.246]	[0.433]	[0.520]	[0.412]	[0.142]
F (Prob >F)	6.000	8.57	2.52	8.03	3.30	2.52	7.07	8.43	17.73	12.65	3.83
	[0.000]	[0.000]	[0.011]	[0.000]	[0.001]	[0.015]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
F – Statistics for INST			5.20		15.23		2.69		26.36		7.89
[Prob>F]			[0.074]		[0.001]		[0.260]		[0.000]		[0.019]
F – Statistics for FDI			3.81		4.95		4.76		41.97		3.63
[Prob>F]			[0.149]		[0.084]		[0.093]		[0.006]		[0.163]

*Note: Standard errors are presented in parenthesis. Kleibergeen-Paap rk LM = Test of under identification; Kleibergeen-Paap rk Wald F = Test of weak identification; C – Statistics = Test of Exogeneity / orthogonality of suspect instruments; Hansen J = Test of over identifying restrictions. *, **, *** denotes significance levels at 1%, 5% and 10% respectively. Models 3, 5, 7, 9 and 11are interactions of FDI and institutional quality index. RSG is real sector growth index; MANVA is manufacturing value additions; INVA is industrial value additions; AGVA is agriculture value additions; SERVA is service value additions.*

Though our study focused on growth at the disaggregated level, it supports the earlier conclusion of Aisen and Veiga (2013) that increasing political stability expands a country's gross domestic product. Compton et al. (2011) also note that though the components of economic freedom affect economic on different levels, the overall impact is a positive association between institutional quality and growth. The findings also corroborate the recent views of Iheonu et al. (2017) that institutional quality unequivocally promotes the economic growth of 12 West African countries. We illustrate the relevance of our results with our data. Our results show that a standard deviation (std. dev = 0.868, Table 1) increase in Africa's institutional environment will invariably grow the real sector by approximately 2.47percentagees points [(coefficient of institutions * std. dev) = (2.846 * 0.868 = 2.470)]. More illustratively, we picked two countries with varied levels of institutional quality from our data – one with the highest level of institutional quality (Botswana – 0.701) and one with the least level of institutional quality over the study period (Congo DR – 0.340)[29]. Now should Congo DR strive to attain the level of institutional quality currently in Botswana, the overall real sector of Congo will go by approximately 1.027 percentages[30]. Thus, it beholds on African leaders to strive for institutional excellence since, it is likely to help transform the real sector, where social gains ultimately reside. Scott (2008) notes that charitable institutions provide a framework for social order by reducing uncertainty. Elgin and Oztunali (2014) note that without the right level of institutional quality, the growth of any economy is insufficient in reducing the size of the informal sector.

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[29] According the ICRG, the highest value a country can obtain from the indicators of institutional quality we employed is 40. We however, normalized the average indicators over the period for each country to lie between 1 and 0. Where 1 indicates higher institutional quality and 0 denotes poor institutional quality.

[30] The short run increase in growth is given by multiplying the coefficient of institutional quality from model 2, Table 4.9A by the changes in levels of institutional quality [2.846 * (0.701-0.340) = 1.027]

We further assessed the direct association between FDI and institutions on the growth of each component of the real sector. Within the enabling environment of GDP per capita, inflation growth, government expenditure and credit to the private sector, we did not find any evidence of any direct association between either FDI or institutional quality on growth in manufacturing value additions (see model 4). The insignificant relationship between FDI and growth on manufacturing value additions and the same at the overall growth of the real sector may not be surprising given the high bivariate correlation between the two. Further analysis shows that while FDI deters growths in both industrial and agriculture value additions at 5% and 1% significance levels, institutions directly enhance growth of these sectors slightly at 10% significance levels. Whiles FDI may be directly detrimental to the growth of these sectors; institutions directly boost the growth of these sectors (see models 6 and 8). The positive impact of institutions at the overall real sector and growths in industrial and agriculture sectors supports those conclusions by Carraro and Karfakis (2018) on the relevance of institutions in the allocation of resources across sectors in Africa. Thus, issues such as the rule of law, government effectiveness, and sound institutional framework matter for growth at the lower level. The adverse effect of FDI on the agriculture sectors is much greater than on industrial growth, as a unit rise in FDI will lead to a 0.42 units dip in agriculture growth and 0.09 units dip in industrial growth. It goes to suggest that even when one controls for the right level of institutions, FDI on its own accord cannot promote the growth of these two sectors and may be damaging to any initial growth these sectors may have chalked. Lastly, we found evidence of a direct positive association between FDI and growth of service value additions, suggesting that firms in the services sector can grow if such firms can attract the needed FDI. At a 5% significance level, a unit rise in service related FDI will develop the sector by approximately 0.08 units. We did not find any significant evidence that institutions alone can lead to service sector growth (see model 10). Overall, the positive association between FDI and service sector value additions and the subsequent opposing and insignificant effect of FDI on the growth of the other sectors affirms the current trend in the dynamics of FDI flows, both globally and in Africa. Accordingly, there seems to be a rise in service related FDI than manufacturing and primary sector FDIs. While services FDI increased by approximately 14% on an annual basis between 1989 and 2008, the manufacturing share also dropped by 17% within the same period. By the end of 2012, services related FDI to Africa had grown by four-folds from its 2001 value (UNTAD, 2016; 2011).

We have established that capital flows, and for that matter, FDI alone cannot engineer economic growth, which has been supported by the results but at the same time, we have shown that institutions can boost growth at the overall growth level (models 1 and 2). Armed with the notion, we tested the proposition that with a well-functioning institutional environment, foreign direct investment will be able to inspire economic growth at the overall level of Africa's real sector. Thus, conditioned on the right level of institutional quality, the initial adverse and insignificant impact of foreign direct investment could be transformed into positive effects. We tested this assertion by estimating equation 3.7, where our interest was in the coefficient of the interaction between institutions and FDI, in this case, β_8. This was so because, according to Brambor et al., (2006), the only variable of interest in an interaction model is neither of the coefficients of the constitutive terms making up the interactive term, but just the coefficient of the interactive terms. From model 3, we found evidence that charitable institutions combined with FDI can lead to growth, as the coefficient of the interaction between FDI and institutions was positive and significant slightly at 10% significance level. Therefore, we can say that at the overall level of the real sector, charitable institutions can help stir growth through the attraction of foreign direct investments. Given the right level of institutional quality, the initial insignificant impact of FDI on growth may be reduced or wholly overturned into positive effects. To drum home the relevance of our results, we tested the above assertion with our sample. We went back to our initial analysis of the institutional gap between Botswana (0.701) and Congo DR (0.340). We tested the marginal impact of FDI on growth conditioned on the level of institutions in Congo DR assuming there was a one standard deviation increase in the flow of FDI to Congo DR. In this case, FDI will grow the real sector by approximately 1.707 percentage points respectively[31]. All things being equal, assuming the institutional environment in Congo DR improves to the current level attained by Botswana, then a standard deviation increase in the flow of FDI will grow Congo DR real sector by approximately 3.285 percentages points. From the above estimation, Congo DR will experience almost double growth rates (92.44%) per under the expected level of institutional quality. Thus in the attraction of FDI into Africa, issues surrounding the rule of law, ease of government changeovers, repatriation of profits by multinationals, sound judicial services, reduction in perceived corruption, reduced ethnic and religious tensions, stable macroeconomic environment, and low crime rates are all essential to a host country's desire for growth at the lower level.

We further evaluated the effect of FDI on each sector conditioned on institutional effectiveness. Such analysis enabled us to examine in detail the sectors driving the overall growth and those lacking behind or indifferent to these conditions. Having earlier established that neither FDI nor institutions had any direct impact on manufacturing growth, we found the effect of FDI conditioned on institutional quality to be positive and significant at a 5% significance level (see model 5). On the face level, the results are encouraging, given the recent drop in manufacturing related FDI (UNCTAD, 2011). Thus, countries interested in attracting FDI into the manufacturing sector must first show a strong commitment to

[31] We estimate this with equation 4.9 $[(\beta_6 + \beta_8 INST) x Std.dev\ of\ FDI] = [(0.048 + 0.949\ x\ 0.340) x 4.606]$

strengthening their institutional environment. Such a commitment will invariably lead to the growth of the sector through the attraction of FDI. Concerning growth in agriculture, we found evidence of a positive association between the interaction term and growth in agriculture (see model 9), just like at the overall level of the real sector. Thus, with the right level of institutional effectiveness, FDI can boost the growth of the agriculture value additions. Although we initially found FDI to be directly detrimental to growth whiles institutions positively impacted growth, a combination of the two leads to a positive effect. We can deduce that the positive impact of institutions is strong enough to overturn the adverse impact of FDI on the sector. An essential note is that institutional quality has both direct and indirect positive effect on the growth of the agriculture sector. If governments are stable, there is press, and constitutional freedom, the right level of institutions can boost the growth benefits of FDI on the agriculture sector or reduce the initial adverse impact of FDI on the sector, if not eliminate it. The results on the growth of service value additions are intriguing and fascinating as we found the combined effect of FDI and institutions to very significant at a marginal rate of 10% but adversely related to the growth of the sector (see model 11). The results suggest that in this sector, the growth benefits of FDI will reduce as the level of institutional quality advances. Though fascinating, the results could be due to the fact we had earlier established that institutions on their own have no direct impact on the growth of the sector (see model 10), and the trend seems to continue even when combined with FDI. One plausible explanation may be that FDI into Africa had previously been concentrated in the manufacturing, primary, and extractive sectors, with little to the service sector. Thus, most laws regarding profit repatriation, investor freedom, free pressing, and all the institutional governance frameworks may have been written with these sectors in mind. With the gradual increase in service sector related FDI; governments may realize the need to adjust their institutional quality environment so that the full benefits of FDI to the service sector are realized. Finally, we found no supporting evidence that institutions, together with FDI, promote the growth of industrial value additions.

3.8.1.1 Test of joint significance and marginal effect analysis – FDI

Armed with the information that the coefficient of interaction terms contained little information about the effect of a conditional variable on a dependent variable, it was essential to perform a marginal test analysis. As contended by Brambor et al., (2006), it could be possible that the marginal effect of an independent variable will be significant at certain levels of the conditional variable, even when the coefficient of the interaction term is insignificant. It thus implies that conclusions based just on the coefficient of the interaction terms may be flawed as one assumes that the simple significance or otherwise of the coefficient on interactive term means there is an effect or no effect. Another equally important test is the joint significance test, which also tests whether the joint association between the conditional variable on the one hand and the interactive terms, on the other hand, have any association.

Table 3.10: Marginal Effects of FDI on real sector growth and its components at varied levels of institutional quality

Inst. Quality index at	25th (3.768)	50th (4.366)	75th (4.850)	90th (5.40)	Source
Real sector growth index	3.624** (5.526)	4.191** (6.404)	4.651** (7.113)	5.173** (7.919)	Model 3, Table 4.9
Manufacturing sector growth	-0.065* (0.522)	-0.029* (0.604)	-0.0009* (0.671)	0.032* (0.748)	Model 5, Table 4.9
Industrial sector growth	-0.147 (4.396)	-0.268 (5.094)	-0.367 (5.658)	-0.478 (6.300)	Model 7, Table 4.9
Agriculture sector growth	-0.438*** (0.522)	-0.425*** (0.604)	-0.413*** (0.671)	-0.401*** (0.747)	Model 9, Table 4.9

Service sector growth	0.120*** (1.183)	-0.043*** (2.182)	-0.174*** (2.424)	-0.324*** (2.670)	Model 11, Table 4.9

We evaluated the marginal effect by the application of equation 3.9, where we ascertained the threshold values of institutional quality at which the effect of FDI on the growth of the overall real sector and its components will be at least zero. We evaluated various percentile values on the institutional quality index that is at the 25th, 50th, 75th, and 90th percentiles, which we illustrate in Table 3.10. At the overall growth of the real sector, at a 5% significance level, a unit increase in foreign direct investment will grow the real sector by 3.624 units, 4.191 units, 4.651 units, and 5.173 units at the 25th, 50th, 75th, and 90th percentiles of institutional quality respectively. Thus, although FDI initially had no growth effects at the overall level of the real sector, it suggests that increases in institutional quality also increases the growth impact of FDI at the overall real sector. Therefore, countries eager to attract more FDI must first improve their institutional environment, as this is pre-requisite to enjoy the gains of FDI, especially at the overall level of the real sector. At the decomposed level, the marginal analysis relating to manufacturing shows that increasing the level of institutional quality enhances the growth benefit from FDI, by reducing any initial adverse or insignificant impact of FDI, up to the 90th percentile of institutions where the adverse effect is wholly overturned into positive effects. At 10% significance level, a unit increase in FDI will reduce manufacturing growth by 0.065, 0.029, and 0.0009 units at the 25th, 50th, and 75th percentiles respectively. However, at the 90th percentile of institutions, a unit increase in the flows of FDI leads to a 0.032 unit's growth in manufacturing.

Regarding growth in agriculture, we noticed that as the levels of institutional quality increases, the initial adverse effect of FDI on the sector decreases. A unit increase in FDI would reduce the adverse impact by 0.438 units, 0.425 units, 0.413 units, and 0.401units at the 25^{th}, 50^{th}, $75^{th,}$ and 90^{th} percentiles of the institutional quality index respectively, at a 1% significant level. Even though, institutions play a vital role in the association between FDI and growth of agriculture value additions, the current level of institutions in Africa can only reduce any negative impact on the sector, but cannot eradicate it. Our results show that the adverse impact persists at the 90^{th} percentile of institutions. On service sector growth, our analysis shows that the growth impact of FDI conditioned on institutions is only positive up to the 25^{th} percentile, where a unit increase in FDI will grow the service sector by 0.120 units at a 1% significant level. However, beyond the 25^{th} percentile threshold, increases in FDI conditioned on increases in institutional quality lead to gradual drops in the growth of the sector. Increasing FDI at the 50^{th}, 75^{th} and 90^{th} percentiles of institutions will lead to 0.043 units, 0.174 units and 0.324 units fall in the growth of services at a 1% significant level respectively. It is not a case of a general assumption that institutions matter or does not matter for the growth impact of FDI on the real sector, but a case of what is the optimal point at which institutions matter.

3.8.2 The real sector, portfolio equity, and institutional quality

We turn our minds to the impact of portfolio equity on real sector growth and components, bearing in mind the relevance of the institutional environment. Unlike FDI, only a hand-full of studies have sought to assess the conditional effect of institutions in the association between portfolio flows and growth, even at the aggregated level of growth (Durham, 2004). Foreign portfolio investment, which comprises of the buying and selling of equity and bonds listed on both local and international stock markets are known for their volatile nature and short-term stay. This feature may have shifted the attention of capital seekers from portfolio investments to the more stable FDI, especially in the wake of the global financial crisis. However, portfolio investments will be of enormous benefits to the growth and development of the real sector. As a form of finance, portfolio investments can be deployed in various ways, as it is neither firm nor sector-specific. Given the potential loss of control that comes with FDI and the subsequent issue of being sector focus, local firms are likely to seed production to their foreign counterparts. Thus, in the development of local firms and specific sectors, FDI may not be the best option. Portfolio investments (debt and equity) provide feedback on private wealth and absorption through the issuance of equity and debt instruments. Another essential benefit from portfolio investments is the development of strong corporate governance and institutions.

From Table 3.11, we assessed the direct impact of equity flows on the growth of the real sector and the subsequent effect conditioned on the level of institutional quality. On the direct impact, we found no effect that equity flows either enhances growth or retards growth when we controlled for other determinants of growth that excludes institutional quality. The impact was negative but remained insignificant when we controlled for institutional quality (see models 1 and 2). Although our assessment was a disaggregated level of growth, the insignificant equity-growth relationship supports the conclusions of Durham (2004) that lagged equity flows has no impact on growth. It also supports the view of Agbloryor et al., (2012) that although the equity flows may be detrimental to growth, the effect is at times insignificant. One plausible reason for no relationship could be that equity investors are much concerned with aggregate growth than disaggregated growth when making equity investment decisions. From model 2, we found institutions to have a direct positive impact on the growth of the overall real sector. Model 3 shows that when countries have the right level of institutions, they can always benefit from the influx of portfolio equity, as we found the interaction term between portfolio equity and institutional quality to be positive and significant at 5% significant level. From model 3, one can extrapolate that the impact of equity flows at the overall level of the real sector depends on the assumption that strong institutions sustain real sector growth. Based on the above assumption, equity investors are confident that it is when institutions are active that their financial interest will be projected. For instance, Lemmon and Lins (2003) assert that in the absence of robust corporate governance mechanisms, it is much easier for corporate insiders to exploit minority shareholders most especially in periods of financial austerity.

Table 3.11: Real Sector Growth, portfolio equity and institutional quality

Dep. Variable	**RSG**	**RSG**	**RSG**	**MANVA**	**MANVA**	**INVA**	**INVA**	**AGVA**	**AGVA**	**SERVA**	**SERVA**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
Portfolio Equity	1.664	-2.011	-1.241	-0.435	-0.476*	-0.658	-0.219	-1.058	-0.826	-0.123	-0.580***
Flows	(2.334)	(1.367)	(0.884)	(0.418)	(0.274)	(0.576)	(0.612)	(1.461)	(1.056)	(0.322)	(0.192)
Institutional Qua		1.401**	0.346	1.123*	1.320***	-0.414	-0.199	1.527*	1.337	0.746*	0.330*
Index		(0.623)	(0.430)	(0.583)	(0.444)	(0.560)	(0.638)	(0.867)	(0.816)	(0.424)	(0.193)
Interaction Terms			1.238**		0.282		-0.742		0.747		0.243*
			(0.488)		(0.331)		(0.902')		(1.527)		(0.146)
GDP Per Cap	0.204***	0.683***	0.645**	0.585**	0.727***	1.144***	1.103***	1.408***	1.525***	0.466***	0.035
	(0.025)	(0.256)	(0.250)	(0.237)	(0.235)	(0229)	(0.222)	(0.318)	(0.332)	(0.122)	(0.067)
Gov't Expenditure	-0.143	-0.271	-0.166	-0.297*	-0.358**	0.024	0.029	-0.171	-0.105	-018	-0.165**
	(0.291)	(0.284)	(0.236)	(0.160)	(0.150)	(0.156)	(0.152)	(0.225)	(0.224)	(0.101)	(0.080)
Trade Openness	0.225***	0.137***	0.187***	0.090**	0.081**	0.052	0.040	-0.115**	-0.107**	0.051*	0.044**
	(0.050)	(0.047)	(0.039)	(0.037)	(0.035)	(0.044)	(0.046)	(0.054)	(0.052)	(0.029)	(0.021)
Inflation	-0.240***	-0.216***	-0.125*	-0.164**	-0.124	-0.125***	-0.122***	0.089*	0.110**	-0.009	-0.029
	(0.090)	(0.083)	(0.074)	(0.067)	(0.063)	(0.041)	(0.042)	(0.052)	(0.050)	(0.035)	(0.031)
Private Sector Credit	-0.010	-0.19*	-0.120**	0.001	-0.009	-0.093**	-0.078*	0.132	0.196**	0.006	-0.041**
	(0.067)	(0.062)	(0.057)	(0.038)	(0.032)	(0.042)	(0.040)	(0.099)	(0.098)	(0.028)	(0.017)
Diagnostics:											
Observations	457	425	597	369	369	430	430	422	396	381	444
Kleibergeen-Paap rk	21.322	25.213	32.270	26.252	28.180	21.989	26.254	25.809	33.728	31.120	32.354
LM test [p -value]	[0.006]	[0.047]	[0.004]	[0.036]	[0.043]	[0.079]	[0.051]	[0.040]	[0.009]	[0.013]	[0.006]
Kleibergeen-Paap rk	4.903	4.678	28.668	4.561	9.614	3.653	4.810	4.613	4.346	3.819	44.817
Wald F test											
OID (Hansen J) test;	9.443	13.243	20.063	18.768	19.340	12.075	12.337	16.317	15.813	12.508	16.441
[p-value]	[0.222]	[0.508]	[0.094]	[0.174]	[0.251]	[0.522]	[0.653]	[0.294]	[0.466]	[0.640]	[0.287]
Orthog option:	1.587	8.822	15.111	7.242	8.052	5.417	7.762	4.860	10.377	7.262	10.429
(Hansen J) [p-value	[0.811]	[0.358]	[0.128]	[0.511]	[0.624]	[0.712]	[0.652]	[0.772]	[0.408]	[0.509]	[0.408]
Exogeneity (C) test	7.856	4.420	4.952	11.526	11.287	6.658	4.574	11.457	5.436	5.246	6.012
[p-value]	[0.050]	[0.620]	[0.175]	[0.073]	[0.080]	[0.247]	[0.470]	[0.075]	[0.489]	[0.630]	[0.198]
F (Prob >F)	22.05	5.62	5.86	4.56	6.06	6.76	5.26	4.99	5.49	4.69	3.75
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
F – Statistics for			4.64		8.86		1.38		3.00		9.09
INST [Prob>F]			[0.098]		[0.012]		[0.503]		[0.224]		[0.011]
F – Statistics for PEF			4.59		3.07		1.18		1.00		9.09
[Prob>F]			[0.101]		[0.216]		[0.554]		[0.709]		[0.011]

*Note: Standard errors are presented in parenthesis. Kleibergeen-Paap rk LM = Test of under identification; Kleibergeen-Paap rk Wald F = Test of weak identification; C – Statistics = Test of Exogeneity / orthogonality of suspect instruments; Hansen J = Test of over identifying restrictions. *, **, *** denotes significance levels at 1%, 5% and 10% respectively. Models 3, 5, 7, 9 and 11are interactions of Portfolio equity flows and institutional quality index. RSG is real sector growth index; MANVA is manufacturing value additions; INVA is industrial value additions; AGVA is agriculture value additions; SERVA is service value additions.*

Using equation 3.9 and with our data, countries obtain at least the mean value of institutional effectiveness with growth by approximately 4.096 units for every one unit increase in portfolio equity flows. If Congo DR, the country with the lowest institutional quality attains the mean level of institutional quality, its real sector will grow by 0.729 units for every increase in the flow of portfolio equity. The increase will be more profound if there is an increase in the current level of institutional quality in Congo DR to that of Botswana. In that case, the overall real sector of Congo DR will grow by approximately 2.337 units for every unit increase in the flow of portfolio equity[32].

At the decomposed level of the real sector, we found that on the direct linkages, equity flows are detrimental to growths in all the individual components but insignificant (see models 4, 6, 8 and 10). Consistent with the tag that equity flows are very volatile, we believe these same characteristics is being exhibited and even more profound at a lower level of growth. Perhaps equity investors are more sceptical about the growth prospects of these sectors in Africa. For instance, manufacturing and industrial sectors continue to suffer since most countries on the continent are import driven. This phenomenon is likely to dwarf the growth of these sectors, making them unattractive to potential investors, especially equity investors. However, these sectors can support growth from the direct effect of strong institutions. Just like at the overall real sector level, we found evidence that strong institutions have a direct positive impact on growths in manufacturing, agriculture and services value additions at 10% significance level (see model 4, 8 and 10). On the conditional effect of institutional quality, we found that except the services sector where we found the coefficient of the interaction to be positive and

[32] Using the non-normalized average values of institutional quality, the average for Botswana is 5.61 while that of Congo DR is 2.72. Using equation 4.9, the effect is calculated as $[(\beta_6 + \beta_8 INST) x \Delta\, INST] = [(0.048 + 0.949\, x\, 0.340) x (5.61 - 2.72]$.

significant (see model 11), there was no significant relationship regarding all sectors at face value.

With the right level of institutional quality, perhaps equity providers have realized Africa's rising services sector and are much convinced about the prospects of the sector, therefore willing to commit funds. Again, given the volatile nature equity capital has, the services sector provides an avenue where capital providers can make quick returns as the sector requires less of physical capital to start in terms of buildings and other massive infrastructure. Though small relative to other sectors, the services sector in Africa is growing at a rapid space and accounts for over half of gross domestic product in most countries on the continent. Another critical point is that perhaps the institutions are better promoted at the overall level than sector-specific regulations. Investors might appreciate efforts that drive the entire sector than individual sectors.

3.8.2.1 Test of joint significance and marginal effect analysis – Portfolio equity

For a clearer perspective on the effect the equity flows will have depending on the levels of institutional quality, we performed a marginal effect analysis. From the joint significance test, we have established that indeed, institutions matter in the association between equity flows and growth at the overall level of the real sector, manufacturing and services (see Table 3.11). However, the marginal effect will tell us the threshold at which institutions do matter for the impact of equity flows on growth. From Table 3.12, we found that increasing levels of institutional quality leads to increased growth at the overall level of the real sector from increasing portfolio flows. At a 1% significance level, a unit increase in portfolio equity will grow the real sector by 3.424 units, then increase to 4.164 units and further to 4.763 and 5.444 units at the 25^{th}, 50^{th}, 75^{th} and 90^{th} percentiles of institutional quality respectively.

Table 3.12: Marginal Effects of portfolio equity on real sector growth and its components at varied levels of institutional quality

Inst. Quality index at	25^{th} (3.768)	50^{th} (4.366)	75^{th} (4.850)	90^{th} (5.40)	Source
Real sector growth index	3.424***	4.164***	4.763***	5.444***	Model 3, Table
	(2.054)	(2.388)	(2.660)	(2.970)	4.11
Manufacturing sector	0.587***	0.755***	0.892***	1.047***	Model 5, Table
growth	(1.674)	(1.939)	(2.154)	(2.399)	4.11
Industrial sector growth	-2.909	-3.336	-3.682	-4.075	Model 7, Table
	(2.403)	(2.785)	(3.094)	(3.444)	4.11
Agriculture sector growth	1.989	2.435	2.797	3.209	Model 9, Table
	(3.121)	(3.616)	(4.017)	(0.747)	4.11
Service sector growth	0.336*	0.481*	0.599*	0.732*	Model 11, Table
	(0.728)	(0.843)	(0.936)	(1.043)	4.11

Thus, an instant adjustment to the level of institutions leads to an immediate rise in growth from portfolio equity. Increasing institutional quality ensures that equity flows are allocated effectively to enhance the growth of the real sector. To the extent that there are weaknesses in institutional quality, increases in equity flows may be misallocated, especially at the lower level of growth. At the individual level, although the interaction effect on the growth of manufacturing appeared to be positive but insignificant, the marginal analysis shows that institutions do matter for the impact of equity flows on manufacturing sector growth. At a 1% significance level, a unit increase in the quantum of portfolio equity will lead to 0.587, 0.755, 0.892- and 1.047-units' growth in manufacturing sector growth at the 25^{th}, 50^{th}, 75^{th} and 90^{th} percentiles of institutional quality respectively. Likewise, a unit upsurge in portfolio equity will grow the services sector by 0.336, 0.481, 0.599, and 732 units at the 25^{th}, 50^{th}, $75^{th,}$ and 90^{th} percentiles of institutional quality respectively. The marginal analysis in Table 3.12 further confirms the insignificant impact of equity flows on industrial and agriculture sector growth as we found the marginal effect to be insignificant at the 25^{th}, 50^{th}, 75^{th} and 90^{th} percentiles of institutional quality.

3.8.3 The real sector, private debt, and institutional quality

"The sharp fall in global FDI contrasted with the trend in other cross-border capital flows. Total capital flows increased from 5.6 to 6.9 percent of global GDP, as bank lending and portfolio investment (mostly debt) flow compensated for the FDI slump" (UNCTAD 2018). We evaluate the linkages between private debt flows, institutions, and growth of the real sector in Table 3.13. Consistent with the results on FDI and equity flows, private debt flows have no significant direct influence on the growth of the overall real sector both in the presence and absence of institutional quality (see models 1 and 2). This conclusion contradicts assertions by Alfaro (2004) that there is a positive effect of private debt flows on growth, and that any adverse impact from debt flows on growth results from the sovereign-to-sovereign component inherent in total debt. Given that our measure of debt is only private, it's mind-boggling. However, we were mindful that our indicator of growth is dissimilar to that of Alfaro et al. (2004). A plausible explanation could be that debt flows to most African countries are government-driven than individual or such flows are general than being sector-specific. Again, we obtained consistent results that institutions have a direct positive influence of growth at the overall real sector (see model 2). Our results provide enough evidence that advanced institutional development can transform the initial insignificant effect on growth at the overall real sector into positive through its interaction with debt flows. This is evident by the significantly positive coefficient of the multiplicative term (see model 3).

Table 3.13: Real Sector Growth, private debt, and institutional quality

Dep. Variable	**RSG**	**RSG**	**RSG**	**MANVA**	**MANVA**	**INVA**	**INVA**	**AGVA**	**AGVA**	**SERVA**	**SERVA**
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**	**(9)**	**(10)**	**(11)**
Private Debt Flows	0.315	0.777	-0.284	-0.511***	2.264**	-0.385*	-0.049	-0.082	0.031	-0.020	-0.551
	(1.534)	(0.589)	(0.600)	(0.148)	(0.1.12)	(0.216)	(0.234)	(0.149)	(0.345)	(0.170)	(0.763)
Institutional Qua Index		3.103***	2.450**	2.061**	2.530**	0.872*	0.047	1.785**	1.833**	0.454	0.377
		(0.1.087)	(0.975)	(0.961)	(1.129)	(0.493)	(0.557)	(0.726)	(0.722)	(0.343)	(0.341)
Interaction Terms			0.539**		2.242**		0.288**		0.049		-0.371
			(0.280)		(0.926)		(0.128)		(0.253)		(0.634)
GDP Per Cap	0.305**	0.181***	0.182***	0.077**	0.083	0.129**	0.088**	0.153***	0.157***	0.139***	0.142***
	(0.137)	(0.016)	(0.022)	(0.040)	(0.058)	(0.061)	(0.036)	(0.054)	(0.054)	(0.046)	(0.047)
Gov't Expenditure	-0.903**	-0.156	-0.405	0.162	-0.058	-0.100	-0.221*	-0.315**	-0.330**	0.109	0.148*
	(0.361)	(0.290)	(0.300)	(0.178)	(0.166)	(0.120)	(0.118)	(0.154)	(0.155)	(0.080)	(0.081)
Trade Openness	0.191**	0.121**	0.181***	0.041	0.073	0.026	0.094**	-0.034	-0.034	0.104***	0.107***
	(0.086)	(0.057)	(0.062)	(0.043)	(0.059)	(0.051)	(0.042)	(0.035)	(0.035)	(0.040)	(0.039)
Inflation	-0.086	-0.040	-0.041	-0.004	-0.005	-0.041**	-0.027**	-0.044**	-0.046**	-0.038***	-0.039***
	(0.056)	(0.045)	(0.040)	(0.015)	(0.015)	(0.018)	(0.010)	(0.022)	(0.022)	(0.013)	(0.014)
Private Sector Credit	0.001	-0.184***	-0.151**	-0.007	-0.079*	-0.051	-0.085***	0.077	-0.112	-0.044	-0.041
	(0.140)	(0.054)	(0.064)	(0.040)	(0.043)	(0.044)	(0.031)	(0.121)	(0.113)	(0.036)	(0.037)
Diagnostics:											
Observations	555	616	616	423	440	536	590	590	590	498	498
Kleibergeen-Paap rk	21.723	23.387	43.156	60.277	30.628	35.274	92.491	93.146	93.210	27.665	26.587
LM test [p – value]	[0.009]	[0.054]	[0.001]	[0.000]	[0.032]	[0.001]	[0.000]	[0.000]	[0.000]	[0.024]	[0.064]
Kleibergeen-Paap rk	44.451	10.904	13.218	81.361	3.370	168.319	39.403	32.561	28.394	102.697	4.026
Wald F test											
OID (Hansen J) test;	13.178	16.686	19.117	17.086	15.245	11.948	14.183	7.538	8.048	19.347	15.575
[p-value]	[0.106]	[0.214]	[0.322]	[0.314]	[0.578]	[0.450]	[0.361]	[0.294]	[0.840]	[0.152]	[0.483]
Orthog -option:	7.291	8.772	10.398	13.347	13.53	3.902	9.718	6.052	5.737	9.248	8.151
(Hansen J) [p-value	[0.121]	[0.362]	[0.406]	[0.101]	[0.221]	[0.866]	[0.465]	[0.641]	[0.837]	[0.322]	[0.614]
Exogeneity (C) test	5.887	7.914	8.719	3.739	2.191	8.047	4.466	1.485	2.311	10.099	7.423
[p-value]	[0.208]	[0.161]	[0.274]	[0.809]	[0.949]	[0.090]	[0.470]	[0.686]	[0.510]	[0.121]	[0.284]
F (Prob >F)	3.08	40.10	20.59	5.07	3.52	1.96	2.81	2.25	2.04	3.95	4.14
	[0.006]	[0.000]	[0.000]	[0.000]	[0.001]	[0.059]	[0.005]	[0.028]	[0.040]	[0.000]	[0.000]
F – Statistics for INST			8.87		17.55		5.17		6.73		1.69
[Prob>F]			[0.012]		[0.000]		[0.075]		[0.035]		[0.430]
F – Statistics for PNG			3.72		7.71		6.56		0.05		1.38
[Prob>F]			[0.156]		[0.021]		[0.038]		[0.976]		[0.503]

*Note: Standard errors are presented in parenthesis. Kleibergeen-Paap rk LM = Test of under identification; Kleibergeen-Paap rk Wald F = Test of weak identification; C – Statistics = Test of Exogeneity / orthogonality of suspect instruments; Hansen J = Test of over identifying restrictions. *, **, *** denotes significance levels at 1%, 5% and 10% respectively. Models 3, 5, 7, 9 and 11are interactions of private non-guaranteed debt flows and institutional quality index. RSG is real sector growth index; MANVA is manufacturing value additions; INVA is industrial value additions; AGVA is agriculture value additions; SERVA is service value additions.*

Institutional development will help deal with issues of loan default and misallocation that often characterizes the demand for debt capital by both firms and individual. Although investors may be slowly associated with lower-level financing, they may be convinced that strong institutions will ensure the efficient allocation and use of debt capital. At the individual levels, we found that increasing debt flows is hazardous to both growths in manufacturing and industrial value additions (see model 4 and 6). This may be surprising as most financial institutions are quick to finance firms in these sectors because of their large asset base and are fewer propensities to default. However, we found that when institutions are active, financial institutions are confident that such firms will be less likely to default on repayments, as we found the interaction between debt flows and institutions to be positive and significant at 5% significance level for both sectors (see models 5 and 7). With strong institutions, Africa can increase its share of global manufacturing through private debt financing. Economic transformation is possible with a growing industrialization mind-set.

We found that though debt flows are detrimental to agriculture growth, the impact was insignificant (see model 6). The inconsequential relationship may not be surprising as most financial institutions are reluctant to lend to the sector because of their high inclination to default. Agriculture firms are prone to high risk, which includes potential draught, livestock disease, and crop infestations, lack of available market for produce and price variabilities. High financial risks could also result from the seasonality of harvest. According to Mhlanga (2010), agriculture share of total bank, lending in SSA is below 10% on the average. The insignificant effect of debt flows on the sector persists even in the presence of institutions as we found the coefficient of the interaction between debt flows and institutions to be positive but insignificant. Though worrying for a continent with vast arable land, financial institutions see the sector as a perilous one. Major Banks avoid the sector because of the largely rural setting of most farmers, obsolete means of production, poor infrastructure as well as low scale production, are all disincentive to financial institutions. Even in cases where finance is available, the high-interest rates to the sector are a major hindrance (WEF, 2015; Mahieux et al., 2011). According to CSA (2014), the average interest rate to an African farmer ranges between 10% and 30%, a phenomenon that makes repayment difficult. In terms of growing the sector, we found that institutions provide an avenue as we found that a unit rise in the current level of agriculture-related institutions would lead to a 1.785 unit's growth in the sector, at a 5% significance level. More importantly, though the coefficient of the interaction term showed no significance, our marginal effect analysis shows that growth in institutions will someday aid the attraction of debt flows into the sector. Such institutions could include strengthening already existing farm groups to impress upon their colleagues to avoid financing default, upholding ethical means of production, fronting for financing as groups rather than as individual smallholder farmers.

3.8.3.1 Test of joint significance and marginal effect analysis – Private debt

Though the interaction term shows growing institutions matter for a positive influence of debt flows on the real sector, we assessed the specific point at which the transformation takes place. We, therefore, carried out a threshold analysis at the 25th, 50th, 75^{th,} and 90th percentiles of institutional quality. We show the assessment of the marginal effect of private debt on the real sector at the various percentiles of institutional quality in Table 3.14. The analysis at the overall level of the real sector shows that the earliest indication of overcoming the insignificant effect is at the 25th percentile of institutions, where a unit increase in private debt will lead to 1.747 units increase in growth at 5% significance level. The impact of private debt on growth further increases to 90th percentile of institutions where a unit rise in private debt leads a 2.627 units growth at the overall level of the real sector at a 5% significance level. At the individual sectors, we found the benefit of private debt to be stronger on the manufacturing, and agriculture sectors as the level of institutions improve. At a 5% significance level, a unit surge in private debt leads to a whopping 10.712, 12.053, 13.138, and 14.371 units' growth in manufacturing at the 25th, 50th, 75th, and 90th percentile of institutions respectively. Similarly, we found that rising institutions matter for agriculture growth based on private debt flows. Increasing private debt to the sector will result in a 6.938, 8.034, 8.921, and 9.929-unit's growth in the agriculture sector at the 25th, 50th, 75th, and 90th percentile of institutional quality at a 5% significance level respectively. However, we found that the impact of debt flows on industrial growth remains positive irrespective of the levels of improvement in institutions. This gives policymakers a clear cut-out way on which is the best option towards industrialization if it is to be hinged on the level of institutions.

Table 3.14: Marginal Effects of private debt on real sector growth and its components at varied levels of institutional quality

Inst. Quality index at	**25th (3.768)**	**50th (4.366)**	**75th (4.850)**	**90th (5.40)**	**Source**
Real sector growth index	1.747** (3.675)	2.069** (4.258)	2.330** (4.730)	2.627** (5.267)	Model 3, Table 4.13
Manufacturing sector growth	10.712** (4.253)	12.053** (4.928)	13.138** (5.475)	14.371** (6.095)	Model 5, Table 4.13
Industrial sector growth	1.037 (2.099)	1.209 (2.433)	1.349 (2.702)	1.507 (3.009)	Model 7, Table 4.13
Agriculture sector growth	6.938** (2.720)	8.034** (3.152)	8.921** (3.501)	9.929** (3.898)	Model 9, Table 4.13
Service sector growth	-1.972 (1.283)	-2.197 (1.488)	-2.379 (1.652)	-2.587 (1.043)	Model 11, Table 4.13

3.9 Effect of controls – Institutional quality

Under most regressions (29/33), we found that the growth rate of GDP per capita is a vital ingredient in sectoral value additions or growth, as the impact was positive and significant. Increases in GDP per capita signifies increase spending which will invariably be beneficial to all sector. The positive relationship may lead to increase in demand for goods and services provided by these sectors. With the increase in demand for products, these sectors can also create employment and generate additional revenue for government through taxes. The positive impact of GDP per capita is in line with the conclusions of Kodongo and Ojah (2017). The size of government seems to deter the growth of the real sector and its component, as we found a significant negative impact under most of the regressions (8/33). Though surprising, increases in government spending may not be towards these sectors.

Trade openness enters most regressions as positive and significant (20/33). The positive effect shows the competitiveness of these sectors on the global market. Trade openness will offer these sectors a broader market base, increase production and export. Though Kodongo and Ojah (2017) found trade openness to impact positively on the real sector, the impact was insignificant across all sectors. Consistent with the growth literature, we found that rising inflation hinders the growth of the real sector and its components. Most regressions (18/33) show that a persistent increase in the price of inputs will make planning difficult for all sectors. It may also affect the profit margins that should accrue to all sectors. Consistent with Kodongo and Ojah (2017), private sector credit is insensitive primarily to the growth of the real sector as we found a negative and insignificant relationship under most regressions (21/33). Perhaps these sectors lack the need asset base to command financial support for growth and expansion.

3.10 Conclusion and Policy recommendations – Financial Development

Cognisant of the benefits that capital flows bring to host countries, many countries continue to position themselves to attract large volumes of cross border flows. Prominent capital-flows related policies include trade and financial liberalization, relaxation of capital control restrictions, tax havens and holiday, institutional development, and conducive business environments. These related policies are triggered by the accompanying benefits as alluded earlier, which include economic growth, technological transfer, human and skills development, improved productivity, among others. However, the argument is that the growth enhancement of capital flows are not absolute and that the benefits from capital flows received by two countries will differ due to specific home country characteristics that can either dwarf or up-shoot the benefits. Again, the growth-enhancement of capital flows is mostly measured at the overall aggregate indicators of economic growth (GDP, GDP per capita). Relying on a set of 30 African countries, we sought to ascertain the relevance to private capital flows to growth, but at a lower measure of growth, conditioned on a set of host country's absorptive capacities, that is financial development and institutional quality. Our indicators of private capital flows were foreign direct investment, portfolio equity flows, and private non-guaranteed debt, while our growth indicators include growths in agriculture, manufacturing, industry, and service value additions.

We start our conclusion with financial development. Using a new and composite measure of financial development that encompasses access, depth, and efficiency, we sought to evaluate the growth impact of each component of capital flows on the overall real sector and its components, conditioned on the extent of financial development. We hypothesized that any lasting impact of capital flows at the lower levels of growth may only be realized if countries attain a certain level of financial development, devoid of that, the long-term benefits of private capital flows may be immaterial and at worse detrimental. We deployed Lewbel (2012) IV estimator to deal with issues of endogeneity, measurement errors, omitted variables, and heteroscedasticity, on a sample of thirty African countries, over a twenty-eight-year period. Contrary to other studies on this subject, especially within the context of Africa, we make our conclusion not solely on the coefficients of the interaction's terms. Our conclusions are mainly based on the recommendations of Brambor et al. (2006) by the computation of the marginal effects. In all regressions, we controlled for GDP growth, financial openness, domestic savings, government expenditure, and the quality of institutions, consistent with the capital flows-growth literature.

3.10.1 Real sector growth, foreign direct investment, and financial development

Due to its long gestation and relative stability compared to other forms of private capital flows, many developing as well as developed countries continue to implement policies aimed at the attraction and retention of foreign direct investments. Our initial analysis shows overwhelming evidence of a no significant impact of FDI on the growth of the overall real sector. The insignificant effect persists in the presence of financial development, whether index or private sector credit. Thus, FDI cannot influence growth at the overall level of the real sector. On decomposing the measures of the real sector, the direct impact of FDI however, varied. We found FDI to have no growth impact on manufacturing value additions, and at the same time, damaging to the growth of the agricultural sector. However, we found strong evidence of a positive direct association between FDI and growth of industrial and service sectors. The positive impact regarding the service sector and the insignificant manufacturing effect aligns with the recent change in the direction of hitherto manufacturing-related FDI to service-related FDI. Further evidence of the much-acknowledged direction of resource-based FDI to Africa is confirmed by the positive impact on the growth of industrial value additions.

However, we also postulated that capital flows could not independently affect growth. Thus, being aware of the fact that the growth-enhancement of FDI may be achieved with the existence of specific indicators, we interacted FDI with indicators of financial development. On the face level, we found an unambiguous strong positive impact of the interaction between FDI and financial development on the growth at the overall level of the real sector and its components. However, the significance of the interaction only tells a limited story that in the presence of a developed financial sector, FDI to Africa can spur the growth of the real sector. The full impact is determined at conditional levels of financial development. The marginal effect confirms that increasing levels of financial development enhances the growth effect of FDI in the overall sector and growth of the service sector. Although the growth impact on industrial is positive and significant, even up to the 90th percentile of financial development, we observe negligible drops in growth. However, the growth impact of FDI on the manufacturing sector is only evident at higher levels (90th percentile) of financial development. We also found that although financial development may reduce any initial adverse effect of FDI on agriculture, the persistent of the adverse effect continues even to the 90th percentile of financial development.

The essential point is that although FDI may be independently detrimental or even irrelevant to growth at the disaggregated level, a well-developed financial sector can act as a good moderator in overturning the insignificant or adverse impact into positive. Thus financial sector development in a necessary ingredient in the association between capital flows (FDI) and real sector growth. However, the positive impact conditioned on the financial sector may be ascertained at varying levels of growth and may depend on the indicator of real sector growth. It also suggests that countries with weakening or dwindling financial sectors stand the risk of increasing private capital outflows, as ill-developed financial sectors may be prone to exchange rate losses, currency depreciation, and financial turmoil.

The preceding discussions show the relevance of financial development to the FDI-growth nexus, even at the less disaggregated level of growth. Although FDI has not trickled down beyond the aggregate level of growth, a mature financial sector is a booster for investors to extend capital to these sectors. Based on the outcome of the study, we, therefore, proffer the following for policy implementation. In terms of industrialization, FDI can be apposite only if Africa's financial sector has attained a healthy level of development. Perhaps the current level of the financial sector is not robust enough to champion Africa's industrialization if it is hinged or attached to FDI inflows. The quantum of investments from FDI into the sector will need to operate through a conduit, which at the current dispensation cannot be the financial system. However, given that industry growth has a stout positive connexion with foreign direct investment, and even stronger when the relationship is conditioned on financial development (private sector credit), industry growth can jump-start the drive for industrialization, up to a point where the financial sector will be robust enough to augment the support of FDI in enhancing the growth manufacturing.

On the agriculture sector, the initial direct adverse impact on FDI and the persistent negative effect at conditional levels of financial development presents a challenge to policymakers regarding FDI-Agric related policies. The formulation of such policies will be essential to Agenda 2063's declaration to "consolidate the modernization of Africa's agriculture and agro-business through scaled-up value addition and productivity, and by 2025" (AU, 2015). Tailor-made financial services for the sector should be a priority just as if we have a host of export-related financial services across the continent. One shudders to understand how even none of the agriculture-related declarations for Agenda 2063 makes little mention of tackling financial challenges bedevilling the growth of the sector, “Develop and implement affirmative policies and advocacy to ensure women’s increased access to land and inputs, and ensure that at least 30% of agricultural financing is accessed by women”(AU, 2015, pp 15). Indeed, these interventions are insufficient. I believe policymakers should not play the ostrich regarding finance to the real sector.

The study has also shown the relevance of FDI even without financial development to the growth of services in Africa, and the effect is even profound in an environment of a developed financial sector. Policies that incorporate the attraction of service FDI and trade should be prioritized among African leaders. It’s time we shift our focus from the attachment to agriculture and extractive sector FDI. With the gradual increase in financial sector services provision, Africa will increase its quantum of global FDI.

Briefly, the above studies have shown that the growth impact of capital flows is evident at the disaggregated level of growth only when certain domestic conditions exist, and these studies have proved that based on financial development. The assumption is that due to the size and structure of foreign firms, they can negotiate low cost on funds in a developed financial sector, which can enhance growth at a disaggregated level of the real sector. The results of the financial sector suggest that other germane characteristics such as institutional quality, business climate, regionalism, either individually or jointly, can spur growth at the lower level through the attraction and retention of private capital flows.

3.10.2 Real sector growth, portfolio equity flow, and financial development

We also examined the association between growth of Africa’s real sector and portfolio equity Contrary to the assertion that portfolio flows are “hot money” in nature and thus characterized as damaging to growth, the study has shown that portfolio flows on their own have no unmitigated direct impact at a disaggregate level of growth. At the overall level of the real sector, the insignificant effect even persists when we account for both measures of financial development. At the decomposed level, while the insignificant relationship exists for growths in agriculture, industry, and services, manufacturing value additions had a positive association with portfolio flows. Again, recognizing that equity flows may not have any independent impact of growth at the overall level of the real sector and the component level, we sought the interaction between equity flows and financial development on the real sector and found an overwhelmingly positive effect. Regarding our primary measure of financial development, the coefficient of the interactive term between portfolio equity and the financial development proved to be positive and significant under all regressions. Thus, just like FDI, though equity flows have an unfettered impact on growth both at the overall and decomposed measures of the real sector, countries with the sound financial sector in terms of access, depth and efficiency can transform the insignificant impact to growth. More importantly, our marginal analysis shows that increase in financial sector development leads to high growth impact of equity flows on all components of the real sector.

The positive interaction between portfolio equity flows and financial development and subsequent marginal effects presents an alternative and a shift from excessive reliance on dwindling FDI flow to Africa. As noted by the United Nations, on the need for alternative sources of financing other than the traditional FDI, the UN contends that "the dividing lines between FDI and other types of flows are becoming increasingly blurred," therefore, "Portfolio equity flows can be used for FDI-like purposes. MNEs can acquire long-term strategic stakes in foreign enterprises, with a measure of control, even if below the 10 percent threshold" and further acknowledges that "FDI, as measured in the balance of payments, contains components that behave like portfolio flows. They can be relatively short-term and volatile" (WIR, 2018, pp. 11). We also recommend that sectors such as agriculture and manufacturing can turn their attention to the attraction of equity flows than the usual reliance on FDI.

3.10.3 Real sector growth, private debt, and financial development

Again, controlling for GDP growth, government expenditure, domestic savings, financial openness, and institution's development, we found evidence, which contradicts the assertion that private debt have a positive effect on growth. We found strong evidence to the contrary at a lower level of growth, as private debt flows had a direct adverse effect on growth at the overall level of the real sector, growth in manufacturing and industrial value additions had no growth effects at all in terms of agriculture and service sector growths. Some studies have confirmed such conclusions at an aggregate level of growth. The outcome could be attributed to the hot money nature of debt flows, as these flows are always in search of high returns. Though we found financial development to be a cure to the initial adverse or insignificant effect, the cure was deemed beneficial to growth in services but at higher levels of financial developments. To some extent, the development of the financial market eradicates the initial adverse effect, but Africa's financial sector is yet to reach or attain that turning point where financial development could ultimately overturn the adverse effect of debt flows on the growth of the real sector. Thus, the study acknowledges the relevance of developed financial sector as an absorptive capacity in the association between debt flows and the growth of the real sectors in Africa, however, until the point where the financial sector is well developed, private debt flows are more likely to be misallocated and be detrimental to growth. Given the fixed interest and skittish characteristics of debt flows, the benefit of such flows may only be appreciated in an environment of the developed financial sector. For the known disadvantages associated with an ill-developed financial sector coupled with the increasing appetite of African economies towards debt flows, there is the need for a stronger collaboration to increase the current level of financial development on the continent. Individual countries and the continent should work tirelessly towards the strengthening all aspects of the financial factor to enjoy the full benefits of private debt flows at the lower level of growth.

3.11 Conclusion and policy recommendations - Institutional Quality

The principal theme of the study was to examine the relationship between capital flows, institutional quality, and growth of the real sector on a set of 30 African countries. Aside from assessing the direct associations between capital flows and institutions, and growth of the real sector, our prime motive was to evaluate the conditional levels of institutional quality at which capital flows may enhance the growth of the real sector. Though the literature posits that specific absorptive characteristics are essential in the association between growth and capital, previous works has focused largely on growth at the aggregated level, with little or no attention to disaggregated growth. We decomposed capital flows into foreign direct investment, portfolio equity flows, and private debt flows. We also decomposed real sector growth into manufacturing, industrial, agriculture, and service sector growth. We employed controls that are relevant to growth.

Starting with FDI, exhilarating implications for policy implementation were unravelled. First, we disabuse the conventional notion that FDI has a direct positive influence on growth. Though the view may hold for growth at the aggregate level, we found evidence to the contrary at the overall growth of the real sector and manufacturing sector growth, where the effect of FDI on growth was insignificant. More worrying was the adverse impact FDI have on growths in industry and agriculture. However, FDI has a direct positive impact on service growth.

Further, we found evidence of a direct impact of institutional quality on growth of the overall real sector, industrial and agriculture value additions. Since it was difficult to find a growth variable where both FDI and institutions affect it positively, we assessed further whether charitable institutions are springboards to harness the growth potential of FDI. We asked the question of whether institutions can provide an enabling environment where FDI can positively impact growth. Based on just the coefficient of the interaction of FDI and institutions, we found evidence that institutions alter the initial insignificant effect of FDI at the overall level of the real sector while reducing the initial adverse impact on agriculture and manufacturing value additions. However, we found the interaction between FDI and institutions to be damaging to the growth of the services sector while the impact of the interaction had no significance on industrial value additions.

We therefore, say that based on the sign and direction of the interactive terms, good institutions are essential for the ultimate realization of FDI benefits on disaggregated growth. More importantly, our marginal analysis shows that improving the institutional environment provides an excellent platform for the benefits from FDI to flourish at the overall level of the real sector. Conditioned on increasing institutional framework, high inflows FDI lead to high growth at the overall real sector and manufacturing sector growth. The marginal analysis shows that though institutions matter in the linkages between FDI and agriculture growth, the current level of institutions and increasing institutions can only reduce the adverse impact of FDI on the sector. Another fascinating revelation is that the growth benefits of FDI on the services sector diminishes as the level institution's increases, while the impact of FDI on industrial growth is unresponsive to developments in institutions.

The relevance of the study stands out for various reasons. The first is the quantum of FDI that flows to Africa. Though the flow of FDI has been increasing since early 1990, the continent still accounts for a lower share of global FDI (UNCTAD, 2018). Again, much of the flow has been concentrated in the extractive, primary, and perhaps the manufacturing sectors. Secondly, Africa seems to have a poor record in terms of institutional effectiveness, as the level of institutional quality is deemed relatively low. Incidence of coups and chaos of government takeovers, perceived corruption, and disregard for the rule of law all account for weaknesses in Africa's institutional framework. In addition, the growth of the economy and its sectors are paramount on the agenda of every country and the African Union. Lastly, FDI and institutions are acknowledged as growth sustainability and poverty reduction mechanisms.

Therefore, for governments who are keen on attracting FDI for growth at the lower level, the first priority should be directed at ensuring a conducive business and tax environment, upholding the rights and privileges of the citizenry, freedom of the press and opposition parties, independent judiciary and legislature, reduction in the conflicts and upholding the tenets democracy. Implementing such policies will go a long way in elevating growth that comes from FDI at the overall level of the real sector, as well as reducing the adverse impact of FDI on the growth of the agriculture sector. In order to realize the full benefits of FDI on agriculture, much work must be done regarding the institutional framework, given that the negative effect persists to the 90^{th} percentile, though at a decreasing rate. We recommend agriculture tailor-made policies on issues of land ownership and settlements, export and import of cash crops, special courts to deal with agriculture and labour related issues. We believe these measures will gradually help in eradicating any initial adverse impact of FDI on the sector. However, since institutions also have a direct impact on agriculture growth, policymakers could focus on that aspect as well to sustain growth.

Regarding growth in services, it will be prudent for policymakers to pay much attention to the increases in services related FDI to sustain growth in the sector as there is a strong positive relationship between the two. However, if policymakers still want to inculcate institutions into the FDI-services sector dynamics, the essential threshold of institutions should not exceed the 25th percentile since, beyond that threshold, the effect will be detrimental. Finally, our results have indicated that policy may work differently regarding growth at the aggregate and disaggregated level. Therefore, policies should be tailor-made for specific sectors and industries. If African countries want to bounce back to the days of high manufacturing FDI, then the surest route is the development of strong institutions. Without developments in the institutional framework, we are confident that manufacturing related FDI will continue to dwindle and shift towards other sectors, especially the services sector.

Concerning the impact of equity flows on growth, the critical emerging theme is that equity flows alone have no impetus to grow Africa's real sector, but at the same time, institutions are pre-requisite for growth of the real sector. More importantly, the impact of equity flows is enhanced in countries with a certain level of institutional quality as strong institutions deal with issues of insider trading, protects investors, helps with the allocation of resources, reduces incidences of corruption and government involvement in trading activities. The impact of equity flows on growth expands as institutions improve at the overall real sector level, bringing into sharp focus, the combined force of all the individual sectors. It is worthy for countries to pay particular attention to strengthening both the manufacturing and services sectors as growing institutions related to these sectors spurs growth through portfolio equity. Overall, the institutions-equity nexus presents another way out of the dependence and reliance of just FDI as the preferred capital flows to enhance growth, especially at the disaggregated or lower level.

We have also established that debt flows may be dire to the growth of the real sector, but more specially to manufacturing and industry growth. At the same time, institutions can grow these sectors as goods institutions provide some assurance to the providers of debt capital, regarding misallocation of funds, default, and repayment. Poor institutional quality thus seems to matter in the attraction and allocation of debt capital. Primarily, private debt flows conditioned on the right level institutions matter for the combined growth of Africa's real sector, the manufacturing, industrial, and agriculture sectors. It behoves on governments to develop sector-specific institutional frameworks as this will spur the growth of these sectors through the attraction of capital flows.

Appendix 1: List of Countries

Country	RSG	SVA	MVA	AVA	IVA	INST	FD	PSC	FDI	PNG	PEF
Algeria	10.624	6.377	1.172	5.85	3.126	0.480	0.14	13.8	0.932	0.010	0
Botswana	15.505	6.666	5.240	1.660	1.939	0.701	0.22	18.75	2.503	0.0002	0.056
Burkina	19.706	5.923	3.598	4.464	5722	0.549	0.11	14.91	1.091	0	-0.142
Cameroon	10.536	2.638	2.383	3.813	1.702	0.551	0.08	11.35	1.183	-0.246	-0.013
Congo, DR	72.038	2.889	35.411	31.575	14.284	0.340	0.05	2.69	2.889	0	-0.005
Congo	13.413	2.720	4.786	3.088	2.989	0.536	0.06	7.82	8.952	0	0.002
Cote d'voire	5.507	4.449	3.634	4.381	4.669	0.493	0.18	18.63	1.555	-0.325	0.036
Egypt	16.575	4.699	4.622	3.187	4.067	0.576	0.27	34.4	2.313	-0.066	0.014
Gabon	22.602	2.686	16.608	2.741	0.566	0.533	0.10	9.88	1.817	0	-0.04
Ghana	9.861	6.996	4.160	3.566	10.378	0.582	0.12	8.62	3.889	0.010	0.176
Guinea	13.417	3.595	2.952	4.390	4.273	0.509	0.00	3.76	2.702	0	-0.001
Guinea Bis	7.900	4.517	3.148	2.388	3.883	0.440	0.029	4.38	1.442	0	0.038
Kenya	11.149	5.976	2.558	2.687	3.557	0.534	0.15	22	0.841	-0.129	0.097
Madagascar	10.479	2.174	3.038	1.467	4.667	0.538	0.09	10.81	3.788	0.003	0.002
Malawi	16.418	4.488	3.207	4.799	3.923	0.529	0.09	6.73	2.699	-0.007	-0.006
Mali	14.884	4.832	0	4.208	5.844	0.493	0.11	13.81	2.026	0	0.045
Morocco	15.665	3.979	2.972	5.438	3.276	0.672	0.30	45.98	1.735	0.394	0.086

Mozambique	26.884	7.164	7.207	4.874	8.665	0.548	0.11	14.81	10.463	0.00	-0.003
Namibia	14.450	4.507	3.601	2.865	3.477	0.693	0.33	42.65	4.796	0.00	0.310
Niger	12.615	3.543	8.464	5.962	8.987	0.459	0.09	8.89	3.817	-0.422	0.068
Nigeria	17.205	6.462	2.482	6.379	1.881	0.453	0.20	9.72	2.069	0.275	0.388
Senegal	13.143	3.910	3.732	3.328	4.573	0.556	0.12	22.44	1.511	0.061	-0.06
Sierra Leone	21.125	5.616	1.159	4.949	11.850	0.452	0.07	3.213	4.960.	0.00	0.014
South Africa	7.817	3.316	1.550	1.820	1.132	0.618	0.48	119.4	1.219	0.234	1.823
Sudan	21.830	5.007	6.514	3.403	8.301	0.427	0.08	6.54	2.594	0.00	0.017
Tanzania	21.127	5.470	5.816	3.730	6.893	0.607	0.105	9.19	3.035	0.172	0.010
Togo	14.583	3.520	3.941	2.965	4.158	0.491	0.11	20.96	2.879	0.00	0.314
Tunisia	11.691	4.373	2.625	4.004	2.401	0.648	0.23	60.67	2.703	0.102	0.061
Uganda	26.793	6.978	8.142	2.873	8.800	0.580	0.09	7.49	3.107	0.533	0.069
Zambia	15.638	5.652	3.964	1.456	4.566	0.517	0.08	8.60	5.094	1.331	0.0613

CHAPTER FOUR

MACROECONOMIC VOLATILITY, PRIVATE CAPITAL FLOWS AND FINANCIAL DEVELOPMENT IN AFRICA

“Nothing is worthwhile that is not hard. You do not improve your muscles by doing the easy thing; you improve it by doing the hard thing, and you get your zest by doing a thing that is difficult not a thing that is easy”. – Woodrow Wilson

4.1 Introduction and Problem

The virtues of trade and financial liberalization allows countries to open their economies to multinational enterprises (MNE) and foreign affiliates. MNEs come along with capital that could augment the existing domestic capital, thereby enabling expansion in the production of goods and services, create jobs, develop skills of local affiliates, transfer of technical ability, and efficiency in production. Capital flows remain a crucial subject of discussion among policymakers, investors, and academics because external capital helps drive down the domestic interest rates, reduce the cost of borrowing, and increases the money supply via integration with financial systems (Henry, 2000; Mishra, 2001). External capital helps to bridge the local financing gap while stimulating economic growth. Agenor (2003) is of the view that increased foreign investment is associated with macroeconomic and financial stability, which comes about through increased liquidity, consumption smoothing, potent factor output, and improved domestic investment.

Despite the associated gains, international capital has its antecedent problems, such as inauspicious terms of trade and local currency depreciation (Athukorala and Rajapatirana, 2003), and inflationary pressure (Filer, 2004). The adverse impact of capital flows could be profound in the absence of weak institutions and financial development (Lane, 2015; Guichard, 2017). Calvao (1998) contends that the influx of external capital could plunge an economy into a financial crisis. Despite the associated risk, many are of the view that a country stands to benefit a lot if it can minimize the adverse impact of capital flows. Countries, therefore, continue to implement policies to gain a competitive advantage over others to attract large volumes of external capital.

In Africa, private capital has relieved most economies from the reliance on overseas development assistance (ODA), which is often accompanied by restrictions and directions on usage and governance. The gradual shift from ODA and other forms of flows to private capital could be traced back to three decades ago. According to WIR (2018), the quantum of ODA to most developing economies has declined to almost one-fourth of total FDI flows to these economies. Over these years, private capital has become the preference of most African countries as many continue to implement policies directed towards the attraction and retention of private capital (Sy and Rakatondra, 2015). Cross-border capital flows to Africa has been impressive in boosting growth and development after the global financial crisis and at times when there is a gradual decline in official development assistance to the region. The increase in capital flows is driven by global factors such as falling US interest rate, commodity prices, and global risk aversion, and more importantly, by domestic indicators (higher GDP growth, GDP per capita, flexible exchange rates, financial development, and institutional quality) Hannan (2018). The increase is reflective both in absolute terms and as a portion of GDP when compared to other emerging economies.

Though FDI remains the dominant mode of capital flows to developing economies, much of the surge has been necessitated by non-resident portfolio flows, which stood at USD 113 billion by the close of 2017, increasing by almost 83% over ten years. Within the same period, non-official flows have increased by approximately fifteen folds from USD 4 billion in 1980 to USD 60 billion as of 2017. The impact of capital flows is known to correlate with the nature and type of flows. While equity flows are deemed volatile because of their inherent lack of permanence, debt flows are considered the riskiest, with FDI as the most stable and less volatile (UNCTAD, 2018). Calderon et al. (2004) noted that the stability of FDI depends on whether it takes the form of mergers and acquisitions, greenfield, or merely round-tripping. Historically, the volume of capital flows to Africa has been low when compared to other emerging economies. However, flows to the region are currently deemed to be at its high point, this time, on the back of surges in liability flows to the region. Total capital flows to the region rose slightly from 6.1% of GDP to 6.6% of GDP between 2016 and 2017. Since the mid-year of 2000, portfolio investment, especially liability flows, have more than tripled, though stable FDI continues to dominate the quantum of flows. Various factors account for the increase in the various types of flows. While volatile global markets have contributed to the surge in debt and equity flows, falling US interest rates and commodity prices have pushed large volumes of FDI to the region (IMF, 2018b; WIR, 2018).

Attracting the right volume of capital flows is often plagued with challenges. Aside from the inherent volatility and unpredictability of private capital flows, host country-specific characteristics can also affect the inflow of private capital. Though the literature on capital flows is replete with studies on the factors that affect private capital inflows, such studies continue because of the constant revolving nature of capital flows, taste and preferences of investors, business environment, and recipient countries' dynamics. Investors can assess most of these host country-specific characteristics before deciding to invest abroad or not. Among these include human capital development, the extent of trade and financial openness, the size of government, investment returns, among others. Another set of indicators investors consider is the potential impact of macroeconomic or monetary policy indicators. According to Cordon (1990) and Barrel and Pain (1996), policy variables such as inflation, GDP growth rate, interest and exchange rates have a strong correlation with investment. Issues of monetary policy and economic crises have, at times, been linked with lower inflows of private capital (Kaminsky and Reinhart 1999; Calvo, Leiderman, and Reinhart, 1996).

Investors being mindful of the macro indicators make a conscious effort to factor them in their decision to invest abroad. However, what investors may not predict, but could affect returns on investment is the volatilities or uncertainties associated with macroeconomic variables. Since volatilities are unpredictable, any impact is likely to occur when the investment is underway, or funds have been committed. On the demand side, the unpredictability of volatilities associated with capital flows could affect the amount and quantum of inward capital flows to destination countries. Macroeconomic uncertainties can lead to sudden stops and reversal of capital flows leading to a change in quantum or direction.

Uncertainties can hinder the attraction of private capital, which can adversely impact the growth of countries that hugely depend on these flows for investment and economic buoyancy. Globally, investors are likely to shun economic zones grappled with huge debts, unstable governments, and increased risk of capital loss. Shocks affecting capital flows may impede the directional movement of the flows. According to a UNDP (2011) report, "a financial shock can result in the sudden reversal of capital flows and also in a sharp decline in inflows" (p.86). The report further admonished, "for this reason, policy measures to build a country's resilience to private capital-related shocks should focus on stabilizing the volatility associated with private capital flows" (UNDP, 2011, pp.87). Such shocks or volatilities could result from the devaluation of the exchange rate, inflationary pressures, as well as growth volatility. Lensink and Morrissey (2006) posit that countries that are deemed political and economically volatile attract few foreign investors. Volatilities associated with capital flows could also lead to distortions in the economic advancement of countries (Forbes and Warnock, 2012).

On the determinants of capital flows, the literature acknowledges two distinct factors that drive the movement of capital across borders – the pull and push factors (Sarno et al. 2016; Fuertes et al. 2015; Fratzscher, 2012; and Forbes and Warnock, 2012; Calvo et al. 1996; Fernandez-Aris, 1996). The portfolio balance approach is the underlying bases for the distinction where factors such as risk, expected return, as well as risk preference among nations are essential in the determinants of capital flows (Hannan, 2017; Ahmed and Zlate, 2014). Accordingly, these two factors have determined the evolution of capital flows over time, as they form the foundation for policy directions towards capital flows in both source and destination countries. While the push factors refer to conditions outside the home of the recipient countries, pull factors are conditions available to the recipient country or country-specific that attract external capital flows, and these include the domestic interest and exchange rates, domestic growth, trade and extent of financial liberalization, human capital and investment environment (Sarno et al. 2016).

The first pillar of this study relates to the pull-factor determinants of capital flows. Though push factors significantly drove huge capital to developing countries at the onset of the financial crisis, domestic (pull) factors have been dominant in attracting capital flows in the wake of the recovery period (Fratzscher, 2012). With a prime focus on the domestic exchange rate, the study sought to examine the impact of the volatility of exchange rate on capital flows in Africa. Arguably, the literature posits that multinational enterprises and external investors are concerned about the impact of macroeconomic uncertainty (institutional, social or political) on their investments. The levels of uncertainty associated with macroeconomic indicators can affect foreign capital inflows, as they have a direct impact on the confidence of external investors. Though MNEs desire to invest abroad as a form of diversification, volatility of the domestic exchange rate leads to hikes in the cost of international business transactions, reduction in profits and a dip in volumes of cross border capital flows.

According to the proponents of investment irreversibility and the "options to wait", future uncertainty leads to a postponement of current investment as economic agents will hold onto additional investment until such a time that the level of uncertainty has been dispelled. Again, since the returns on investment are unpredictable in the face of uncertainty, additional investment will be curtailed. This portrays an inverse association between investments and uncertainty (Nickell, 1978; Pindyck, 1991; Dixit and Pindyck, 1994). However, empirical conclusions on the linkage between capital flows and uncertainties stemming from exchange rate are considerably very few, especially for developing countries and Africa. Accordingly, Demir (2009) maintains that, although the literature on the factors influencing private capital flows may abound, only a handful have concentrated on the volatilities associated with capital flows, especially Africa. Similarly, Caporale (2015) noted that notwithstanding the substantial literature on international asset transactions, the empirics on exchange rate uncertainty remains countable, especially for non-FDI capital flows. Though exchange rate volatility-capital flows nexus may have received some attention within the African context, the evidence for the literature is still scanty, sparse and inconclusive (Asamoah et al., 2016; Fernandez et al., 2015; Alley, 2014; Coleman and Agyire-Tettey, 2008). Again, on the volatility-capital flows nexus, much focus has been on FDI to the neglect of other private capital flows (debt and equity). However, on the relevance of other capital flows, UNCTAD (2018) admonishes that developing economies can access a wide variety of external financing that includes FDI, portfolio equity and debt flows (private and public). The report further states that the dividing lines between FDI and other types of flows are becoming increasingly blurred as these flows may be deployed for FDI-like purposes. Specifically, "It is important to consider FDI in the context of other components of the financial account in the balance of payments – portfolio debt and equity investment, while noting that the other flows are also critical. An additional motivation for considering other types of capital flows is that the dividing lines between FDI and other types of flows are becoming increasingly blurred" (WIR, 2018, pp. 11). The report contends that while FDI has become relatively short-term and volatile as portfolio and debt flows, portfolio equity flows are useful for FDI-like purposes. We sought to validate whether truly, the dividing lines are indeed blurred as we extend the scope of the present study by focusing on linkages between exchange rate volatility and all three components of private capital flows (FDI portfolio equity and private non-guaranteed debt flows).

The second part of the study lies in the realm of opposing views on the relationship between uncertainty and investments. Much of the inconclusiveness of the empirics' stuns from the theoretical propositions on the impact of volatility on investment based on either investors' attitude towards risk or the sources of the uncertainty. As stated earlier, the investment irreversibility theory posits that, when faced with future uncertainties from the macroeconomic environment, the quantum of foreign capital will diminish. However, based on the theories of risk-neutrality and investment reversibility, Hartman (1972) and Abel (1983) posit that uncertainty increases the desire to increase current investment as the marginal product of capital and profits are expected to rise with rising uncertainty. Considering the opposing theories, we contend that the association between capital flows and volatility may not be strictly positive or negative or monotonic. The study, therefore, addressed the issue of the non-linearity of economic volatility and capital flows. It is worth noting that the empirics on macroeconomic volatility and capital flows does not support a robust one side direction or conclusion. While some studies have found volatility to positively affect investment and capital flows (Daly and Vo, 2013; Batten and Vo, 2010: Cordon, 1990), other studies have found a negative association between economic volatility and capital flows (Jehan and Hamid, 2017; Asamoah et al. 2016; Cavallari and D'Addona, 2011; Lipsey and Chrystal (2006). Some also found no clear direction on the volatility-capital flows nexus (Bell, 2004; Kosteletou and Liargovas, 2000). Existing studies take a linear relationship as given, raising doubt on the validity of the conclusions drawn from such studies. Perhaps the inconsistency in the empirics emanates from the fact that earlier studies have not considered the possibility of a non-monotonic relationship in the exchange rate volatility-private capital flows equation. Concerning private capital flows to Africa, Anyanwu and Yameogo (2015) found a U-shaped relationship between (FDI) and economic growth for a set of West African economies, but not between uncertainty and capital flows. On the impact of global financial cycle, proxied by the volatility index (VIX) on the attraction of private capital flows to some emerging economies, Nier et al. (2014) found that the effect of volatility on capital flows depends on the levels of the financial cycle, raising doubts about the assumption of linearity on the determinants of capital flows by most existing studies, and the relevance of non-linearity between capital flows and volatility. Focusing on the volatility of the domestic exchange rate; the study follows the influential work of Lind and Mehlum (2010) in determining the appropriate test for a U-shaped relationship between capital flows and economic uncertainties. In as much as it is most likely for investments to flow to more stable, calm and predictable environments based on the irreversibility of investments, we were of the opinion that at some points in time, private capital (MNE) may flow to individual high volatile economies in order to make greater returns on investments, cement their place in the market and have high bargaining power before other competitors move in. Again, we built the argument that such a relationship is too complex to be either strictly positive or strictly negative and that beyond a certain point, an upsurge of economic uncertainty could still lead to an increase in the flow of private capital even when the initial relationship is negative. An understanding of the nature of the relationship, especially if non-linear will inform policy directions on the attraction of capital flows amid the varying points of the exchange rate volatility. A non-linear relationship suggests to policymakers that standard monetary and trade policies on exchange rate management and capital flows will be inadequate under macroeconomic uncertainty. Thus, we sought to determine whether the exchange rate volatility-capital flows nexus is linear, U-shaped, or an inverted U-shaped.

Lastly, we focused on the ability of structural dynamics in host countries and the ability of policy frameworks to shape the association between macroeconomic volatilities emanating from within. Based on the notion of absorptive capacities (Durham, 2004) and the perceived positive impact of financial development on the attraction of capital flows (Agbloyor et al. 2014; Asiedu, 2013; AfDB, 2010; Dutta and Roy, 2008), we employed financial development as a mediating variable in the volatility-capital flows nexus. The literature acknowledges the mediating roles of variables such as financial development, in averting or reducing any potential adverse impact of uncertainty. According to Scott (2008), institutional frameworks provide a framework for social order by reducing uncertainty. Aghion et al. (2004) noted that without a robust functioning financial sector, unhindered financial liberalization can be harmful to economies where such flows go. Again, though capital flows to developing countries are known to be more volatile than those to developed economies, Rigobon and Broner (2005) had already concluded that country-specific features such as the levels of financial and institutional development could reduce the extent of capital flows volatility. We believe that apart from institutions providing assurances to investors on the protection of their rights, a functioning financial sector will channel capital to the sectors that need them most by reducing information asymmetry, risk of default, and ultimately, any potential macroeconomic uncertainties. According to Dabla-Norris and Srivisal (2013), financial depth is essential in reducing any potential volatilities associated with output, investment growth, and consumption. They state that financial depth absorbs any adverse effects exerted by external shocks on macroeconomic volatility. Aghion et al. (2009) noted that countries developed financially suffer less from any adverse impact of exchange rate volatility.

Arguably, countries with developed financial sectors facilitate the transition of foreign capital into the domestic environment, mostly through the banking and stock markets. There is efficient distribution of financial resources through reduction in information asymmetry, information distribution, and risk diversification. Caballero and Krishnamurthy (2006) posit that though capital flows expose countries to potential crashes and capital flows reversals, the development of the domestic financial sector helps to reduce the advent impact of these crashes and reversals. Although the mediating role of financial development in the African capital flows literature is evident in the works of Agbloyor et al. (2016), Agbloyor et al. (2014), Alfaro (2010), Ezeoha and Cattaneo (2012), these studies looked at the association between capital flows and growth.

Consequently, our study focused on the mediating role of financial development in the capital flows-volatility dynamics in Africa. Our study differs from previous African studies in varied aspects. Kodongo and Ojah (2012) studied the linkages between the exchange rate and equity flows in Africa. However, they did not consider the impact of exchange rate volatility and the mediating role of financial development. Although Asamoah et al. (2016), Kyereboah-Coleman and Agyire-Tettey (2008) concentrated on exchange rate uncertainty, they both focused on only FDI flows. Again, while Kyereboah-Coleman and Agyire-Tettey (2008) did not consider the impact of a moderating variable, Asamoah et al. (2016) examined the moderating impact of institutions. More recently, Jehan and Hamid (2017) studied the role of financial development in the association between capital flows and exchange rate volatility. However, the study focused on FDI and remittance, with no specific focus on Africa. Accordingly, this study is concerned with the effect of macroeconomic volatilities on capital flows, conditioned on the levels of financial development in Africa. More importantly, we employed financial development indicators that overcome the limitations of single indices while accounting for the complexities and multifaceted characteristics of financial development in terms of financial access, efficiency, and depth.

We, thus, summarize the objectives of the study in these questions: (1) What is the nature of the relationship between inward capital flows and macroeconomic volatilities? (2) How long does the impact of exchange rate volatility on capital flows persist? (3) Can financial development moderate the association between macroeconomic volatilities and capital flows? (4) At what points or critical values can financial development neutralize the adverse impact of macroeconomic volatility of private capital flows? We answered the above questions in three steps. In the first stage, we modelled the volatility of domestic macroeconomic uncertainty through a GARCH (1, 1) approach. We found that GARCH was appropriate in modelling volatility other than the traditional standard deviation and the ARCH (1, 0) due to its ability to capture previous volatilities. In the second stage, we investigated both the linear and non-linear relationship between the estimated exchange rate volatility, and capital flows via a panel model data estimation by the application of system GMM two-step orthogonal estimator. In the third stage, we estimated the association between exchange rate volatilities and inward capital flows conditioned on the levels of financial development, noting the marginal effects and threshold levels of financial development. Finally, we determined the critical values of the threshold at which financial development can eradicate the adverse impact of volatilities on capital flows through a marginal effect analysis.

4.2 Literature Review

4.2.1 Theoretical Review

Theoretically, there have been ambiguous positions on the relationship between the level of investment and uncertainty. Based on the framework of risk neutrality, there exists a positive association between uncertainty and investment. Under this framework, Hartman (1972) and further echoed by Abel (1983) contend that uncertainty is likely to boost the expected return on investment and thus becomes an incentive to increase the current level of investment stock. In other theories, where investments are irreversible (Dixit and Pindyck, 1994; Bernanke, 1983), scholars contend that there is an option to slow down on investment levels amid uncertainty. However, Carruth et al. (2000) provide somehow convincing evidence of an inverse relationship between investment and uncertainty. In a foreign investor's decision to invest in a host country, factors that are likely to be considered could be issues relating to political and economic stability. For instance, a continuous depreciation in the exchange rate of a host country provides reasonable grounds for increased investment as it reduces the cost of capital, value of assets, and production in foreign capital in contrast to the source country. Uncertainty will, however, derail the growth of investments as the foreign firm may find it challenging to plan, making the option to pause on investment more beneficial. Demir (2009) shows that rising economic uncertainty and country risks reduced fixed investments spending by most firms in the real sector.

The theoretical frameworks on capital flows also fall in line with the theories on risk neutrality, perfect market, and the expected return on investments enjoyed by foreign investors outside their home country. Many have looked at the theoretical basis on capital flows and the willingness of foreign investors to move abroad, such as Cushman's (1988; 1985) relative cost theory and later Froot and Stein's (1991) wealth position hypothesis. Cushman (1988: 1985) contends that the fall in the value of the local currency relative of the home currency relative to that of the foreign investors makes the cost of doing business and production cheaper in the destination country, especially for investors seeking production advantage. Thus, the theory of relative labour cost can explain the directional movement of capital flows to most countries. On the same tangent, Froot and Stein (1991) note that a fall in the value of a capital destination country leads to an increase in the value of assets owned by foreign investors thereby increasing the wealth of such foreign investors.

4.2.2 Empirical Review

On the empirics, we briefly assessed the factors driving capital flows to developing and emerging countries, including Africa. We then considered the association between macroeconomic volatilities and capital flows and finally, the association between capital flows and macroeconomic volatilities conditioned on the levels of certain absorptive features, especially, financial development. According to the IMF (2014) among the factors that drove portfolio, capital flows to SSA frontier markets between 2011 and 2013 are notable with push factors such as low yield on bonds, weak economic growth and excess liquidity in advanced countries, while the pull factors included low debt levels, structural reforms, and improved macroeconomic fundamentals. Using quarterly data for a set of twenty-nine emerging market economies between 2000 and 2012, Neir et al. (2014) assessed the effect of selected push variables on gross private capital flow. In the baseline model, they found that the financial cycle (VIX), growth differential with G4 economies, and interest rate differentials are key push determinants of gross private capital flows. On the pull factors, they found that while countries with robust financial services' sector attract large inflows, countries with the higher sovereign risk attract the least inflows. Summing up the debate, Hannan (2018) acknowledges the relative importance of both push and full factors in the movement of capital flows. In as much as surges in capital flows are mostly attributable to external factors, one cannot also ignore the importance of domestic structural dynamics such as financial market liberalization and integration with the global financial systems. Significantly, Hannan (2018) posits that the relevance of these two categorized determinants may depend on the type of capital flow.

On the association between perceived volatilities and the attraction of inward capital flows, the general hypothesis is that macroeconomic volatilities are negatively associated with all forms of private capital flows. Thus, investors and MNEs shun jurisdictions that are deemed volatile and flip-flop. Such jurisdictions attract less external capital because investors fear the loss of the capital invested. On the association between volatility and capital flows, Gouri et al. (2016) shows that volatility can predict the flow of international capital flows. From a sample of 26 emerging economies, they found that increases in stock market volatility lead to a fall in net capital flows, driven by the exit of foreign investors. They further showed that the adverse impact of volatility on capital flows comprised of both global and country-specific volatility. Proxying volatility of financial cycles by the volatility index, Neir et al. (2014) found the association to be non-monotonic. They contend that at high values of the volatility index, the impact on capital flows are marginally significant, but at the lower end of the index, changes in volatility have no statistically significant effect on the attraction of capital flows.

Assessing the effect of the unexplained component of exchange rate volatility of FDI in transition economies, Balaban et al. (2019) posit the effect varies based on specific sector FDIs, with an adverse impact on manufacturing sector FDI, positive for financial and total FDI inflows and insignificant on communication and transport sector FDI. On a study of ten Latin American and Caribbean economies, Dal Bianco and Loan (2017) observed an inverse impact of both price and exchange rate volatilities on FDI inflows between 1990 and 2012. Deseatnicov and Akiba (2016) also note that while foreign investors are likely to tolerate exchange rate and political uncertainties in developed countries, the same investors will not tolerate the similar levels of uncertainty of developing countries.

Employing the GARCH family models to model the volatility of the domestic exchange rate for Ghana between 1970 and 2002, Kyereboah-Coleman and Agyire-Tettey (2008) found that exchange rate volatility deters FDI flows to Ghana. Similarly, employing the GARCH framework in modelling inflation and exchange rate uncertainty, Undoh and Egwaikhide (2008) found the volatility of the variables negatively affect FDI flows to Nigeria. On a panel data on 40 SSA countries between 1996 and 2011, Asamoah et al. (2016) also found evidence in support of an inverse relationship between domestic exchange rate volatility and FDI flows.

The dominant theme emanating from the above review is that volatility of the exchange rate dampens capital inflows, though many empirics have been on the dominant type of capital flows, which is FDI. We further examined brief empirical studies on the mediating role of financial development in the volatility-capital flows equation and end with a specific focus on the relevance of financial development in the exchange rate volatility-capital flows nexus.

Although the initial relationship between financial integration and economic growth was weak, Ahmed and Mmolainyane (2014) noted that the position could be improved indirectly through the development of the capital market in Botswana. Using a panel dataset of 30 SSA countries, Ahmed (2016) found an initial adverse association between financial integration and economic growth. However, with a well-developed domestic financial market, the initial adverse relationship between financial integration and economic growth could be overturned. Moradbeigi and Law (2017) also found financial development as a moderating variable in reducing the dampening effect of oil abundance or resource curse on economic growth. Muazu and Alagidede (2017) contend that a well-developed financial sector can reduce the effect of real shocks on the various components of growth volatility, although the effect is more in the short run.

Few studies have found financial development to model the association between volatility and capital flows. Though Neir et al. (2014) show the relationship between volatility and capital flows is non-linear; they note that financial development intensifies the potential effect on volatility of the capital flows. At low developments of the financial sector, volatility has no significant impact on capital flows. However, as the financial sector develops the adverse impact of volatility on capital flows to emerging market countries increases. By proxying financial development with stock market capitalization, the intuition is that countries will want to attract capital flows in the presence of volatility and reduce the level of involvement in stock market participation. Using a panel dataset of 114 developing countries that included 39 African countries, Jehan and Hamid (2017) assessed the role of financial development in the association between domestic exchange rate volatility and capital flows. With a specific focus on FDI and remittances, the study employed bank credit and private sector credit as indicators of financial development to establish their empirical relationship. Initial estimations showed that exchange rate volatility deters FDI inflows. However, they showed that increases in financial development can mitigate the initial adverse effect as they found the coefficient of the interaction between all indicators of financial development and exchange rate volatility to be positive and significant. Though we found within the context of Africa, many have deployed institutions as mediating variables between volatility and capital flows (Asamoah et al. 2016; Asiedu 2013), the mediating role of financial development was conspicuously missing in relevant academic studies. We thus filled this gap as we employed a newly developed financial indicator, subdivided into financial markets and institutions indices to mediate the association between domestic exchange rate volatility and inward private capital flows.

4.3 Methodology

We presented the data sources and estimation procedures necessary to achieve the objectives of the study. We provided the primary sources of data. We then looked at the procedure for estimating the volatility of the macroeconomic variable after which we estimated our dynamic panel with a system GMM two-step procedure with forward orthogonal deviations.

4.3.1 Description of Data and Variables

We tested the study hypothesis over 28 years between 1990 and 2018. We selected countries based purely on the availability of data on capital flows and financial development. Secondly, the number of countries varied depending on the type of capital flows since we assessed each component differently. FDI regression consisted of 40 countries. Portfolio equity flows also consisted of 24 countries whiles private debt flows consisted of 21 countries[33].

Consistent with Opperman and Adjasi (2017) and Broto et al. (2011), we made use of net capital inflows as opposed to gross inflows. Unlike net flows, gross capital flows on African countries were not readily available, and not comprehensive in terms of coverage. We obtained all measures of capital flows from the World Development Indicators (WDI) of the World Bank. We also sourced data on financial development from the International Monetary Fund.

4.3.1.1 Private Capital Flows

The definition of private capital flows are as defined by the World Development Indicators of the World Bank. According to WDI (2018), **"Foreign direct investment (FDI)** is the decision by a foreign entity to acquire a lasting interest in another entity other than one in its home country, where such interest usually is not less than a 10% stake. The interest is the

[33] The list of countries can be found as appendices at the end of the chapter.

accumulation of equity capital, reinvestment of earnings, other long-term capital, and short-term capital, as shown in the balance of payments." FDI is net inflows scaled by GDP. **Portfolio equity flow (PEF)** is the equity securities except for those considered to be direct investments. "It embodies shares, stocks, depository receipts (American or global), and direct purchases of shares in local stock markets by foreign investors". PEF is portfolio equity flows expressed as a percentage of GDP. **Private non-guaranteed debt (PNG)** is an external obligation of a private debtor that is not backed by a guarantee in terms of repayment by any entity. "Net flows received by the borrower during the year are disbursements minus principal repayments. Long-term external debt is debt that has an original or extended maturity of more than one year, and that is owed to nonresidents by residents of an economy and repayable in currency, goods, or services" (WDI, 2018). It is an external obligation of a private debtor that is not guaranteed for repayment by a public entity. PNG is net flows as a ratio of GDP.

4.3.1.2 Macroeconomic Volatility

The volatility of macroeconomic variables looks at the short-run movements in the trends of these variables over a relatively long period. Volatilities hinder the ability of firms and businesses to plan over a long period as movements of such variables are unpredictable. Uncertainties emanating from economic variables can distort the quantum of both domestic and foreign investment for a country. Thus, investors consider the extent of volatility, not only those connected with macroeconomic variables but also political, social, and institutional uncertainties in their decision to invest abroad.

Domestic Macroeconomic Volatilities: The Exchange rate volatility

We employed the exchange rate as our proxy for domestic macroeconomic volatility. Regarding the exchange rate, which is the official rate at which one can exchange a unit of the home currency for foreign currency, the volatilities of the exchange rate have dire consequences on investment. Linking the exchange rate and investment, the depreciation of a capital recipient country's currency increases the value of investments due to two reasons. First, the depreciation of the home currency relative to source currency makes the cost of production inputs very cheap and, therefore, beneficial to multinationals seeking production advantage away from home. Secondly, the depreciation of the host currency lowers the value of assets relative to that of the foreign currency. Thus, holding the quantum of foreign currency, multinationals can undertake huge investments and projects in the host country. Accordingly, the quantum of foreign investments increases through the injection of capital. However, exchange rate uncertainty is likely to derail gains made on investments as the associated uncertainty can distort the investment decisions of multinationals leading to a dip in the quantum of investments. Uncertainty will affect production projections, expected return on investments, and the value of assets or investment by multinationals. Accordingly, the IMF (2016) notes the relevance of exchange rate depreciation in curbing the effect of global capital flows cycle on the economy of a lot of emerging market countries. Bruno and Shin (2015) also note that countries with higher real effective exchange rates attract large volumes of capital flows. However, as indicated earlier, Kyereboah-Coleman and Agyire-Tettey (2008) and Asamoah et al. (2016) found an inverse relationship between exchange rate volatility with FDI flows. We estimate the volatility of the real effective exchange rate as consistent with Alagidede and Ibrahim (2017), Asamoah et al. (2016), and Kyereboah-Coleman and Agyire-Tettey (2008).

4.3.1.3 Financial Development

The literature has primarily focused on either banking or stock market indicators as proxies for financial development to the neglect of the impact of other equally essential market indicators such as insurance, pension funds, bonds, mutual funds (Ito and Kawai, 2018).

Equally important are the additional roles of nonbank financial institutions such as venture capitals, microfinance institutions, investment banks, credit unions, and savings and loan institutions. This is because the concept of financial development is multidimensional and should not be confined to only traditional indicators. The current proxies are also skewed in terms of the quantity aspect of financial development (size and depth) to the neglect of the qualitative aspects of financial development such as efficiency, liquidity, cost-profit performance, diversity and the institutional environment including legal systems (Ito and Kawai, 2018; Hasan et al., 2009). We used a broad-based index of financial development that overcomes the limitations of single indices while accounting for the complexities and multifaceted characteristics of financial development. Recently developed by the IMF, the index takes into account financial markets and institutions development in terms of depth (liquidity and size of markets), efficiency (low-cost financial services amidst sustained revenues, and capital market activities) and access (i.e. the accessibility of financial services) Svirydzenka (2016). The index is constructed using data from various sources that include the IMF's financial access survey, the BIS debt securities database, Dealogic corporate debt database, and the World Bank FinStats 2015. The index has recently been deployed as the ultimate measure of financial development (Hannan, 2017; Berhane, 2018; Khan et al., 2018 and Tchamyou et al. (2019). To get a deeper understanding of the impact of the development of the financial sector, we further assessed the conditional impact of financial development from the two sub-indices making up the broad financial development index. The use of the sub-indices gave us an indication of which aspects of financial development were critical in the linkage between capital flows and macroeconomic uncertainties. These were the financial institution's index and the financial market index. Accordingly, Svirydzenka (2016) transcripts that these two sub-indices look at the development of financial markets and financial institutions in terms of access, depth, and efficiency. While financial institutions focus on the standard banking sector, financial markets are concerned with stock and debt markets development. On the relative importance of the new indicators, Svirydzenka (2016) is convinced that “The indices are an improvement over the traditional measures of financial development. Conceptually, they incorporate information on a broader range of financial development features for a wider array of financial agents” (Svirydzenka (2016, pp. 20).

4.3.1.4 Control Variables

Consistent with the literature on the determinants of capital flows, we employed a set of variables to act as controls in the analysis. We measured trade as the sum of imports and exports of goods and services scaled by GDP. We then measured financial openness with the Chinn and Ito (2008) index of financial openness. Based on the virtues of financial and trade liberation, as indicated by the neoclassical, we expected a positive impact of both trade and financial openness. On the determinant of FDI to Africa, Asiedu (2002) notes that openness to trade matters in the attraction of FDI. We measured natural resources endowment as the sum of natural gas, minerals, coal forest, and oil rents, expressed as a percentage of GDP. Though natural resource is one of the driving factors of FDI into the extractive sector, the literature remains inconclusive on the directional effect. While Asideu (2013) found natural resources to deter FDI inflows, Dupasquier, and Osakwe (2006) found a positive impact of natural resources on FDI inflows. Significantly, the effect of natural resources on portfolio investments is equally mixed. We therefore, expected a mixed effect of natural resources rents on capital flows. We measured human resources or human capital development with data from the Penn World Tables (Feenstra, Inklaar, and Timmer, 2015). The index is based on years of schooling and returns to education. To the extent that foreign investors will not come along with human capital, they will depend on domestic human capital to convert raw materials into finished goods. Lucas (1990) noted that differences in human capital differentiate the flow of capital between countries. We hypothesized a positive effect of human capital on the attraction of capital flows. Consistent with most exchange rate volatility studies, we controlled for the real effective exchange rate of host countries. We expected that the devaluation of the host country's currency relative to foreign currency will make a host country attractive to foreign enterprises. We anticipated a positive impact of exchange rates on capital flows. We then obtained data on all controls except for financial openness and human development from the World Development Indicators (WDI) of the World Bank.

4.3.2 Regression Model Estimation

Our baseline equation relates to theory of Bean (1981) and Darby et al. (1999) on the determinants of investments, where investment growth in a country is primarily a function of economic growth and the cost of capital. Since MNEs view capital flows as a form of investment, we related the above theory on the determinants of investment to the factors affecting MNE's decision to invest abroad. We thus specified our initial equation like Hannan et al. (2018; 2017) and Neir et al. (2014) by relating private capital flows to a set of determinants grouped as domestic macroeconomic volatility, financial development, and a set of controls. Equation (4.1) simplifies our baseline regression as:

$$PCF_{it} = f(DMV_{it},\ FD_t,\ CONT_{it}) \tag{4.1}$$

From equation (4.1) PCF_{it} measures a set of private capital flows (FDI, PEF, PNG) for country *i* at time *t*; DMV_{it} denotes a vector of domestic macroeconomic uncertainties known to deter capital flows to country *i* at time *t*. In this study, we proxy DMV_{it} by the exchange rate uncertainty. $CONT_{it}$ denotes a set of controls in a standard capital flows or investment model. However, since the focus of our study was on assessing the volatility of domestic macroeconomic variables on the attraction of private capital flows, we first tested the evidence of a linear association between macroeconomic volatilities and the attraction of private capital flows. Our principal question was whether volatilities of the domestic macroeconomic variables deter or stifle the inflow of private capital flows to Africa. We thus expanded equation (4.1) to be:

$$PCF_{it} = \alpha PCF_{it-1} + \Sigma\beta_1 \mathrm{DMV}_{it} + \Sigma\beta_2 X_{it} + U_i + \varepsilon_t + \lambda \mathrm{t}_{it} \qquad (4.2)$$

PCF_{it} is a vector of private capital flow variables representing foreign direct investment, portfolio equity, and private non-guaranteed debt. PCF_{it-1} is a lag of private capital flows testing for convergence and reinforcing effects as suggested in a dynamic panel data setting. DMV_{it} indicates domestic macroeconomic volatilities proxied by the domestic exchange rate. X_{it} denotes a set of controls in a standard capital flows or investment model that includes trade openness, financial openness, human capital development, natural resources endowments. $U_i, \varepsilon_t, \lambda \mathrm{t}_{it}$ signifies country effects, a time-varying idiosyncratic shock with the standard *iid* assumption, and a model error term.

From the above equation (4.2), β_1 was our variable of interest. It tests the direct effect of domestic macroeconomic volatilities on capital flows to Africa. Our prior expectation was a negative impact of volatility on the attraction of capital flows. However, a positive effect was high probably because of the theory of investment reversibility.

4.3.2.1 Non-linear Estimation

We further examined the possibility of a non-linear relationship between domestic macroeconomic volatility and the attraction of private capital flows. Such an analysis helped to determine if the impact of volatility is strictly monotonic or varies at certain points along the slope of the volatility. For instance, does the relationship between volatility decrease at the start of the interval and increase at the end of the interval, or is it vice versa? Again, the principal question was whether any possible adverse effect of volatilities on capital flows could depend on the levels of volatilities. To test the above hypothesis of a non-linear relationship, we followed Lind and Mehlum (2010) and tested for evidence of a U-shaped or an inverted U-shaped relationship. The model has recently been employed by Neir et al. (2014) in the capital flows literature. We, therefore, extended equation (4.2) to include the square or quadratic term of the macroeconomic volatility. Equation (4.3) is specified below:

$$PCF_{it} = \alpha PCF_{it-1} + \Sigma\beta_1 \mathrm{DMV}_{it} + \Sigma\delta(\mathrm{DMV}_{it})^2 + \Sigma\beta_2 X_{it} + U_i + \varepsilon_t + \lambda \mathrm{t}_{it} \qquad (4.3)$$

From equation (4.3), DMV^2 is the quadratic term for the domestic macroeconomic volatilities. The remaining variables remain as explained in equation 4.2. Regarding the existence or otherwise of a non-linear relationship, Lind and Mehlum (2010) propose a set of three-step procedure. The first is the sign and direction of the quadratic term. There exists an inverse U-shaped relationship when the coefficient of the linear term is positive, and that of the quadratic term is negative and significant, while a U-shape exists when the coefficient of the linear term is negative, and the quadratic term is positive and significant. The second step notes that the slopes at the extreme ends of the data (minimum and maximum) must be sufficiently steep. Thus, for an inverse U-shaped, the slope at the minimum data point must exhibit positive and significant effects while the slope and the maximum data point should be negative and significant. Using the DMV in regression model (4.3) above, the joint null hypothesis at the extreme ends of the data under an inverse U-shaped relationship according to Lind and Mehlum (2010) and further by Arcand et al. (2015) is stated in equation (4.4) and (4.5) below:

$$H_0 : (\beta_1 + 2\delta DMV_{min} \leq 0) \; U \; (\beta_1 + 2\delta DMV_{max} \geq 0) \qquad (4.4)$$

$$H_1 : (\beta_1 + 2\delta DMV_{min} > 0) \cap (\beta_1 + 2\delta DMV_{max} > 0) \qquad (4.5)$$

DMV_{min} and DMV_{max} are the minimum and maximum values of the DMV. The corresponding t-statistics, which also corresponds to the rejection zone, can also be estimated. Following Kuo et al. (2014), let θ_1 represent the variance estimation of$\widehat{\beta_1}$, $\theta_2$is the estimated variance of$2\hat{\delta}$, while θ_3 is the covariance estimation of $\widehat{\beta_1}$ and$2\hat{\delta}$. The values $\widehat{\beta_1}$ and $2\hat{\delta}$ represent the estimated values of $\beta_1$and2δ, correspondingly. Thus the corresponding t-statistics at the minimum and maximum values of DMV is stipulated in equation (4.6) below:

$$T_i = \frac{\beta_1 + \widehat{2\hat{\delta}(DMV)}}{\sqrt{[\theta_1 + 2\theta_3(DMV_i) + \theta_2 \ (DMV_i)^2]}} \ ; i = \max or \min point \qquad (4.6)$$

The final procedure suggested the estimation of the point of inflection or the turning point of the quadratic term at a minimum and maximum values, must lie within the range of the data set. Again, we took the partial derivative of equation (4.3) which yielded the threshold or turning point at which the effect of volatilities on capital flows becomes non-monotonic. The partial derivative is presented in equation (4.7)

$$\frac{d(PCF)}{d(DMV)} = \beta_1 + 2\delta DMV \qquad (4.7)$$

At this point, the additional surges in volatilities might have no impact on private capital net flows. Such a relationship could be concave or convex. That point inflection was achieved by setting equation (4.7) below to zero and making DMV the subject, as exhibited in equation (4.8)

$$\beta_1 + 2\delta DMV = 0; \qquad DMV = \frac{\widehat{\beta_1}}{\widehat{2\delta}} \qquad (4.8)$$

We tested the above condition at the 95% confidence interval of the turning point. There was evidence of a U-shaped relationship once the confidence interval lies within the range of the data (Haans et al. 2016; Kuo et al. 2014). According to Brambor et al. (2006), we could also interpret equation (4.7) by looking at the interpretation of interaction models, where the effect of DMV on the attraction of net capital flows is dependent on varying levels of DMV itself.

We now assessed the ability of a host country's structural characteristics to deal with any form of volatilities associated with the inward capital flows. We did this based on the literature on the relevance of absorptive capacities of host countries in the attraction and retention of capital flows (Durham, 2014; Alfaro et al. 2010). We looked at the absorptive features in the form of financial development. We, therefore, estimated another regression model leading to the attainment of the study's current objectives.

4.3.2.2 Private Capital Flows, Macroeconomic Volatilities, and Financial Development

With the prior expectation that macroeconomic volatilities can be damaging to the attraction of capital flows, we sought to examine whether the levels of financial development was essential in a country's ability to overturn the adverse impact of macroeconomic volatility, in order to increase the quantum of any form of capital flows. In extreme cases of a positive effect of volatilities on private capital flows, we also sought to ascertain if the current levels of financial development can play a significant role in partnering volatilities to rig in large volumes of private capital flows. We therefore, ascertained the moderating effect of financial development in the capital flows-macroeconomic volatility dynamics in two simple steps. The first was to include an interaction term of economic volatility, and financial development in the capital flows in the linear equation in (4.2) above. We thus estimated equation (4.9) below:

$$PCF_{it} = \alpha PCF_{it-1} + \Sigma\beta_1 \mathrm{DMV}_{it} + \Sigma\beta_3 X_{it} + \beta_4 \mathrm{FD}_{it} + \beta_5 (DMV * \mathrm{FD})_{it} + U_i + \varepsilon_t + \lambda \mathrm{t}_{it} \tag{4.9}$$

From the above equation, while β_4 and β_1 examines the direct effect of financial development and *DMV* on the attraction of capital flows, our variable of interest was β_5, which assesses the effect of volatilities on private capital flows conditioned on varying levels of financial development. It is essential to note that in equation (4.9), the constitutive terms $\beta_1$and β_4 need not be explained as consistent with interaction models. The impact of these variables on capital flows is conditional on varying degrees of each other, from the angle of which one is the conditional variable. While β_1 captures the effect of *DMV* on capital flows when financial development is zero, β_4 also captures the impact of financial development on capital flows when *DMV* is zero. However, what if the values of *DMV* and FD are different from zero? Thus, in equation (4.9) the coefficient of DMV and financial development ($\beta_1$and β_4) are only conditional marginal variables, whose impact on private capital flows depend on the marginal effect of each other. The assessment of the conditional varying points (marginal effects) showed that the effect of volatilities on capital flows in the presence of financial development was not static as may be in the case of equation (4.2), but the impact of any change in capital flows resulting from macroeconomic volatilities depends on the different levels of financial development.

This marginal effect assessment is essential as one cannot make any meaningful assessment of the impact of volatilities on capital flows by merely focusing on the coefficient of the interaction (β_5) between *DMV* and FD. Again, the determination of the marginal effect is vital because, macroeconomic volatilities may have a significant impact on capital flows at modifying values of financial development, even when the coefficient of the interaction between the two is insignificant (Neir et al. 2014; Brambor et al. 2006; Ai and Norton; 2003). Thus, the marginal effect in our case was the partial derivative of equation (4.9), where we took the first derivative of PCF to *DMV*, which results in equation (4.10).

$$\frac{d(PCF)}{d(DMV)} = \beta_1 + \beta_5 FD \tag{4.10}$$

Should we find both β_1 and β_5 to be positive values, then fractional increases in volatilities will lead to increases in capital flows based on increasing values of financial development up to the point where private capital is optimized. However, with the hindsight that volatilities deter capital inflows (Asamoah et al. 2016; Kyereboah-Colema and Agyire-Tettey, 2008), and financial development also attracts capital inflows (Agbloyor et al. 2013), there was the probability of an adverse effect of macroeconomic volatility and positive effect of financial development on capital flows. In such a scenario, we sought to ascertain the percentile levels of financial development necessary to reduce any adverse impact of macroeconomic volatility on capital flows, and if possible, to completely eradicate the negative impact of volatilities on private capital flows in Africa. Brambor et al. (2006) further require that standard errors for the multiplicative term be captured separately from the standard error of the constitutive terms. Equation (4.11) shows the standard errors for the interactive term.

$$se\left(\frac{d(PCF)}{d(DMV)}\right) = \sqrt{var(\widehat{\beta_1}) + FD^2 var(\widehat{\beta_5}) + 2FD_{cov}(\widehat{\beta_1}\widehat{\beta_5})} \tag{4.11}$$

From the above equation, a negative covariance indicates the possibility of a significant marginal effect ($\beta_1 + \beta_5 FD$) from financial development, even if all other indicators are insignificant. Thus, the analysis of such a multiplicative term equation needs further analysis. Given the continuous nature of the measures of financial development, we sought to assess the marginal effect of macroeconomic volatilities on the attraction of capital flows at the different percentiles of financial development.

4.3.3 Estimating Real Effective Exchange Rate (REER)

We estimated the REER by the application of the purchasing price parity (PPP) approach. According to the PPP, a country's REER is a function of its nominal exchange rate (NER) relative to the ratio of a foreign price level to the national price levels. The PPP looks at the competitiveness of a country's goods and services in terms of international trade. The PPP contends that pricing structures in countries underline cost differentials among countries. We proxied our foreign price levels by the USA producers' price index and adjusted the NER by the price differentials between the USA and each of our sample countries. Following Elbadawi (1992), we define the REER for each country as:

$$RERR_i = NER_i * \frac{PPI^{US}}{CPI_i} \tag{4.12}$$

From equation (4.12), NER_i denotes the nominal exchange rate of a country, which is the value of the domestic currency needed to exchange a unit of the United States dollar. PPI^{US} represents the producers' price index of the United States, which was our proxy for foreign price levels. CPI_i denotes the domestic price level, which is captured by the consumer price index. It implies that a decrease (or an increase) in the REER leads to a real appreciation (or depreciation) of the domestic currency. We obtained data on the USA producer's price index from FRED. The real exchange rate is important as it also captures the effect of inflation differentials to provide a robust measure of the price of foreign currency in real terms.

4.3.4 Modelling Volatility

Modelling the volatility of macroeconomic variables was a daunting task given the numerous mechanisms of capturing volatility in the literature. According to Frenkel and Goldstein (1991), volatile economic indicators denote the short-term variations in the levels of these indicators in their longer-term movements. Associated capital flows-volatilities studies in

Africa have primarily captured volatilities by either the standard deviation over a rolling window approach (Opperman and Adjasi, 2017) or the Arch-GARCH framework (Asamoah et al. 2016; Brafu-Insaidoo and Biekpe, 2011; Kyereboah-Coleman and Agyire-Tettey, 2008). Other studies that have used GARCH to capture the volatility of economic indicators in Africa include Alagidede and Ibrahim (2017). We stuck with the GARCH family models as it overcomes the limitations of the traditional standard deviation approach. According to Bah and Amusa (2003), the GARCH family models are known to capture volatilities in macroeconomic indicators much accurately than the rudimental standard deviation mechanisms. Furthermore, McKenzie (1999) notes that economic variables such as exchange rates are best fitted with a GARCH procedure. More importantly, the GARCH procedures allow current volatility to depend on its previous volatility. Using the GARCH process, we derive our volatility as follows:

$$VOL_t = \delta + \phi VOL_{t-1} + \varepsilon_t \tag{4.13}$$

Where $\varepsilon_t \approx iid\ N(0, h_t)$

$$h_t = \beta + \psi \varepsilon_{t-1}^2 + \chi h_{t-1} \tag{4.14}$$

Note that $\beta > 0$; $\psi \geq 0$; $\chi \geq 0$.

From equation (4.14), our conditional variance (h_t), is a function of the mean (β) of the conditional variance, information about the past volatility, which is the lag of the squared residual ε_{t-1}^2 (ARCH term); and the previous forecast error variance, χh_{t-1} (GARCH term).

We began with a test of stationarity to ensure that our economic variable was stationary in order to avoid incidence of spurious regression. We thus performed a unit root test by the application of an augmented Dickey-Fuller test (Dickey and Fuller, 1979). In instances when variables are not stationary in levels or integrated at order zero, then the variables must be differenced at the first level (integrated at order 1), or the second level (integrated at order 2). Once, our variables were stationary; we estimated the mean-variance equation. The mean-variance equation allowed us to generate the mean-variance series which captures the volatilities in our domestic macroeconomic variable. The case of a GARCH (1, 1) showed the presence of a first-order moving average ARCH term and first-order autoregressive GARCH term. Based on equation (4.14), the ARCH term denotes ψ while the GARCH term denotesχ. As indicated, the ARCH terms capture current news on volatility, while the GARCH term captures the impact of previous volatility on the current volatility. The sum of the ARCH and GARCH terms $(\psi + \chi)$ captures volatility persistence. The assumption was that the impact of volatility will linger on for a more extended period if the sum of the ARCH and GARCH terms is closer to unity. We also tested for the absence of serial correlation and Arch effects.

4.3.5 Panel Data Estimation – System GMM

Many regression estimations face issues of measurement errors, reverse causality, endogeneity and omitted variable bias. One way to deal with such issues is the use of a dynamic panel data estimation procedure. Dynamic panel data estimations have unobserved panel level effects which are known to be associated with lags of the dependent variable, thereby rendering standard estimators inconsistent. Dynamic panel estimators help capture agglomeration effects by including the lagged of the dependent variable (capital flows) as an explanatory variable. We did this for the fact that capital flows have a reinforcing effort. As contended by Bond (2002), the inclusion of the lagged dependent variable allows for dynamics in the underlying process to recover consistent estimates of other parameters, even if the lagged dependent variable is not a variable of interest. We employed the system generalized methods of moments (GMM) estimator as propelled by Blundell and Bond (1998), as opposed to the difference GMM by Arellano and Bond (1991) because of the inherent limitation of the latter. Among these limitations is the use of lagged regressors in their levels as instruments in differences. Accordingly, instrumentation using lagged variables are known to be inefficient if these regressors are persistent over time (Arellano and Bover 1995). Though the differencing reduces any potential country-specific unobserved fixed effect, the difference GMM is deemed to be downwards bias and less precise because it has inferior finite properties. However, the system GMM employs lesser instruments and additional moment conditions to correct for the subject of weak instruments in the difference GMM, making it more efficient (Hayakawa, 2007). The system GMM estimator was further employed due to the relationship between the duration of our study and the sample size, especially in the case of foreign direct investments. As noted by Rodman (2009), the estimator is also applicable where there are small periods and larger sample sizes.

We preferred the two-step GMM estimator, in contrast to the one-step, because the two-step is known to be asymptotically more effective and vigorous in the face of heteroscedasticity. We further used the Windmeijer (2005) finite-sample correction to obtain efficient standard errors where most appropriate and applied the small option to correct for small sample bias to the covariance matrix (Rodman, 2009). We made use of the forward orthogonal deviations to improve the efficiency of our results due to the availability of gaps in our panel sample. To check the validity of the system GMM estimator, we report the p-values of two significance tests. The first is the second-order serial correlation [AR(2)], which tests whether the error terms are serially correlated or not. If there are serial correlations in the first order, it may not count, unlike in the second order. The second is the Hansen J test, for over-identification restrictions on the validity of instruments employed in the regression estimation. The Hansen J tests the null hypothesis that over-identifying restrictions in instruments do not correlate with the error term. Hansen (1982) contends that only p-values of the test higher than 0.1 should be accepted. The strength of these tests depends on the nature of the relationship between the sample size and number of instrument counts. Thus, to avoid instrument proliferation and model over-fitness, we followed Rodman (2009) and collapse our instrument matrix. The appropriate relationship is that the ratio (*r*) of the sample size (*n*) to the number of instrument counts (*i*) should be higher or equal to one (i.e., $r = n / I \geq 1$). This means that in all regressions, the number of instruments should be reduced to the point where it does not exceed the sample size (Asiedu, 2013; Rodman, 2009). We treated all variables, except for the indicators of volatility, the levels of the volatility variables and financial development as exogenous. These three variables are endogenous in the analysis. We limited the lags of these variables to a maximum value of two periods and used them as instruments. For all specifications, the lagged of the capital flows were regarded as predetermined, with all controls treated as exogenous. We did not introduce any external instruments. This was influenced by the sufficiency of instruments in the system GMM estimator. In the GMM estimator, the first difference of the exogenous variables, the lags of all endogenous variables, and lagged difference of the endogenous variables are used as standard instruments in the dynamic panel estimation (Arellano and Bond, 1991). Again, we used only internal instruments due to the difficulty in identifying additional external instruments. Furthermore, we sought to maintain the assumption of fewer instruments relative to the sample size (Rodman, 2009; Asiedu, 2013).

4.4 Discussion of results

We first present the results of our volatility estimation to ensure that we followed the right procedures in the generation of our volatility series. These include tests of stationarity, ARCH and GARCH persistence, tests for serial correlation and heteroscedasticity. Once these conditions have been satisfied, we began our formal analysis with a description of our variables. Descriptive statistics enabled us to explore our data and laid bare the pattern of the variables employed in our study. We then examined the nature of the relationship between our capital flows and volatility, both linear and non-linear through a panel data estimation. Finally, we tested the conditional levels of financial development at which volatilities affect the attraction of capital flows.

4.4.1 Estimation of Exchange Rate Volatility

Regarding the domestic macroeconomic variable, we first estimated the growth rate of the exchange rate by taking the log difference of the real effective exchange rate. We then applied our GARCH (1,1) estimation on the generated growth of the annual exchange rates. The first was to eliminate any possibilities of non-stationarity in the exchange rate. We, therefore, performed a test of stationarity by the application of the Augmented Dick-Fuller (1972) unit root test. The ADF test was performed with an intercept, then with an intercept and trend, and lastly with no trend and intercept at 5% significance level. Stationary attained in levels thus integrated at zero or I (0) or higher levels of integration, mostly at first differencing [order one or I (1)] or second differencing [order I (2)]. All countries attained stationarity in levels or order I (0) of the growth in exchange rate.

Once all variables were stationary, we then estimated the mean-variance equation. Estimating the conditional variance equations from equation (4.14), we found the mean (β) to be mostly significant, though not in all cases. Again, we found information about the previous volatility as captured by the squared of the residuals (ε_{t-1}^2) from the mean, which represents the ARCH term to be generally significant, albeit not under all estimations. However, information about the previous forecast volatility (h_{t-1}), which represents the GARCH term was found to be positive and significant under all estimations. Finally, we ascertained evidence of volatility clustering and persistence by adding the sum of the coefficients of the ARCH (ψ) and GARCH (χ) terms. According to Enders (1995), volatility shocks are deemed to be persistent when the sum of the coefficients is close to unity ($\psi + \chi \approx 1$), and that impact from volatility will linger over a long period. Significantly, we found the sum of all ARCH and GARCH terms to be closer to unity.

To give credence that our GARCH model was specified, we performed two additional tests of serial correlation (of the residuals and the squared residuals) and conditional heteroscedasticity. We used the Ljung-Box statistics to confirm that our series did not suffer from autocorrelation, up to a lagged value of 12. Also, the ARCH LM statistics for heteroscedasticity test the null hypothesis that there is no ARCH effect present in the residuals. The insignificance of the Observation * R-squared settles on the absence of conditional heteroscedasticity. Thus, we derived our volatility variables with the right specifications and procedures.

4.4.2 Descriptive Statistics

Given that our sample sizes varied concerning the three types of capital, we present three types of summary statistics. We display these descriptive as an appendix to the chapter. We analysed our capital flows variables as these appear once under all three descriptive tables. From Table 4.1A, the value of FDI of 3.61% confirms the assertion that FDI flows to Africa has generally being deemed lower compared to the rest of the world. The WIR (2017) notes that Africa's share of global FDI inflows has hovered around the 5% mark between 2013 and 2016. Uncertainty surrounding the flow of FDI to Africa seems high when one looks at just the absolute indicator of risk (8.052). However, the risk per return on FDI shows a lower risk as indicated by the coefficient of correlation (2.234). Comparing the mean of FDI with that of portfolio equity (0.312%) and private debt flows (0.199%) in Tables 4.1B and C indicates that FDI remains the most preferred form of capital to Africa, followed by equity flows and debt flows. In the same order, the absolute measure of risk indicates that FDI is the riskiest. However, the risk per return shows that portfolio equity is the riskiest type of capital flows with a coefficient of variation of 12.799, followed by private debt flows with a coefficient of variation of 11.721. Again, these values confirm the known assertion that FDI is the most stable form of capital flows while equity flows is the riskiest, usually described as hot money. Since there are various types of currencies in Africa, we logged the exchange rate volatility variable to make it easily comparable across countries. Across the three descriptive, the lowest mean value of exchange rate volatility shows that on the average, currencies in Africa are 3.73% volatile relative to a unit of the US dollar, with a high volatility value of 4.13% per 1% change in the US dollar. There seems to be a gradual depreciation of most African currencies against the US Dollar and are very volatile. However, the low standard deviations and coefficient of variations indicate that the rate of volatility does not vary widely among countries.

Across the three descriptive tables, all three indicators of financial development confirm the notion of low financial development on the continent. With each index normalized to lie between zero and one, this means all three support the view that the banking sector is more developed than the stock markets, and that banks drive financial development in Africa. We focus on Table 4.1A because it covers large countries. While the financial institution's index had a mean value of 0.234, the financial market index was 0.048, dropping the mean of the composite index to 0.142. Again, the risk per return show that financial markets are riskier than financial institutions and the overall financial development index. Observations show that only thirteen (13) out of the forty (40) countries lie above the mean value of the financial development index, fourteen above the financial institution's index, and just nine above the financial market index. South Africa is the most developed under all three indicators with a study period averages on 0.483, 0.60, and 0.356 for financial development, institutions, and markets, respectively. The least developed under all three is Guinea Bissau for the study period, with averages of 0.032, 0.063, and 0 for financial development, institutions, and markets in that order. On a relative ranking of 183 countries in 2013 in terms of access to depth and efficiency, Svirydzenka (2016) found that only twelve (12) African countries appeared in the first 100 under the overall financial development index, seven (7) under the institution's index and nine (9) under the financial market index. Africa lacks behind in terms of financial development. It is worthy to note that the average financial market index for our data (0.048) is closer to the results of Svirydzenka (2016), which ranged between 0 and 0.046. On why financial development is deemed low on the continent, Honohan and Beck (2007) attributed the situation to a host of factors that included macroeconomic instability, lack of regulatory independence, weak governance structures, and the largely informal nature of most economies.

The statistics on financial openness may support the low level of financial development across the continent, as we found a low average value (-0.648) over the study period. This indicates that financial reforms and liberation on the continent requires some attention. Most countries are however seen to adopt trade liberation as the average trade openness is around 67.8%, 66.3% and 63.18% and lower risk values across all three tables. In situations where there is the possibility of outliers such as the case of trade openness, where there are large variance between the minimum and maximum values, we winsorized such variables at the upper and lower 5% of the distribution.

4.4.3 Regression Results – System GMM

We began our analysis of the linear and non-linear relationship between domestic macroeconomic volatility and the attraction of capital flows. We then ascertained the moderating impact of both volatility indicators with indicators on financial development on the attraction of capital flows. We then looked at the association between the interaction of volatilities and indicators of financial development on capital flows. Lastly, we looked at the marginal effect of volatilities on capital flows at varying levels of financial development.

4.4.3.1 Linear and Non-linear effect of exchange rate volatilities on capital flows

The initial analysis in table 4.3 tests both the linear and non-linear effect of exchange rate volatility on all three components of capital flows. From Table 4.3A, models 1 to 3 test the linear relationships, while models 4 to 6 present the results of the non-linear (quadratic) impact of exchange rate volatility on capital flows.

Our results from the linear estimation in models 1 to 3 gave credence to the theoretical proposition that uncertainty hurts the level of investment. We found evidence at conventional significance levels that exchange rate volatilities tend to reduce all forms of private capital inflows to Africa. Thus, in an environment of uncertainty that emanates from the domestic exchange rate, foreign investors are more likely to hold back on increases in the level of investments, be it FDI, portfolio equity, or debt flows. The antagonistic relationship between exchange rate volatility and capital flows is consistent with the theories of real options and investment irreversibility that the level of uncertainty allows investors to postpone current investments, causing a fall in current investment levels. Thus, at high levels of uncertainty, economic agents are likely to invest less (Dixit and Pindyck, 1994; Akkina and Celibi (2002). Again, consistent with the argument of Bénassy-Quéré et al. (2001), economic volatilities, especially, exchange rate, presents extra risk to the adjusted return on investment to foreign affiliates, leading to holding on future investments. They admit that the adverse impact of volatility on capital flows is equivalent to misalignment.

Our results call for stability in the management of exchange rate on the continent, as we found less volatile exchange to have a positive relationship with FDI flows. The positive relationship from exchange rate confirms the assertion that the depreciation of the domestic currency attracts foreign capital, as it leads to an appreciation in the value of capital invested and the overall position of business in terms of asset valuation. The results confirm the espoused view of Froot and Stein (1991) and Ang (2008) that local currency depreciation is a bait to attract foreign capital as it lowers the cost of production and increases wealth, relative to their home currency. Generally, stability of economic variables in the economy aids businesses to plan and forecast for the future. We, however, noted an inverse relationship between the depreciation of the exchange rate and debt flows in model (3). One possible reason could be that most debt arrangements have fixed terms of payment over the period of the arrangement and therefore are not affected by fluctuations in the domestic exchange rate. Kim (2019) found similar results for a set of emerging countries after establishing an inverse relationship between the depreciation of the exchange rate and debt denominated in foreign currency.

Results from models 4 to 6 support the assertion of non-linearity in the association between uncertainty and investments. From model 4, we found the coefficient of the linear exchange rate volatility to be negative while the coefficient of squared exchange rate volatility was positive and significant on FDI flows. The same observation is seen in models 5 and 6, where the coefficient of linear volatility maintains its initial negative sign, but the squared term appears positive and significant on portfolio equity and private non-guaranteed debt flows. The significant negative coefficients for the linear terms and the subsequent significant positive coefficients of the quadratic terms indicate the observance of a non-linear U-shaped relationship between volatility and capital flows.

Table 4.3A: Capital Flows and Domestic Macroeconomic Volatility – Linear and Non-linear Relationships

	Linear		**Model**	**Quadratic**		**Model**
	(1)	**(2)**	**(3)**	**(4)**		
Dependent Variables	**FDI**	**PEF**	**PNG**	**FDI**	**PEF**	**PNG**
Constant	-3.895 (1.118) ***	0.344 (0.146) **	1.899 (0.576) ***	-4.465 (1.160) ***	0.283 (0.135) **	1.695 (0.446) ***
Lag Dependent Variable	0.087 (0.034) **	0.619 (0.015) ***	0.102 (0.013) ***	0.086 (0.030) ***	0.601 (0.016) ***	0.509 (0.34) ***
Exchange rate	0.148 (0.069) **	0.007 (0.002) ***	-0.042 (0.022) *	0.198 (0.081) **	0.011 (0.004) **	-0.025 (0.012) *
Exchange rate volatility	-0.068 (0.01) **	-0.032 (0.008) ***	-0.141 (0.040) ***	-0.117 (0.045) **	-0.061 (0.015) ***	-0.244(0.052) ***
Exchange rate volatility^2				0.003 (0.001) **	0.007 (0.003) **	0.021 (0.006) ***
Financial Openness	0.114 (0.055) **	0.011 (0.006) *	0.099 (0.027) ***	0.093 (0.056)	0.011 (0.007)	0.064 (0.024) **
Human Capital	0.831 (0.391) **	0.039 (0.038)	-0.517 (0.260) *	0.76 (0.448) *	0.091 (0.046) *	-0.263 (0.190)
Natural Resources	0.165 (0.041) ***	-0.020 (0.006) ***	-0.028 (0.023)	0.156 (0.048) ***	-0.021 (0.010) **	-0.045 (0.018) **
Trade Openness	0.769 (0.226) ***	-0.050 (0.028) *	-0.189 (0.086) **	0.881 (0.253) ***	-0.058 (0.028) *	-0.165 (0.072) **
Diagnostics:						
Observations	740	573	508	740	573	506
Number of groups *(n)*	35	24	21	35	24	21
Number of instruments *(i)*	15	20	18	15	20	18
Instrument ratio *(n/i)*	2.33	1.20	1.11	2.33	1.20	1.33
AR (1): p-value	0.003	0.014	0.017	0.003	0.013	0.001
AR (2): p-value	0.573	0.660	0.098	0.558	0.539	0.118
Hansen J: p-value	0.976	0.328	0.706	0.930	0.227	0.648
F	15.420	894.60	61.04	10.530	584.39	199.59
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000
Slope at min bound				-0.149 (0.056) ***	-0.198 (0.064) ***	-0.649 (0.161) ***
Slope at max bound				0.538 (0.004)	0.065 (0.037) **	0.126 (0.079) *
Inflection Points				23.408	4.238	5.796
[95% Confidence interval]				[-6.320, 26.593]	[-9.605, 8.777]	[-9.605, 8.777]

*Note: Values in parenthesis represent Windmeijer (2005) robust standard corrected errors. FDI is foreign direct investment; PEF is portfolio equity flow; PNG is private non-guaranteed debt. AR (1) = Test of first-order autocorrelation; AR (2) = Test of second-order autocorrelation; Hansen J = Test of overidentifying restrictions *, **, *** denotes significance levels of 1%, 5% and 10%, respectively. The slope represent the lower and upper bounds of exchange rate volatility while the points of inflection are the values of exchange rate volatility at which FDI, PEF and PNG attains the maximum net flows in the regression equation.*

The results indicate that the impact of volatilities on the attraction and retention of capital flows in Africa is dependent on varying levels of volatility. The non-linearity assumption means that though the initial impact of exchange rate volatility of capital flows is detrimental to increasing capital flows, at specific points in time, increasing volatilities will lead to higher inflows of capital flows, at high levels of uncertainty. Models 4 to 6 show the points of inflection at 95% confidence interval. Reflecting the maximum functions, the point of inflection for exchange rate volatility under FDI is 25.966, while it is 4.7238 and 5.796 under PEF and PNG respectively. On the face level, there is evidence of a non-linear relationship once the confidence interval lies within the range of the data (Haans et al. 2016; Kuo et al. 2014; Lind and Mehlon, 2010). The points of inflection imply that beyond the estimated values, increasing volatilities in the exchange will lead to increasing levels of capital flows to Africa, conditioned on the current volatilities.

However, for evidence of a U-shape, the point of inflection lies within the confidence interval and with a negative slope at the minimum bounds and positive slope at the maximum bounds, both significant at conventional levels of significance (Kuo et al. 2014; Lind and Mehlon, 2010). From table 4.3A, while exchange rate volatility under PEF and PNG (models 5 and 6) exhibits a U-shape relationship, model 4 under FDI only exhibit a non-linear relationship, but not necessarily a U-shape[34]. The U-shaped relationship under PEF and PNG signifies that exchange rate volatility is only deemed harmful at the initial stages of investment but ultimately becomes beneficial in the attraction of capital flows. Thus, after the point of inflection, foreign investors no longer consider volatilities of the exchange rate as deleterious and will consider it more beneficial to increase current investment. The non-linear

[34] There is evidence of U shaped when both the upper and lower limits are significant, and the point of inflection lies within the range of values, where the slope at the minimum point is negative and the slope at the maximum is positive. However, a non-linear relationship exists if the linear quadratic terms are significant in different directions and the point of inflection falls within the range of minimum and maximum points.

relationship exhibited by exchange rate volatility only suggests that though the association is not strictly linear, beyond the point of inflection, foreign investors are mainly insensitive to exchange rate volatility and could even increase in the face of increasing macroeconomic volatilities.

Table 4.3B: Marginal effects of exchange rate volatility on FDI, PEF and PNG at varied levels of exchange rate volatility.

Model EXRVOL@	**A FDI**	**Model EXRVOL@**	**B PEF**	**Model EXRVOL @**	**C PNG**
25th Percentile (0.088)	-0.096*** (1.033)	25th Percentile (3.160)	-0.039*** (0.019)	25th Percentile (3.183)	-0.177*** (0.044)
50th Percentile (0.133)	-0.092*** (1.046)	50th Percentile (4.146)	-0.032*** (0.009)	50thPercentile (3.983)	-0.160 (0.026)
Mean Value (0.142)	-0.089*** (1.060)	Mean Value (3.728)	-0.035*** (0.012)	Mean Value (3.879)	-0.163** (0.025)
75th Percentile (0.161)	-0.086*** (1.070)	75th Percentile (4.681)	-0.028*** (0.010)	75th Percentile (4.651)	-0.146*** (0.047)
90th Percentile (0.265)	-0.073*** (1.123)	90th Percentile (5.385)	-0.023 (0.018)	90th Percentile (5.376)	-0.131*** (0.082)

NB: FDI is foreign direct investment; PEF is portfolio equity flow; PNG is private non-guaranteed debt; EXRVOL is exchange rate volatility.

Finally, and consistent with the requirements of interactive coefficients[35], we ascertained the marginal effect of exchange rate volatilities on capital flows at varying levels of volatility. We also used the marginal effect to validate our assertion of a non-linear relationship, where at lower levels of volatility, the effect on volatility on capital flows is high, but the negative effect decreases at higher or increasing levels of volatility. The marginal analysis further shows the critical points at which the negative impact of volatilities on FDI flows will be positive. From Table 4.3B, we observe that at lower levels of the exchange rate volatility

[35] Brambor et al (2006); Neir et al. (2014).

(25th percentile), the adverse impact of volatilities on all capital flows in higher. However, at the upper levels of volatility (90th percentile), the adverse impact of exchange rate volatility on capital flows decreases. The results from the observed significance of various percentile levels suggest that the impact of volatility on capital flows in a function of increasing volatility and that increasing uncertainty from the exchange rate could lead to a fall in the adverse effect of volatility on foreign investment. The results thus support the theory of investment reversibility and risk neutrality (Abel 1983 and Hartman 1972), that there exists a positive linkage between uncertainty and investment. They contend that increasing uncertainty has the potential of increasing expected profit, which in turn encourages more investment. At increasing exchange rate uncertainty, foreign enterprises may choose to invest more. Foreign enterprises can invest in assets at relatively lower cost. To compensate for the uncertain growth of the macroeconomic variable, MNE can price goods at relatively high prices to enjoy abnormal profits. Therefore, the results suggest that the volatility-capital flow relationship could be explained by both the investment irreversibility and risk neutrality theories.

4.4.4 Foreign Direct Investments, Exchange Rate Volatility and Financial Development

We present the results of the association between exchange rate volatility and foreign direct investment, conditioned on the levels of financial development. We explored three indices of financial development. We first ascertained the direct effects of both financial development and exchange rate volatility in the presence of other control variables. Table 4.4A presents the results of the empirical results on the direct and indirect relationship between exchange rate volatility and FDI flows to Africa. Models 1 to 3 look at the unconditional association between exchange rate volatility and FDI flows in the presence of the three indices of financial development, while models 4 to 6 presents the association between exchange rate volatility and FDI flows conditioned on the levels of each financial development index.

From equation 1 to 3, we observe a significant direct relationship between exchange rate uncertainty and FDI flows at conservative levels of significance, amid all three measures of financial development. Though the magnitude of the effect varies under each model, there appears to be very marginal variations between the overall index and the financial institution's index. However, the magnitude of the adverse impact of exchange rate volatility in the presence of the financial market index is higher than the other two, a sign that confirms the low financial markets development in Africa and the lack of supposed confidence in that aspect of the financial sector. Specifically, a 1% increase in the levels of the domestic exchange rate leads to 0.08% dip in FDI flows in the presence of the overall financial development index, a 0.09% fall when we control for financial institutions, and 0.37% in the presence of financial markets. The significant adverse relationship supports the investment irreversibility theory (Dixit and Pindyck, 1994; Akkina and Celibi, 2002) and the risk-averse nature of many investors (Bénassy-Quéré et al.2001) that where macroeconomic uncertainty abounds, in this case, as captured by the domestic exchange rate, there will be a fall in volumes of investments (FDI). Accordingly, the volatility of the domestic exchange rate increases the risk borne by foreign investors as it leads to a dip in projected returns on investments. The instability of the local currency affects the investment decision of MNEs by restraining further investments due to the rate of unpredictability of the exchange between the local and foreign currency. The volatility raises the anticipated cost of production and decreases the value of assets of MNEs. We used the output of our regression estimates to validate our results. Specifically, a unit surge in the growth rate of domestic exchange rate volatility leads to a 0.126 percentage points[36] decline in future FDI flows under model 1, a 0.134 percentage points drop under model 2, and 0.562 under model 3. The impact of

[36] The change is the standard deviation of the log of exchange rate volatility multiplied by the coefficient of the log of exchange rate volatility.

volatility is much stronger in instances of profit repatriation by MNEs as much of the volatile domestic currency may be needed for a few of the foreign currency. The overall effect is that the volatility of the domestic exchange rate automatically triggers "the option to wait" on future investments by foreign investors leading to the observed negative relationship between FDI and the domestic exchange rate volatility. Empirically, our results support the earlier studies that have found the volatility of the domestic exchange rate to be a deterrent to future FDI flows (Balaban et al. 2019; Jehan and Hmid, 2017; Dal Bianco and Loan, 2017; Asamoah et al., 2016; Cavallari and d'Addona, 2013; Azam et al., 2012; Sharifi-Renani and Mirfatah, 2012; Arratibel et al., 2011; Kyereboah-Coleman and Agyire-Tettey, 2008; Kiyota and Urata, 2004). However, not all studies are in tandem with our results as it contradicts studies that have either found no significant impact of exchange rate volatility or that volatility increases FDI inflows (Chowdhury and Wheeler, 2015; Abbot et al., 2012; Dhakal et al., 2010; Gottschalk and Hall, 2008), and those studies that have found a positive impact of exchange rate volatility on FDI inflows (Bénassy-Quéré and Lahrèche-Révil, 2001; Urata and Kawia, 2000; Goldberg and Kolstad, 1995).

On the direct linkages between FDI and financial development, our expectation was in line with the views of Alfaro et al. (2004) that nations with advanced financial markets benefit more from FDI both directly and indirectly as FDI attraction also enhances economic growth, thus establishing a definite link between FDI and financial development. Since financial sector development ensures the efficient allocation of resources, MNEs will find such markets more attractive as an investment destination.

Table 4.4A: Foreign Direct Investments, Exchange Rate Volatility and Financial Development

Dependent Var.	FDI (1)	FDI (2)	FDI (3)	FDI (4)	FDI (5)	FDI (6)
Constant	-3.368	-1.498	-1.974	-0.584	-0.858	-1.640
	(2.325)	(0.854)	(1.481)	(1.839)	(1.700)	(2.715)
Lag FDI	0.091***	0.103**	0.097**	0.097**	0.104***	0.070
	(0.042)	(0.046)	(0.037)	(0.036)	(0.033)	(0.045)
Exchange rate volatility (ERV)	-0.083**	-0.088**	-0.369***	-0.107**	-0.120**	-0.277**
	(0.037)	(0.043)	(0.114)	(0.048)	(0.048)	(0.128)
Financial development index (FD)	1.392**			1.256**		
	(0.596)			(0.514)		
Financial institutions index (FIN)		1.031**			1.125**	
		(0.505)			(0.509)	
Financial market index (FMK)			2.744**			-0.390*
			(1.105)			(0.218)
FD x ERV				0.129**		
				(0.063)		
FIN x ERV					0.145**	
					(0.071)	
FMK x ERV						0.249**
						(0.117)
Exchange rate	0.066	0.150	0.001	0.043	0.010	0.109
	(0.105)	(0.087)	(0.062)	(0.062)	(0.065)	(0.075)
Financial openness	0.006	0.020	0.169	0.072	0.081	0.083
	(0.133)	(0.160)	(0.158)	(0.086)	(0.079)	(0.112)
Human resources	-0.324	-0.015	-0.133	-0.396	-0.284	-0.020
	(0.824)	(0.715)	(0.629)	(0.590)	(0.474)	(0.964)
Natural resources	0.242***	0.202***	0.195***	-0.220***	0.198***	0.205***
	(0.075)	(0.062)	(0.054)	(0.055)	(0.052)	(0.067)
Trade	0.758*	0.770*	0.785**	0.829**	0.750**	0.910**
	(0.420)	(0.380)	(0.362)	(0.365)	(0.325)	(0.391)
Diagnostics:						
Observations	751	755	779	755	755	722
Number of groups *(n)*	35	35	35	35	35	33
Number of instruments *(i)*	28	28	31	34	27	21
Instrument ratio *(n/i)*	1.25	1.25	1.13	1.03	1.30	1.57
Critical Points				0.829	0.828	1.12
AR (1): p-value	0.008	0.009	0.0.02	0.007	0.006	0.006
AR (2): p-value	0.219	0.201	0.239	0.255	0.220	0.589
Hansen J: p-value	0.187	0.092	0.382	0.475	0.301	0.550
F	6.010	7.710	19.580	5.790	10.770	10.170
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000

*Note: Values in parenthesis represent Windmeijer (2005) robust standard corrected errors. FD x ERV is the interaction of the financial development index and exchange rate volatility; FIN x ERV is the interaction of financial institutions index and exchange rate volatility; FMK x ERV is the interaction of financial market index and exchange rate volatility. AR (1) = Test of first-order autocorrelation; AR (2) = Test of second-order autocorrelation; Hansen J = Test of overidentifying restrictions *, **, *** denotes significance levels of 1%, 5% and 10%, respectively.*

Again, from Table 1 to 3, we observe a significant positive association between FDI and all indices of financial development. The significance of the positive lies in the fact that we employed a new indicator of financial development not previously employed in the volatility-FDI nexus, especially in the context of Africa, as previous studies have relied on single indicator measures as proxies for financial development as representative of bank or stock market development. Under model 1, a standard deviation increase in the financial development index will increase FDI inflows by approximately 0.132 percentage points. In the same line, a standard deviation rise in the financial institution's index leads to about 0.125 percentage points increase in FDI flows, while a standard deviation rise in the financial market index leads to 0.247 percentage points increase in FDI flows. The positive correlation shows that foreign investors are willing to partake in the domestic market through borrowing from banks, undertaking insurance agreements, pensions as well as raising capital from the domestic market. Developed financial markets provide liquidity to both domestic and foreign investors. This also helps foreign investors to borrow in the local currency and avoid issues of exchange rate uncertainty, where borrowed funds are denominated in foreign currency. Investors become confident that a developed financial market absorbs issues of moral hazard, encourages savings and resource mobilization, and reduces borrowing cost. The overwhelming conclusion is that financial development in terms of bank and stock market access, efficiency and depth are crucial decisions foreign investors consider in their decision to invest overseas. Our results support the conclusion of Agbloyor et al. (2013) that advanced banking systems can attract more FDI inflows, while stock market development may also attract FDI inflows. Likewise, Jehan and Hamid (2017) found both bank and private sector credit to attract FDI flows. Though Soumare and Tchana (2015) found bidirectional causality between FDI and financial market development, they contend the impact differs based on whether the analysis is focused on bank or stock market development. Further support is the studies of Ezeoha and Cattaneo (2012) on FDI flows to SSA.

We turn attention to the indirect association between exchange rate volatility and FDI conditioned on the strength of the domestic financial sector. We, therefore, interacted each of the three indicators of financial development with exchange rate volatility and assessed their combined impact on FDI flows. In order to account for the impact of high correlation between the exchange rate volatility, financial development indices and the interaction of the two variables, we centre both exchange rate volatility and financial development. We achieved centering by taking the mean value of exchange rate volatility from all the exchange rate volatility variables. We followed the same procedure to centre all financial development indices - the centre values deployed in our multiplicative interaction of exchange rate volatility and financial development.

On the results of our estimation, we expected that conditioned on financial development, the indirect impact of exchange rate volatility on the attraction of FDI will be positive. Models 4 to 6 illustrate the results of our indirect analysis. Based on just the coefficient of the interaction terms, we observe a positive and significant relationship with FDI in all models. We can infer from the results that financial development is vital in curtailing the potential adverse impact exerted by exchange rate volatility on FDI flows. The results further suggest that curbing the exchange rate volatility damming impact on FDI is an increasing function of the level of financial development. Given the negative coefficient of volatilities and the subsequent positive coefficient of the interaction terms, we can confidently say that improving the level of financial development will lead to a significant reduction in the adverse impact of exchange rate volatility on FDI flows. Therefore, one can allude that dealing with the impact of volatility on FDI can be attained at increasing levels of financial development. Another plausible explanation is that as financial development improves, there will be gradual decline in the adverse impact of exchange rate volatility on the attraction and retention of FDI flows. Indeed, it also holds that as the quality of financial development declines or in the absence of financial development, rising volatility of the exchange rate leads to a drop in the volumes of FDI. We can thus say from our results on the coefficient of the interaction term that financial development can mitigate the adverse influence of exchange rate volatility on FDI flows to Africa. Practically, foreign investors can still invest in an environment of exchange rate uncertainty once the domestic financial market is developed. Therefore, it can be said that though instability of the domestic exchange rate may abound, with compliments from the financial sector, countries can still increase the volumes of FDI flows.

4.4.4.1 Marginal effect Analysis of the effect of exchange rate volatility on FDI at levels of financial development

As indicated by Brambor et al. (2006) on interaction models, the effect of an independent variable on the dependent variable should not be interpreted like additive models, where the independent variable has a constant impact on the dependent variable. However, they contend that the effect of a change in the independent variable on the dependent variable is dependent on varying values of the conditional variable. It is therefore impossible to determine if the independent variable impacts the dependent variable by merely focusing on the significance or otherwise of the coefficient of the interactive term. Hence, we ascertained the marginal effect of exchange rate instability on FDI at different values of all three indices of financial development. In this case, the marginal effect will tell us the threshold value of financial development that can completely neutralize the negative impact of exchange rate volatility on foreign direct investment. We conducted the marginal analysis at the 25th, 50th, 75th, and 90th percentiles of financial development and the mean value. We estimated the marginal analysis by the application of equation (10), where we evaluated the impact of exchange rate volatility on FDI flows. From Table 4.4B, model A shows that the adverse impact on exchange rate volatility decreases as the overall financial development index increases at a 1% significance level. As the level of financial development increases by 1% from the 25th to the 90th percentile, the negative effect of exchange rate volatility on FDI falls from -0.096% to -0.073%. However, our observation shows the impact of the exchange rate on FDI remains negative even at the highest (90th) percentile of our financial development index. We therefore determined the critical point or threshold level of financial development that completely eradicates the adverse impact. To achieve that optimal point, we set equation (4.10) to zero and made FD the subject[37].

Table 4.4B: Marginal Effects of Exchange Rate Volatility on Foreign Direct Investment at varied levels of Financial Development Indicators

Model FD Index @	A FDI	Model FIN Index @	B FDI	Model FMK Index @	C FDI
25th Percentile (0.088)	-0.096*** (1.033)	25th Percentile (0.161)	-0.097*** (0.822)	25th Percentile (0.002)	-0.277** (0.981)
50th Percentile (0.133)	-0.092*** (1.046)	50th Percentile (0.203)	-0.091*** (0.844)	50thPercentile (0.011)	-0.274** (0.983)
Mean Value (0.142)	-0.089*** (1.060)	Mean Value (0.234)	-0.086*** (0.859)	Mean Value (0.048)	-0.265** (0.991)
75th Percentile (0.161)	-0.086*** (1.070)	75th Percentile (0.274)	-0.080*** (0.879)	75th Percentile (0.041)	-0.266** (0.989)
90th Percentile (0.265)	-0.073*** (1.123)	90th Percentile (0.411)	-0.060*** (0.948)	90th Percentile (0.166)	-0.236** (0.989)

NB: FD is the overall financial development index; FIN is financial institutions' index; FMK is the financial market index; FDI is foreign direct investment

[37] $\beta_1 + \beta_5 FD = 0\ ;\ FD = \frac{\widehat{\beta_1}}{\widehat{\beta_5}}$ = 0.107 / 0.129 = 0.829.

We obtained the critical value when the financial development index was about 0.829. We could make two critical observations at this point. Given that the overall financial development index ranges between 0 and 1, it suggested that there were periods in the development of the financial sector where the adverse impact of exchange rate volatility on FDI could be wholly eradicated. However, using the minimum (0) and maximum (0.627) values of our data, the obvious analogue was that at the current state of Africa's financial development, we can only infer that financial sector development in Africa minimizes the exchange rate volatility-FDI adverse relationship but cannot eradicate the adverse impact completely. The same observation holds for models B and C of Table 4.4B, where substantial increase in the financial institutions and market indices leads to a drop in the adverse impact of exchange rate volatility on foreign direct investment at 1% and 5% significance levels respectively. A 1% development in financial institutions from the 25^{th} to the 90^{th} percentile leads to a drop in the adverse impact of exchange rate volatility on FDI from -0.097 to -0.060, though the effect cannot be defused out rightly. The critical point for the financial institutions' index is about 0.828, which also lies within the ranges of the financial institutions' index but outside the ranges (0 and 0.739) of our data.

Again, financial institution's development regarding access, depth, and efficiency can only reduce the exchange rate volatility-FDI antagonistic relationship at the current state on institutions development but not up to the point of complete eradication. Regarding financial markets, we see marginal drops in the adverse effect of exchange rate volatility on FDI flows from the 25^{th} percentile (-0.277) to the 90^{th} percentile (-0.236). The critical or turning point regarding financial markets is 1.12, which falls outside the index values of 0 and 1. The critical value shows that it is not plausible for financial market development in Africa to eradicate the negative effect of exchange rate volatility on FDI even though financial market development can marginally reduce the adverse effect. The results on financial markets only confirmed the assertions by Svirydzenka (2016) that financial market development in Africa is fragile when compared to other regions in the world. For instance, while the average financial market development for America, much of Europe, Asia, and Australia was above 0.596, and much of South America ranged between 0.392 and 0.592, the average financial market development for Africa was less than 0.046 (Svirydzenka, 2016). The observation is that financial institutions' development can better neutralize the adverse impact of volatility faster than financial markets and the overall development index and the slow growth of financial development in Africa is a function of weak, inactive illiquid, and the inefficiency of most stock markets on the continent.

4.4.5 Foreign Equity Portfolio Investment, Exchange Rate Volatility and Financial Development

We now turned our attention to the association between portfolio equity flows and exchange rate volatility and further determined if the association is influenced by a country's levels of financial development, and the possible critical point or threshold value of financial development. Though the portfolio equity-exchange rate relationship has received little mention from previous researchers, our focus was driven by the changing dynamics of capital flows, and the recent admonition by the UNCTAD that, portfolio flows can be used for FDI-like projects and that the clear lines between the hitherto types of capital flow are dwindling. According to UNCTAD "an additional motivation for considering other types of capital flows is that the dividing lines between FDI and other types of flows are becoming increasingly blurred, for three main reasons: FDI, as measured in the balance of payments, contains components that behave like portfolio flows. They can be relatively short-term and volatile. Portfolio equity flows can be used for FDI-like purposes. Multinational Enterprises (MNEs) can acquire long-term strategic stakes in foreign enterprises, with a measure of control" (UNCTAD, 2018, pp.11).

Further support for considering portfolio flows lies in the assertion that “The sharp fall in global FDI contrasted with the trend in other cross-border capital flows. Total capital flows increased from 5.6 to 6.9 percent of global GDP, as bank lending and portfolio investment (mostly debt) flow compensated for the FDI slump” UNCTAD (2018, pp.11). However, on the linkages between exchange rate and the types of capital flows, Froot and Stein (1991) contend that the effect of exchange rate on capital flows correlates with information intensity among capital flows. Consequently, they contend that since foreign direct investments are more sensitive to fluctuations in exchange rate than other flows, the impact of exchange rate on FDI flows should be higher. Does the impact vary greatly when it comes to portfolio equity?

We present the results of the direct association between exchange rate volatility and portfolio equity in the presence of other variables including all the indices of financial development in Table 4.5A. From equation 1 to 3, we observe a direct adverse significant connection between the volatility of the domestic exchange rate volatility and portfolio equity flows at conventional levels of significance. Though the magnitude of the effect varies under each model, there appears to be very marginal variations. Specifically, a 1% increase in the levels of the domestic exchange rate leads to 0.02% dip in FDI flows in the presence of the overall financial development index, a 0.02% fall when we control for financial institutions, and a 0.03% fall in the presence of financial markets, all at 1% significance level. The direction of the impact is not different from that of FDI obtained in Table 4.4A, though the magnitude of the impacts on exchange rate volatility on FDI is much higher than in the case of portfolio equity. The magnitude of the impact on FDI supports the assertion by Froot and Stein (1991) that exchange rate affects FDI flows more than other flows, and it holds for the volatility of exchange rate. The development could be also attributed to the quantum of these flows. FDI flows have increased significantly across borders, especially after the global financial crisis.

However, looking at the direction of the relationship, our results support the views of UNCTAD (2018) on the dwindling differences between these types of flows, as we found that exchange rate volatility is detrimental to all forms of capital flows. Again, the magnitude of the impact also follows the same sequence as that of FDI. Significantly, we observe that the impact of exchange rate volatility of both FDI and portfolio equity flows is higher under the financial market index than both financial institutions and the overall financial development index. We also note that the magnitude of the impact of exchange rate volatility for the financial institutions' index is closer to the overall financial development index. This goes to support the intuition that financial development in Africa is a function of financial institutions' development.

Thus, although the impact of volatility on capital flows may be high, the overall impact is reduced when financial markets are combined with financial institutions. On the nature of the relationship between exchange rate volatility and portfolio flows, our results support earlier works of Caporale et al. (2015) when they concluded that exchange rate volatility adversely affects net equity flows within the UK, Euro area and Sweden, but positive in the case of Australia. It also confirms the views of Mishra (2011) and Hau and Rey (2006). It, however, contradicts Daly and Vo (2013) and Batten and Vo (2010) as they note a positive relationship between exchange rate volatility and portfolio equity flows.

Table 4.5A: Portfolio Equity Flows, Exchange Rate Volatility and Financial Development

Dependent Var.	PEF (1)	PEF (2)	PEF (3)	PEF (4)	PEF (5)	PEF (6)
Constant	0.392	0.441***	0.524***	0.494	0.340***	0.106
	(0.103)	(0.854)	(0.089)	(0.821)	(0.088)	(0.106)
Lag PEF	0.603***	0.601**	0.609**	0.260**	0.574***	0.602***
	(0.017)	(0.20)	(0.016)	(0.002)	(0.014)	(0.014)
Exchange rate volatility (ERV)	-0.018***	-0.022***	-0.033***	-0.114*	-0.023*	-0.017**
	(0.006)	(0.004)	(0.005)	(0.059)	(0.013)	(0.007)
Financial development index (FD)	0.071***			0.254**		
	(0.019)			(0.107)		
Financial institutions index (FIN)		0.076**			0.089**	
		(0.027)			(0.037)	
Financial market index (FMK)			0.030***			0.004*
			(0.005)			(0.002)
FD x ERV				0.438***		
				(0.067)		
FIN x ERV					0.064**	
					(0.031)	
FMK x ERV						0.082**
						(0.030)
Exchange rate	0.005	0.006	-0.001	0.036	0.014***	0.11***
	(0.004)	(0.003)	(0.005)	(0.035)	(0.004)	(0.004)
Financial openness	0.008	0.006	0.113	0.103***	-0.004	0.010
	(0.008)	(0.007)	(0.008)	(0.029)	(0.007)	(0.007)
Human resources	0.030	0.032	-0.133**	0.273	0.071	0.084*
	(0.050)	(0.049)	(0.050)	(0.239)	(0.042)	(0.045)
Natural resources	-0.019***	-0.020**	-0.017**	-0.342***	0.027***	-0.024***
	(0.006)	(0.007)	(0.007)	(0.043)	(0.004)	(0.007)
Trade	-0.038*	-0.054**	-0.032	0.247*	-0.050***	0.018
	(0.021)	(0.022)	(0.022)	(0.128)	(0.014)	(0.020)
Diagnostics:						
Observations	573	573	556	540	532	514
Number of groups *(n)*	24	24	24	24	24	24
Number of instruments *(i)*	21	21	21	24	22	22
Instrument ratio *(n/i)*	1.14	1.14	1.14	1.00	1.09	1.09
Critical Points				0.260	0.359	0.207
AR (1): p-value	0.000	0.009	0.002	0.306	0.014	0.016
AR (2): p-value	0.685	0.673	0.643	0.336	0.745	0.589
Hansen J: p-value	0.267	0.256	0.356	0.701	0.282	0.734
F	428.97	410.25	387.24	92608	1185	3231

Prob > F	0.000	0.000	0.000	0.000	0.000	0.000

*Note: FD x ERV is the interaction of the financial development index and exchange rate volatility; FIN x ERV is the interaction of financial institutions index and exchange rate volatility; FMK x ERV is the interaction of financial market index and exchange rate volatility. AR (1) = Test of first-order autocorrelation; AR (2) = Test of second-order autocorrelation; Hansen J = Test of overidentifying restrictions; Values in parenthesis represent small sample standard corrected errors. *, **, *** denotes significance levels of 1%, 5% and 10%, respectively.*

On the direct impact of financial development, we found support for our earlier results under FDI which is consistent with the studies of Alfaro (2014), Agbloyor et al. (2013), and Choong et al. (2010) that financial sector development is essential for increased attraction of capital flows. Significantly, we found that at conventional levels of significance, increasing the level of financial market development leads to a 0.03% surge in portfolio flows. The magnitude of the impact for the overall financial development index and the financial development indices are much larger, as increasing these indices by 1% increase the influx of portfolio equity by 0.07% and 0.8%, respectively. This further supports the assertion that financial development in Africa may be equivalent to financial institutions' development.

We now discuss the results on the indirect impact of exchange rate volatility on portfolio equity flows conditioned on financial development. Again, the results in models 4 to 6 suggest that countries with an overall financial sector development stand a higher chance of attracting portfolio equity inflows. Stronger financial access, efficiency, and depth signify a profound financial system that accommodates both local and external investors. In an environment of financial deepening, foreign investors are assured of a levelled playing field in the quest for additional funds for improved production and development. Foreign investors will have to participate in the domestic financial market by borrowing from the banking sector, raising additional funds through the equity market, take up general, life insurance, and pension policies as well as invest idle funds. In the absence of a well-functioning financial system, foreign investors may find it difficult to raise external capital to augment their available resources. More importantly, our finding suggests that foreign investors can undertake all the above activities in the presence of macroeconomic uncertainty as we found the interaction coefficient of exchange rate volatility and financial development index (model 4) to be positive and significant at a 1% significance level. Although volatile exchange rates can reduce the benefits of diversification when foreign investors invest abroad, the positive coefficient of the interactive term implies that countries developed financially assures foreign portfolio equity providers that the financial system is strong enough to mitigate any adverse impact of macroeconomic volatility emanating from exchange rate volatility. This assurance leads to a surge in the volumes of portfolio equity flows to recipient countries even when beset with fluctuations of the domestic exchange rate.

Since our financial development index is a composite measure of both financial institutions and markets, we further assess if the conditional effect of financial development is a function of both indices, or is driven by one index. Which of the two indexes is leading and which is lagging? From model 5 of Table 4.5A, we find consistent results like the overall financial development index, as we find the coefficient of the interaction between exchange rate volatility and the financial institutions' index to be significant and positive at a 5% significance level. The outcomes suggest that the advancement of the domestic banking sector aids the attraction of portfolio equity flows even when volatility of the exchange rate abounds. Foreign investors deem it prudent to invest abroad once the destination country has a sound banking system that permeates in terms of its access, efficiency and depth as foreign investors place higher premium on the well-function banking sector than the volatility of the domestic exchange rate. Should we base our assessment on just the coefficient of the interaction term, then it is prudent to allude that countries that have a robust banking system are more attractive to foreign investors and will benefit more from portfolio equity flows, amidst the turmoil and volatility of the domestic exchange rate.

The results on the interaction between exchange rate volatility and the financial market index on portfolio flows in model 6 (table 4.5A) confirms our expectation that a developed stock market is a catalyst in dealing with the adverse impact exerted on portfolio flows by the volatility of the domestic exchange rate, as we found the coefficient of the interaction term to be positive and significant. The results mean that foreign investors are confident of raising additional funds from the stock market and that the benefits to be gained from the size and liquidity of a growing financial market outweighs the uncertainty associated with fluctuations of the domestic exchange rate. The results show that the development of the stock market matters in MNE's decision to invest abroad, as they show faith that participation in the stock market will invariably minimize any potential risks associated with the exchange rate. For example, amid exchange rate uncertainties, foreign investors may choose to hold on to shares until such a time that it may be prudent to sell. The market is also an avenue for risk diversification.

4.4.5.1 Marginal Effect Analysis of the Effect of Exchange Rate Volatility on PEF at Levels of Financial Development

Armed with the information that the coefficient of the interaction term provides limited information of the effect of conditional variables (Brambor et al. 2006), a threshold analysis was carried out at varying percentiles (25^{th}, 50^{th}, mean, 75^{th} and 90^{th}) of all three indices of financial development. The intuition was that the coefficient of the interactive term conveys little evidence on the extent to which exchange rate volatility affects portfolio equity flows conditioned on financial development. However, we needed to ascertain the impact of exchange rate volatility on portfolio flows at meaningful values of financial development. Table 4.5B shows the marginal effect analysis for the financial development index (model

A), the financial institutions index (model B) and the financial market index (model C). Model A shows that the adverse impact of exchange rate volatility on portfolio equity decreases at increasing values of the financial development index. From the 25th to the 90th percentile of financial development, the adverse impact of exchange rate volatility on portfolio flows dropped from -0.072 to 0.034 at a 1% significance level. We observe that at the 90th percentile of the financial development index, the initial adverse impact of volatility is neutralized into positive. To confirm our findings, we estimated the critical or threshold level of the financial development index (i.e. the point where the change in PEF w.r.t exchange rate volatility equates to zero). We attained a critical value of 0.260. This means that beyond a financial development index of 0.260, any initial adverse effect of the exchange rate volatility of PEF is eliminated.

Table 4.5B: Marginal effects of exchange rate volatility on portfolio equity flows at varied levels of financial development indicators.

Model **FD Index @**	**A** **PEF**	**Model** **FIN Index @**	**B** **PEF**	**Model** **FMK Index @**	**C** **PEF**
25th Percentile (0.097)	-0.072*** (0.230)	25th Percentile (0.176)	-0.012*** (0.056)	25th Percentile (0.004)	-0.017** (0.0110)
50th Percentile (0.128)	-0.058*** (0.233)	50th Percentile (0.226)	-0.009*** (0.057)	50thPercentile (0.022)	-0.015** (0.0111)
Mean Value (0.172)	-0.039*** (0.237)	Mean Value (0.267)	-0.006*** (0.059)	Mean Value (0.074)	-0.010** (0.0111)
75th Percentile (0.218)	-0.019*** (0.240)	75th Percentile (0.313)	-0.003*** (0.061)	75th Percentile (0.092)	-0.009** (0.0112)
90th Percentile (0.338)	0.034*** (0.254	90th Percentile (0.482)	0.008*** (0.067)	90th Percentile (0.247)	0.003** (0.0114)

NB: FD is the overall financial development index; FIN is financial institutions' index; FMK is the financial market index; PEF is portfolio equity flows

Given that the critical value lies within the data ranges of the financial development (0 and 1), and within the ranges of our sample data (0.023 and 0.623), the critical point is attainable. Our initial assertion that the adverse impact of exchange rate volatility on PEF is neutralised at the 90th percentile of the financial development index is plausible as the 90th percentile value (0.338) lies above the critical point as estimated. The results have far-reaching implications on the attraction of PEF in the presence of exchange rate volatility and financial development, as a well-functioning and active financial sector development can eradicate any adverse impact once the development attains a certain threshold. We found that only four of the sample countries have an average value of the financial development index above the critical point[38].

Looking at the various components of the financial development index, model B of table 4.5B indicates that improvements regarding financial institutions indicators are a significant catalyst for the neutralization of any potential adverse impact of exchange rate uncertainty on the attraction and retention of portfolio equity flows. Intuitively, our results show that an improvement in the financial institutions' index from the 25th to the 75th percentile will lead to drop in the adverse impact of volatility of portfolio from -0.012 to -0.003. At the 90th percentile of the financial institutions' index, the adverse effect is eliminated as the effect of exchange rate volatility conditioned on the extent of financial institutions becomes positive. Precisely, we attain a threshold value of 0.359, which lies within the data range of the financial institutions' index, a sign that the threshold level is attainable if and only if African countries commit more effort to the development of the banking sector. More importantly, the threshold value (0.359), which lies after the 75th percentile but before the 90th percentile, validates our intuition that by the 90th percentile, a sound and efficient banking sector can completely eradicate any adverse impact of domestic exchange rate volatility-portfolio equity

[38] Egypt, Mauritius, Morocco and South Africa.

flows relationship. For our study period we found only seven countries to have a financial institution index above the critical point[39].

Like the financial development and financial institutions indices, we found that financial market advancement could neutralize the adverse impact exerted by economic volatility of the attraction of portfolio flows. Significantly, model C (Table 4.5B) shows that development of the stock markets leads to a fall in the adverse impact from the 25th to the 75th percentile of the financial market index. Like the other indices, the adverse impact of exchange rate volatility is neutralized at the 90th percentile per our estimation, as we find the 90th percentile to fall beyond the critical value at which the neutralization takes place. The critical value attained, which is 0.207 indicates the threshold level that the financial market must reach to overcome the negative effect of volatility on portfolio flows. Though the critical point lies within the data range (0 – 1) and that of our study range (0 – 0.59), only three countries (Egypt, Mauritius and South Africa) can currently achieve that feat as the average financial market index for these countries over the study period was above the critical point. The intuition is that Africa stands to benefit a lot from foreign investors through the development of the stock market, even in the midst of macroeconomic uncertainty. Given the potential benefits of stock market development to the attraction of foreign capital (see Levine, 1996), and the state of currency volatility of most African countries, it calls for consented efforts to either manage the exchange rate or develop the stock market. Which of the two is much more comfortable? It behoves on policymakers.

4.4.6 Private Debt, Exchange Rate Volatility and Financial Development

The association between debt flows and the volatility of the exchange rate can be linked to the original sin hypothesis, which relates to the inability of developing economies to borrow

[39] These are Botswana, Cape Verde, Maritius, Morocco, Seychelles, South Africa and Tunisia.

from the international debt market in their domestic currency because such economies are deemed to have weak and underdeveloped financial systems (Hausmann and Panizza, 2011; Eichengreen and Hausmann, 1999). Most debt agreements and servicing of debt are contracted in foreign currency, which requires the conversion of domestic currency to foreign currency. This phenomenon leads to fluctuations in the domestic currency and can be a concern to foreign investors. Again, the repatriation of profits is subject to foreign exchange volatility. We end the analysis with an evaluation of the direct relationship between debt flows and the volatility of the domestic exchange rate.

We further determined if the association is prejudiced by the overall development of the financial sector at the level of financial institutions and financial markets. The results are shown in Table 4.6A. On the direct impact of exchange rate volatility and financial development of private debt flows, the results are consistent with the indicators of capital flows as we found exchange rate volatility to harm debt flows while financial development index increases the level of debt flows, with financial development exerting the higher magnitude (see model 1). We found similar observations in the presence of the financial institutions and financial market indices with an adverse exchange rate volatility coefficient and a positive financial development index (see models 2 and 3). The decline in debt flows from exchange rate volatility emanates from the perceived fall in the value of principles and interest to be paid to foreign debt investors. This leads to a gradual fall in the volume of foreign debt investments in the domestic market. The volatility reduces the expected gains to foreign investors making it risky to partake in the debt market. Also, where debts are denominated in a foreign currency, the fluctuations in the exchange rate increase the amount of principal and interest to be paid on the part of domestic firms, households, and government.

Overall, the volatility of the exchange rate will affect the value of firms when revalued in terms of the foreign currency, making it difficult to pay on borrowed amounts. This is likely to lead to default on repayment and eventual decline in the volume of foreign debt investments. This phenomenon will lead to a reduction in investments by risk-averse foreign investors. The negative association supports the recent views of Kim (2019), and Caporale et al. (2015) that exchange rate uncertainty negatively affects debt flows in some developed and emerging market economies. Other studies that have also concluded that exchange rate volatility dampens external debt flows include Borensztein and Loungani (2011), Bekaert and Wang (2009), and Fidora et al. (2007). The results are, however, inconsistent with the assertion by Hau and Rey (2006) that volatility of the exchange rate has an unfettered impact on debt flows because debts instruments can be hedged against risk.

Table 4.6A: Private Debt Flows, Exchange Rate Volatility and Financial Development

Dependent Var.	**PNG (1)**	**PNG (2)**	**PNG (3)**	**PNG (4)**	**PNG (5)**	**PNG (6)**
Constant	1.987*** (0.615)	2.471*** (0.437)	1.132*** (0.351)	1.414*** (0472)	1.590** (0.565)	3.224*** (0.975)
Lag PNG	0.081*** (0.009)	0.104*** (0.014)	0.084*** (0.014)	0.011 (0.008)	0.059*** (0.010)	0.0001 (0.018)
Exchange rate volatility (ERV)	-0.087 * (0.044)	-0.099 * (0.048)	-0.044* (0.025)	-0.031* (0.015)	-0.038** (0.018)	-0.615** (0.248)
Financial development index (FD)	0.460 ** (0.188)			0.270*** (0.073)		
Financial institutions index (FIN)		0.592*** (0.197)			0.366*** (0.075)	
Financial market index (FMK)			0.045* (0.026)			0.065** (0.019)
FD x ERV				0.017 (0.020)		
FIN x ERV					0.034* (0.019)	
FMK x ERV						0.283** (0.030)

Exchange rate	0.026**	-0.016	-0.022**	0.004	0.001	-0.012*
	(0.011)	(0.014)	(0.010)	(0.017)	(0.021)	(0.004)
Financial openness	0.027	0.056	0.088***	0.076*	0.062	0.065***
	(0.043)	(0.053)	(0.019)	(0.039)	(0.038)	(0.019)
Human resources	-0.488 *	-0.579***	-0.134	-0.201	-0.379	-0.069
	(0.266)	(0.158)	(0.116)	(0.208)	(0.236)	(0.193)
Natural resources	-0.016	-0.002	0.014	-0.054**	-0.053**	0.003
	(0.037)	(0.026)	(0.021)	(0.023)	(0.019)	(0.025)
Trade	-0.172 **	-0.217***	-0.129***	-0.145*	-0.153*	-0.112*
	(0.054)	(0.071)	(0.045)	(0.083)	(0.080)	(0.055)
Diagnostics:						
Observations	485	483	500	493	476	500
Number of groups *(n)*	21	21	21	21	21	21
Number of instruments *(i)*	20	19	19	20	20	20
Instrument ratio *(n/i)*	1.05	1.11	1.11	1.05	1.05	1.05
Critical Points				1.824	1.12	2.173
AR (1): p-value	0.029	0.019	0.025	0.007	0.021	0.010
AR (2): p-value	0.167	0.091	0.112	0.209	0.128	0.255
Hansen J: p-value	0.235	0.135	0.303	0.230	0.260	0.340
F	103.27	76.70	104.99	35.060	79.29	8.880
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000

*Note: FD x ERV is the interaction of the financial development index and exchange rate volatility; FIN x ERV is the interaction of financial institutions index and exchange rate volatility; FMK x ERV is the interaction of financial market index and exchange rate volatility. AR (1) = Test of first-order autocorrelation; AR (2) = Test of second-order autocorrelation; Hansen J = Test of overidentifying restrictions; Values in parenthesis represent small sample standard corrected errors. *, **, *** denotes significance levels of 1%, 5% and 10%, respectively.*

Regarding our interactive terms, we found that the coefficient of the interaction between the overall financial development index and the volatility of the domestic exchange rate to be positive, suggesting that advancement in financial services can deal with potential negative impacts of volatility on private debt flows, however, we found the coefficient to be insignificant (see model 4). On decomposing the financial development index, model 5 shows a positive and significant coefficient of the interaction between the financial institutions' index and exchange rate volatility marginally at 10% significance level. The results suggest that the development of the banking sector could be efficient in curtailing the volatility effects on debt flows. It means that countries with a less developed banking sector will reduce less debt flows in the wake of volatile exchange rates. The results from our estimations are supported by the views of Kim (2019) that financial development can reduce the negative effect of exchange rate volatility on a debt position. We found the coefficient of the interaction between the stock market index and the exchange rate volatility also being significant at 5%. Again, countries with a robust stock market can dwarf the adverse impact of volatility on debt flows, by overturning the negative impact into positive as indicated by the coefficient of the interaction term. The results indicate that countries with less advanced stock will attract few private debts when the domestic exchange rate is considered very volatile, uncertain and unpredictable.

4.4.6.1 Marginal effect analysis of the effect of exchange rate volatility on private debt at levels of financial development

Though the coefficient of the interaction between exchange rate volatility and the financial development index is insignificant, Brambor et al. (2006) contend that it may be possible for an independent variable to have a significant effect on the dependent variable at marginal values of the conditional variable. Hence, we ascertained the marginal effects of exchange rate on private debt flows at marginal values of all indicators of financial development. From Table 4.6B, model A shows the marginal effect from the 25th to the 90th percentile of the financial development index. A casual observation shows gradual fall in the adverse impact of volatility on debt flows at 1% significance level respectively. Thus, we observe that increases in the financial development index are significant in minimizing the adverse impact but cannot eliminate the effect, as we obtain a threshold value of 1.82. Since the threshold value lies outside the data ranges (0 and 1), we can conclude that increases in the overall financial development can only cause a reduction in the adverse impact of exchange rate volatility on private debt flows but may not be able to neutralize the effect. We find similar results regarding the financial institutions' index (see models 5) as the exchange rate volatility-debt flows nexus decreases from -0.032 to 0.023 from the 25th to the 90th percentile of the index. Though with a low critical value of 1.12, the value also lay outside the data range, leading to the same conclusions as before. We also found that improvements in financial markets, though cannot eliminate the adverse impact of exchange rate volatility on debt flows, an increase in financial market efficiency from the 25th to the 90th percentile will reduce the negative effect from 0.613 to 0.543 at 5% significance levels. Again, the estimated threshold value of 2.17 confirms the assertion that the adverse impact can only reduce but not counterbalance. We further observed that a stronger banking sector will be most efficient and quicker in dealing with any negative impact of domestic exchange rate uncertainty on debt flows, given its lower threshold value. However, the overall assertion looking at the threshold values suggests that the development of the financial sector can only minimize but cannot in the next foreseeable future, eliminate the exchange rate volatility-private debt flows "curse."

Table 4.6B: Marginal effects of exchange rate volatility on private debt flows at varied levels of financial development indicators.

Model **FD Index @**	**A** **PNG**	**Model** **FIN Index @**	**B** **PNG**	**Model** **FMK Index @**	**C** **PNG**
25th Percentile (0.096)	-0.029*** (0.146)	25th Percentile (0.172)	-0.032*** (0.109)	25th Percentile (0.008)	-0.613** (0.121)
50th Percentile (0.131)	-0.028*** (0.149)	50th Percentile (0.223)	-0.030*** (0.113)	50thPercentile (0.027)	-0.607** (0.122)
Mean Value (0.173)	-0.028*** (0.152)	Mean Value (0.260)	-0.029*** (0.115)	Mean Value (0.082)	-0592** (0.123)
75th Percentile (0.215)	-0.027*** (0.154)	75th Percentile (0.309)	-0.027*** (0.119)	75th Percentile (0.110)	-0.584** (0.124)
90th Percentile (0.338)	-0.025*** (0.163)	90th Percentile (0.446)	-0.023*** (0.129)	90th Percentile (0.253)	-0.543** (0.128)

NB: FD is the overall financial development index; FIN is financial institutions' index; FMK is the financial market index; PNG is private non-guaranteed debt flows

4.4.7 Effects on Controls

We interpret the effect of our control values on each element of private capital flows. We found FDI to be reinforcing as its lag is positive and significant at 1% and 5% levels in 87.5% of the regressions under FDI. The relevance of the lagged coefficient is that it acts as a benchmark for current investors to increase or decrease future investments. It also helps potential and new entrants ascertain whether to enter a market or not by looking at the performance of other investments. Primarily, foreign investors will prefer to invest in countries where they are familiar with the system because of previous investment experience. Thus, past FDI inflows have an impact on current FDI flows, and foreign investors may increase the quantum of investments in the domestic market over a relatively long period. It also justifies the use of the dynamic panel estimation procedure, which considers the lag of the dependent variable as a control variable. The real exchange rate was positive and significant under all regressions suggesting the depreciation of the local currency attracts FDI inflows owing to the wealth position hypothesis by Froot and Stein (1991), though the indicator was mostly (6/8) insignificant. We found evidence that openness through capital account liberalization has a positive impact on FDI inflows. In such countries, the amount of restrictions on the ability of foreign investors to repatriate gains on investments is very minimal. Investors will, therefore, consider countries that are more financially open before investing abroad. Therefore, it is somewhat efficient to say that liberalizing most African countries will spur FDI inflows, even though our current estimations point to a positive but insignificant relationship though our results are consistent with Kyereboah-Coleman and Agyire-Tettey (2013) and also inconsistent with Agbloyor et al. (2013). The relevance of human capital is essential in cases that MNE cannot transfer human capital but will have to depend on domestic human capacity. For instance, Borensztein et al. (1997) note that countries endowed with human capital are in a better position to attract efficient transfer of technologies and knowledge from FDI. Our results move in the opposite direction of Borenstein et al. (1997) as human capital enters the regression mostly as negative and insignificant (6/8). Perhaps the type of aid that flows to Africa comes along with the required technical experts and may not need to depend on the local human resources to survive. It could also imply that FDI to Africa only seeks marketplace to sell already finished products.

Primarily our results confirm the assertions that trade openness and natural resources in Africa are catalysts for the attraction of capital flows. The impact of these two variables was positive and significant at conventional significance level across all models. While natural resources enter the regression at 87.5% positive and significant, trade openness is positive and significant under all regressions. On natural resources, the positive effect confirms the view of AEO (2014) that more than 95% of FDI into Africa moves towards natural resource-endowed countries. The conclusion on natural resources is in line with Asamoah et al. (2016) and Anyanwu (2012) though contradicts Asiedu (2013). On trade, Asiedu (2002) notes the relevance of the variable to the attraction of FDI, in addition are the studies of Asamoah et al. (2016) and Agbloyor et al. (2013) on FDI flows to Africa. Thus, countries with fewer restrictions on trade openness attract large volumes of FDI inflows.

Regarding the impact of control variables on portfolio equity flows, we found previous equity flows to influence current investments as the lag portfolios were positive and significant under all regressions. Similar conclusions hold for the depreciation of the real exchange rate which was principally positive under all regressions but significant under 50% of the estimations. Though financial liberation also attracts portfolio flows, the results were in tandem with that of FDI as it was mostly (5/8) positive but insignificant. Contrary to FDI flows, the effect of human capital on portfolio flows is consistent with the earlier views of Borenstein et al. (1997) even though most of the regression estimates (5/8) were positive but insignificant. Again, it goes to suggest that foreign investors do not put a premium on the capacity of the domestic human resources when deciding to invest abroad. Again, our results on natural resources and trade openness regarding portfolio flows are inconsistent with their impact on FDI flows, as these variables are primarily found to be significantly detrimental to portfolio equity flows. Given that equity investments are most of stock market activities, most African markets are illiquid to support natural resources explorations.

Lastly, on private debt flows, we still find capital flows to be reinforcing as we found the lag of private debt flows to be positive and significant under four out of six regressions. Contrary to both equity flows and FDI flows, much of the estimates (2/6) shows that the depreciation of the exchange rate adversely affects private debt flows. The adverse impact of the exchange rate is consistent with Kim (2019) that the depreciation of the domestic currency negatively affects debt flows denominated in foreign currencies. Furthermore, liberation of the capital account was deemed to attract debt flows as in the case of the other types of capital flows as financial openness enters the regression (6/6) as positive with half being positive and significant. Thus, more open economies stand to benefit from large inflows of private debt flows. We also found human capital development, natural resources rent and trade openness to all deter flows. While only two out of the six coefficients under human capital and natural resources were significant, all coefficients regarding trade openness were negative and insignificant. Perhaps the assertion that trade openness attracts capital flows might only relate to FDI as consistent with our earlier results.

4. 5 Conclusion and Policy Recommendations

Due to the acclaimed benefits of capital flows to economic growth, countries continue to implement policies that give them competitive advantage in the international capital flows market. Countries are persistently working to reduce policy mistakes and to position themselves as best places for foreign enterprises and MNEs to do business. The literature has thus established that foreign capital inflows lead to macroeconomic and financial stability as a result of increased liquidity, consumption smoothing, competent factor output and improved domestic investment environment. Nevertheless, capital flows are also known to be affected by macroeconomic instability and increasing uncertainty in the domestic macroeconomic space, which are deterrent and a concern to many MNEs seeking investment opportunities away from their home countries. However, opposing theoretical positions on the relationship between uncertainty and investment can offer hope to countries that find themselves in the web of persistent economic uncertainty but desire to gain from international capital flows.

Furthermore, the empirics on the relevance of absorptive capacities in mitigating the negative impact of macroeconomic uncertainty on capital flows means that even in the web of economic instability, countries can benefit indirectly from capital flows through sound, resilient and domestic structural and institutional policy variables. In this study, we examined the impact of macroeconomic uncertainty proxied by the volatility of the domestic exchange on the attraction of private capital flows to Africa. Using varying datasets based on the type of capital flow (FDI, PEF, or PNG) from 1990 to 2018, the study further assessed the possibilities of non-linearity in the exchange rate volatility-capital flows nexus, or if the relationship is strictly monotonic. By the application of the system GMM two-step estimator, the study further examined the association between exchange rate volatility and all three forms of capital flows in the presence of financial development and whether financial development reinforces the association by reducing the potential adverse impact exerted on capital flows by volatile exchange rates, through a marginal effect and threshold analysis. The study made use of a newly constructed index of financial development not employed previously in this area of the empirics. We controlled for financial liberation, human capital development, natural resources endowment, and trade openness as capital flow determinants.

The empirical results from the linear estimates suggest that the volatility of the domestic exchange rate dampens all forms of capital flows, providing evidence for the theory of investment irreversibility and the option to wait as espoused by Dixit and Pindyck (1994). From the quadratic analysis, the regression estimates provide strong evidence of a non-linear, U-shaped relationship between capital flows and exchange rate volatility. The results suggest that at the lower stages of volatility, volatility will reduce capital flows as consistent with the option to wait theory. However, the negative effect of exchange rate volatility on capital flows contracts after a specific threshold value of the exchange rate volatility. From this point, increases in volatility lead to the attraction of capital flows, confirming the theory of investment reversibility that higher uncertainty boost investments due to higher anticipated returns on investment. Our conclusion holds for all the indicators of capital flows.

We also found overwhelming statistical evidence that exchange rate volatility significantly drives down capital flows to Africa when we accounted for known determinants of capital flows. However, cognizant that an effective exchange rate is not independent of the financial system, we considered the impact of exchange rate volatility on capital flows through the interaction of exchange rate volatility with indicators of financial development. The coefficient of the interaction terms provided a clear-cut positive relationship between the interaction term and capital flows, suggesting that on the face-value, in countries that are financially integrated, the adverse impact of volatility on capital flows is minimized. Thus, as the level of financial development edges high, the adverse impact of volatility of capital flows diminishes for countries with better financial systems.

To further examine the level of financial development that minimizes the adverse impact of volatility on capital flows, the study assessed the marginal effect of exchange rate volatility on capital flows at varying levels of the overall financial development index, financial institutions, and financial markets. From our marginal and threshold analysis, we found that financial development under all three indicators up to the 90^{th} percentile can reduce the adverse impact of volatility on foreign direct investments and private debt flows but cannot eradicate the adverse effect as we found a threshold value higher than the maximum sample indicators, and in some cases higher than the maximum data value of 1. Thus, though financial development lessens the adverse effect, there is no evidence that the adverse impact will subside any time soon. However, we found evidence that the negative impact of the exchange rate volatility of portfolio equity flows is eliminated at the 90^{th} percentile of all financial development indicators, as we found the 90^{th} percentile to lie within ranges of the threshold value.

The findings provide several policy directions for foreign investors, financial sector regulators, and government agents charged with trade and the attraction of capital flows. First is the call for ways of stabilizing the exchange rate of most economies in Africa. Issues of exchange rate misalignment is a fundamental problem due to underlying economic regimes of many African countries such as import dependence and the dollarization of many economies.

The efficient management of the economy is critical as it will improve the general economic fundamentals, reduce economic agents' willingness to hedge their wealth in foreign currency, lead to a halt in the scramble for foreign currency, and curb the volatility associated with the domestic exchange rate. Clear cut policies regarding the use and demand of foreign currency in the domestic retail environment should be firm in dwarfing the appetite for foreign currency in the domestic space. Growth in manufacturing and industries will lessen the dependence on foreign goods, reduce imports and the scramble for foreign currency and ultimately, fluctuations in the exchange rate. Governments should have strict policies on importation and should allow imports for only products that cannot be produced internally. Governments should take vital interests in growing local industries or encourage foreign entities to establish production plants within. Policies aimed at the stabilization of the exchange rate should be in sync with the complete development of the financial system.

Financial sector development regarding banking and stock market efficacy should be a constant goal of regulators as foreign investors find the development of the sector a key ingredient in their decision to relocate. Such development is essential as it even offers a haven for foreign investors amid uncertainty. Banks should have a huge capital base to support domestic and foreign businesses seeking financial support. Stock market development should involve innovative ways of attracting more firms to list on the domestic market as means of raising capital and increase total market capitalization. There should be clear evidence of working corporate governance systems in the financial sector space. Though the current study sample and period showed that the threshold at which FD eliminates the adverse impact of volatility of FDI flows lies outside the maximum ranges of the study, it is encouraging to note that the critical values lie within the overall data ranges between 0 and 1. This assures policymakers that attention to financial development will reduce uncertainty and increase external capital. Given that the threshold value for financial development concerning volatility and PEF is attainable earlier than FDI calls for a shift in the preference for external capital. It also calls on African countries to heed the call on the UN that the dividing lines between FDI and other types of flows are becoming increasingly blurred and that these flows are better suited for FDI like purposes and should consider policies aimed at other types of private capital flows.

On the part of government agencies charged with trade policies, it will be imperative to create a conducive and enabling environment for foreign enterprises to operate on the continent, as we found private capital to be reinforcing. Ways of attracting foreign enterprises especially to untapped sectors of the economy should be of prime focus. The use of location tax incentives, free zones and tax holidays can induce investors though it should be implemented with caution. It will be prudent to also encourage partnerships between local and foreign enterprises in order to cement their extended stay. For future studies, researchers could examine the relationship in the opposite direction to assess whether the attraction of capital flows contributes to exchange rate volatility on the continent and whether other variables such as institutional quality, in addition to financial development can moderate the association. Similar studies on other domestic macroeconomic volatility variables such as growth, interest rates, and external volatilities such as commodity price, growth rate of advanced countries, and global money supply can be studied. A comparative study with other economic zones with Africa will be of relevance in recommending the right policies.

Appendix 1: Sample Countries

Foreign Direct Investment: Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cape Verde, Cameroun, Central African Republic, Chad, Congo DR, Congo Republic, Cote D'Ivoire, Egypt, Equatorial Guinea, Ethiopia, Gabon, The Gambia, Ghana, Guinea-Bissau, Kenya, Lesotho, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Niger, Nigeria, Rwanda, Senegal, Seychelles, South Africa, Sudan, Tanzania, Togo, Tunisia, Uganda, Zambia.

Portfolio Equity Flows: Benin, Botswana, Burkina Faso, Cameroun, Congo Republic, Cote D’voire, Egypt, Kenya, Lesotho, Malawi, Mali, Mauritius, Morocco, Namibia, Niger, Nigeria, Senegal, South Africa, Sudan, Tanzania, Togo, Tunisia, Uganda, Zambia.

Private Debt Flows: Algeria, Botswana, Cameroun, Cote D'voire, Egypt, Ghana, Kenya, Madagascar, Malawi, Mauritius, Morocco, Niger, Nigeria, Rwanda, Senegal, South Africa, Tanzania, Togo, Tunisia, Uganda, Zambia.

Appendix 2: Descriptive Statistics

Table 4.1A: Summary Statistics under Foreign Direct Investment (40 Countries)

Variable	Mean.	Median	Std. Dev	C.V	Min	Max	N
Foreign direct investment	3.605	1.996	8.052	2.234	-8.589	161.824	1119
Real exchange rate	3072.943	463.721	70608.43	22.977	-830912.7	2213668	1146
Real exchange rate (Log)	5.324	6.153	2.255	0.424	0.432	14.610	1143
Exchange rate volatility	157.104	71.397	365.861	2.329	0000674	6481.056	1076
Exchange rate volatility (Log)	4.130	4.268	1.523	0.369	-9.605	8.777	1076
Financial Development Index	0.142	0.113	0.095	0.669	0	0.627	1120
Financial Institutions Index	0.234	0.203	0.121	0.517	0	0.738	1120
Financial Market Index	0.048	0.011	0.090	1.85	0	0.586	1120
Financial openness	-0.648	-1.210	1.177	-1.816	-1.917	2.347	1111
Human capital	1.693	1.614	0.410	0.242	1.030	2.885	980
Natural Resources	12.531	8.750	12.136	0.968	0.001	84.240	1116
Trade Openness	67.801	59.643	32.338	0.477	11.087	225.023	1073

Table 4.1B: Summary Statistics under Portfolio Equity Flows (24 Countries)

Variable	Mean.	Median	Std. Dev	C.V	Min	Max	N
Portfolio equity flows	0.312	0.003	3.994	12.801	-30.914	78.179	696
Real exchange rate	4510.12	282.655	91255.08	20.233	-830912.7	2213668	686
Real exchange rate (Log)	5.008	5.654	2.450	0.489	0.432	14.610	684
Exchange rate volatility	135.795	63.202	415.227	3.058	0000674	6481.056	632
Exchange rate volatility (Log)	3.728	4.146	2.108	0.565	-9.605	8.777	632
Financial Development Index	0.171	0.128	0.112	0.655	0.024	0.627	672
Financial Institutions Index	0.267	0.226	0.139	0.521	0.019	0.738	672

Financial Market Index	0.074	0.022	0.108	1.459	0	0.586	672
Financial openness	-0.562	-1.210	1.212	-2.157	-1.917	2.347	667
Human capital	1.761	1.750	0.420	0.239	1.030	2.885	672
Natural Resources	8.780	6.144	9.139	1.041	0.001	59.620	672
Trade Openness	66.343	58.561	29.509	0.445	11.087	165.646	668

Table 4.1C: Summary Statistics under private debt flows (21 Countries)

Variable	Mean.	Median	Std. Dev	C.V	Min	Max	N
Private debt flows	0.199	0	2.338	11.749	-16.766	26.237	609
Real exchange rate	5194.576	255.389	97165.23	18.705	-830912.7	2213668	605
Real exchange rate (Log)	5.127	5.544	2.530	0.493	0.513	14.610	604
Exchange rate volatility	123.342	53.723	401.134	3.252	0000674	6481.056	567
Exchange rate volatility (Log)	3.879	3.984	1.508	0.389	-9.605	8.777	567
Financial Development Index	0.173	0.132	0.112	0.647	0.027	0.627	588
Financial Institutions Index	0.260	0.223	0.127	0.488	0.049	0.738	588
Financial Market Index	0.082	0.027	0.113	1.378	0.001	0.586	588
Financial openness	-0.475	-1.210	1.283	-2.701	-1.917	2.347	588
Human capital	1.816	1.761	0.402	0.221	1.057	2.885	588
Natural Resources	8.475	6.997	6.431	0.759	0.001	35.272	588
Trade Openness	63.184	58.706	23.213	0.367	19.684	137.112	597

CHAPTER FIVE

THRESHOLDS IN PRIVATE CAPITAL FLOWS AND REAL SECTOR GROWTH: A DYNAMIC PANEL ANALYSIS

"Education is the most powerful weapon which you can use to change the world." – Nelson Mandela

5.1 Introduction

Based on the earlier theoretical postulations of Solow-Swan (1956), scholars have acknowledged the benefits of external capital flows to economic growth. Mankiw et al. (1992) show that in an augmented Solow model, capital flows affect the rate of savings, which in turn affects growth positively. In an endogenous growth model, Bailliu (2000) also demonstrates the positive association between growth and capital flows. By augmenting domestic savings, many have found capital flows to enhance economic growth and productivity (Gourinchas and Rey, 2014; Shaghil and Andrei, 2013). In as much as the theory is skewed towards a positive association between capital flows and growth, the empirical literature is far from reaching conclusion on the specific nature of the impact of capital flows on economic growth. The empirics do not support a robust one-side positive association between capital flows and economic growth. Irrespective of the type of capital flows, some studies posit a positive relationship (Adjasi et al. 2012; Kose et al. 2009; Adams, 2009; Reinhart, 2008; Alfaro et al. 2004; Borensztein et al. 1998). Others also contend that the relationship is detrimental (Ahmed, 2016; Klobodu and Adams, 2016; Agbloyor et al. 2014; Reinhart and Rogoff, 2010; Checherita and Rother, 2010; Chanda, 2005; Durham, 2004; Ndikumana and Boyce, 2003; Carkovic and Levine, 2002; Fosu, 1996) or insignificant (Gossel and Biekpe, 2014; Oney and Halilsoy, 2011; Akinlo 2004). Summing up the inconsistencies and ambiguities with the empirics, Obstfeld (2009) admits that the actual impact of financial integration on economic growth remains a controversial issue. Thus, the evidence of a positive effect is far from convincing. Edison et al. (2004) found that on a review of ten empirical studies, less than a quarter of those studies concluded on a positive association between capital mobility and economic growth. Similarly, Bumann et al. (2013) show a weak positive association between financial liberalisation and economic growth on a meta-analysis of sixty empirical studies. Saafi et al. (2016) provide further evidence of a weak causal association between financial liberalization and economic growth.

The debate on the inconsistencies has been alluded to empirical shortfalls, and the failure of most studies to consider possibilities of non-monotonic or nonlinearities in the capital flows economic growth dynamics. Some studies posit that the effect of capital flows on economic growth changes after attaining a certain threshold level, either based on the levels of capital flows itself or some mediating variables. Thus, there exist possibilities of thresholds within the capital flows economic growth relationship, and that the growth impact of capital flows on economic growth is not the same, and it is subject to variations under different levels of capital flows and specific macroeconomic conditions (Yeboua, 2019; Saafi et al. 2016; Amir and Sami, 2016; Slesman et al. 2015: Chen and Quang, 2014; Kose et al. 2011). This missing link in the above nonlinear studies is the overwhelming focus on aggregate growth indicated by GDP growth, output growth, or productivity growth. More specifically, none of the studies have looked at the capital flows - growth nonlinearity from the level of the real sector, where welfare gains and cost reside. The benefit of an assessment focused on disaggregated growth lies in the relevance of these sectors to the overall sustainability and development of most economies in which this study was focussed.

Additionally, even though most studies acknowledge the relevance of mediating variables in the capital flows - growth setting, the levels of capital flows itself, and critical mediating variables such as human capital development, as essential threshold variables, have received little mention in the literature. On the relevance of human capital to capital flows attraction, the literature contends that a well-developed human resources capacity is essential in the attraction of capital flows, especially, when labour cannot be transported. Human capital is very important for the conversion of raw materials into finished products. As indicated by the neo-classicals theory, countries can attract capital flows for development where it has a developed human capital, making it an essential mediating variable. This view has been empirically supported by Kottardi and Stengos (2010) as well as Borenztein et al. (1998). However, at what point does human capital become detrimental to the attraction of capital flows. On capital flows itself, the view that its impact on growth is still in limbo suggest that either the benefit starts and end at some point during the growth of an economy, or it initially hampers growth before enhancing growth. The critical questions are thus, at what point should a country stop its investments in human capital in relation to the attraction of capital flows. Secondly, at what point does increases in capital flows harm growth?

Empirical literature contends that host country structural frameworks are key consideration in the impact of capital flows on growth (Durham, 2004; Alfaro et al., 2004). Although Azariadis and Drazen (1990) acknowledge the nonlinear nature of human capital in economic development, only a few empirics have focused or considered human capital in the association between capital flows and growth, which gain popularity with the seminal work of Borensztein et al., 1998. Other studies that followed included Xu (2000), Ford et al. (2008), Kottardi and Stengos (2010), and Tu et al. (2012). However, these studies suffer from methodological defects in the application of linear interaction models to determine nonlinearity. We found Kottardi and Stengos (2010) to be one paper that has extended the nonlinearity of human capital into the capital flows economic growth nexus. However, though Kottardi and Stengos (2010) looked at thresholds on the effect of capital flows on growth, a limitation is the focus on aggregate growth, the application of a methodology that does not account for endogeneity, and the dynamic nature of growth models, and the limited role accorded to African countries. The seemingly low quantum and lack of robust estimations warrants investigation owing to the theoretical and empirical linkages between human capital development, capital flows, and economic growth as espoused by Lucas (1990). This chapter specifies a threshold model that ameliorates the weaknesses of extant studies and takes into account the dynamic nature of growth and issues of endogeneity. We also extended the scope of our mediating variable (human capital), and focused on growth at a disaggregated level, while relying solely on data from Africa.

On the methodological assessment of nonlinearity, extant studies have sought to determine nonlinearity and thresholds by the process of multiplicative models. These studies focus on mediating variables or squared terms of the independent variables and taking the partial derivative of the dependent variable with respect to the threshold value. However, as indicated by Baum (2013) and Brambor (2006), most studies fail to estimate the appropriate t-statistics and confidence interval within which the exact threshold value lies (Adekunle and Sulaimon, 2018; Anyawu 2015; Checherita and Rother, 2012; Borensztein et al., 1998; Fosu, 1996). Even though recent literature has shifted from the basic multiplicative models to seemingly robust estimations with the inspiring work of Hansen (1999; 2000) static threshold panel estimations, many models still fall short of consistent and unbiased estimates. Many of the studies fail to account for persistency and endogeneity, especially as pertains to growth models. We exploited a recently developed model that deals with the limitation of previous nonlinear models while providing consistent estimates.

We summarize our contribution to the literature in the following thematic ways. First, we focused on growth at the disaggregated level of the real sector. Specifically, we focused on growth in manufacturing, agriculture, industry, and service value additions. The empirics on the nonlinearities in the capital flows-economic growth nexus have remained at the aggregate level of growth, with none at the disaggregated growth level. However, the profound benefit of capital flows to the growth of the real sector in the economy cannot be discounted, and more importantly, the nature of the relationship. Within this framework, we examined the nonlinear dynamic relationship between the growth of the real sector and capital flows. We, however, focused primarily on foreign direct investment (FDI), which is the dominant indicator of capital flows. Secondly, we estimated threshold effects between foreign direct investment and growth when FDI and variations of human capital are our threshold variables. Our third contribution is the application of a non-linear asymmetric mechanism in a dynamic panel threshold estimation procedure that accounts for issues of endogeneity, as proposed by Seo and Shin (2016) with the Stata application by Seo et al. (2019). The model debunks the assumption that either the regressors or threshold variables are both exogenous by modelling a non-linear asymmetric dynamic model while considering individual heterogeneity through the application of Arellano and Bond (1991) first difference GMM estimator. Departing from earlier OLS models such as Hansen (2000) and Seo and Linton (2007), the application of the dynamic model in threshold estimation allowed us to account for the persistent nature of real sector growth. This is because failure to consider such persistent effects could lead to spurious and biased results since the impact of previous real sector growth on current real sector growth cannot be discounted.

Including the lagged real sector growth in a dynamic setting, improves the short-run dynamics between capital flows and the real sector. The application of the GMM also alleviates small sample bias in the difference estimator and controls for country-specific variations in a panel setting. Lastly, we achieved our objective with a set of data on Africa with 36 countries from 1990 to 2018. For instance, out of the 80 countries studied by Chen and Quang 2014, only 18 African countries were included, while only 18 of the 84 sampled countries in Kose et al. (2011) were African countries. The focus on Africa as a capital flow destination allows us to proffer specific policies and add to the debate on capital flows and growth on the continent. We believe Africa holds a very prominent place in the global flow of capital and presents a strong front in terms of being the most significant trading block with the enforcement of the African Continental Free Trade Agreement (ACFTA). The ACFTA will present Africa as a single expanded market, making it very attractive to foreign capital. Currently, many African countries are considered small in terms GDP and population. Again, individual countries cannot compete with other continental bodies such as the European Union and OECD, as well as industrialised countries in Asia, Europe, North and South America. More importantly, the dynamics and growth trajectory of Africa and capital flows validates a sole focus on the region.

5.2 Literature review of empirical studies

We looked at the literature on the real sector and its relevance to the growth and sustainability of the Africa development agenda. We ended the review with some empirics on nonlinearities and various threshold models within the capital flows and growth dynamics.

Why the focus on the real sector? Though recent growth in Africa has improved compared to two decades ago[40], questions border on whether the increased growth is commensurate with poverty reduction, information technology, and science education. Has the growth led to improvements in human life, growth of industries, agriculture, and the volume of intra-continental trade, wasteful domestic investments, and issues of infrastructure, corruption, among others? African governments are also encouraged to diversify their economies to stand any future commodity price shocks. Industrialization should be a concern for African leaders.

[40] Between 2008 and 2014, average growth on the continent was above the 4% threshold. And between 2010 and 2014 growth was 5% (IMF, 2013; AfDB, 2012). Projections for 2019 and 2020 were 4% and 4.1 % (AfDB (2019).

Domestic resources mobilization to ensure debt stabilization and reduction of debt service cost, cutting budgetary assistance to inefficient state-owned enterprises, and maintaining fiscal discipline will be vital in attracting investment. At the same time, jobs for the growing young labour force remains a critical agenda. Expectations are that sustainability of the fundamentals underlying the current growth rates should see close to 64% of countries in the region attaining middle-income status by 2025 (World Bank, 2013).

Many economic watchers are of the view that Africa's economic transformation lies in growth driven by higher productivities in improved agriculture, industrialization, and manufacturing as well as services (Page, 2013; Dinh et al., 2012; UNECA and AU, 2011). According to McKinsey Global Institute (2012), it is estimated that by the end of 2020, the number of stable paying jobs in Africa will be between 54 and 72 million, with most of these jobs coming from the manufacturing, agriculture and services sectors. The projections show that manufacturing, agriculture, and services (retail and hospitality) sectors will account for a combined total of 45% of the anticipated workforce with government services accounting for 30%. Essential to Agenda 2063 is the modernization of agriculture for enhanced productivity, value additions, and food security. Expectations are that modernization of the sector through science and technology will make it attractive to most of the continent's young adults by 2025 (AU, 2015). The growth of the real sector is also essential for the optimal use of available inputs and the growth of other sectors (external, fiscal, and financial).

Assessing the interdependence of these sectors, Anyanwu (2010) postulates that activities such as those in the manufacturing and agricultural sectors have linkage with most areas of the economy, and this lessens the pressure on the external sector. Grabowski (2006) notes the interdependency between the real sectors. "Productivity growth in a unimodal agricultural system will likely stimulate non-agricultural production activities via a variety of different linkages. Backward production linkages exist when the expansion of a production sector requires inputs produced in another sector. As agriculture expands, it often requires machinery, machinery repair, fertilizers, seeds, and so on. Forward linkages exist when the expansion of production in one sector provides materials for processing in another production sector" (Grabowski, 2006, pp. 169). Thus increased agriculture production will boost industry growth, leading to an increase in the quantum of manufactured goods and the expansion of services. On sustaining Africa's economic transformation, Jayne et al., (2018) note that growth in agriculture through multiplier effects in non-farm related jobs or avenues remains a relevant component. The importance of such linkages is also supported by the United Nations report on economic development in Africa, "building complementarity that is, strengthening input-output and demand linkages between services, manufacturing, and agriculture remains a necessary continental goal" (UNCTAD 2015a, pp. 12).

On a set of 45 African countries, Wells and Thirlwall (2003) contend that between 1980 and 1996, the manufacturing sector contributed much in terms of GDP relative to other known sectors such as agriculture and services. Diao et al., (2017) alludes that much of the recent growth in Mauritius is associated with growth in industrialization with the setting up of export promotion zones and a labour concentrated manufacturing sector. Likewise, the African Union is optimistic that the establishment of regional manufacturing hubs is essential for the growth of the continent's private sector and Pan African trade (AU, 2015).

***Do nonlinearities and threshold exist in the relationship*?** Assessing the factors that drive capital flows to the West African sub-region, Anyanwu (2015), with data from 1970 to 2010, found a U-shaped relationship between FDI flows and GDP per capita. The study relied on the squared of GDP per capita to test for non-linearity; however, the results were silent on the exact threshold value. In a recent study of 67 developing countries between 1972 and 2011, Gaies and Nabi (2019) found mixed financing of foreign direct investment and debt flows to be beneficial to the growth of these economies better than the individual flows. Through the inclusion of a squared FDI-to-debt ratio, they found an inverted U-shaped growth impact from the FDI-to-debt ratio.

Employing a dataset of 80 countries between 1984 and 2007, Chen and Quang (2014) assessed the impact of financial integration on economic growth. Under the assumption that the relationship could be nonlinear, the study employed Caner and Hansen's (2014) extension of Hansen's (1999) non-dynamic panel threshold model to account for the endogeneity of regressors. The dependent variable was real GDP per capita, with three main measures of financial integration that included foreign direct investment, derivatives, and other investment flows. They further used the initial levels of income, trade openness, institutional quality, financial depth, government expenditure, and inflation as threshold variables. They found that while institutions, financial depth, and government expenditure offer important threshold variables for the benefit of financial integration on real GDP per capita, threshold values could not be established for trade openness and inflation. The study included three African countries grouped under emerging and fifteen under developing countries. Similar to the conclusions of Chen and Quang (2014), Bakaert et al. (2011) had earlier alluded to the relevance of institutions and financial development as necessary threshold values on the impact of capital account liberalization of productivity growth. Also, the views of Chen and Quang (2014) on trade openness confirms the earlier opinions of Areta et al. (2001) that trade openness does not act as a necessary threshold variable on the impact of capital flows on economic growth, while Cavallo and Frankel (2008) note that openness to trade above a 10% threshold lessen a country’s vulnerability to an economic crisis and sudden shocks from capital flows.

Relying on both de jure and de facto measures of financial integration for 185 countries under various groupings between 1961 and 2015, Amir and Sami (2016) sought to determine the impact of financial integration on economic growth. The paper employed both the panel threshold regression model developed by Hansen (1999) and the logistic smooth transition regression methods to examine the possibility of nonlinear and threshold effects in the association. The dependent variable was the real growth of GDP growth, and the independent variables included the Chin-Ito index of capital account openness, foreign direct investments, portfolio equity flows, non-resident bank loans, and financial accounts. Though they found evidence of thresholds, they contend that distinctive values depended on the country groups. Focusing on the de jure indicator, they show lower threshold values for transition countries, than emerging countries, while developing countries obtained the highest threshold values. Again they posit that while capital account openness enhances growth below the threshold value and above the threshold value for emerging markets, growth retarding for all other income groups above the threshold value. While they caution that the results might suffer from possible endogeneities, the mixed grouping of African countries poses a challenge for a consented continental policy.

Relying on Hansen's (2000) sample splitting procedure, Azman-Saini et al. (2010) examined the threshold levels of financial market development that influence the association between foreign direct investment and growth. The study involved 91 countries over thirty years between 1975 and 2005 with real GDP as the dependent variable against a set of bank indicators (private credit, bank credit, bank assets, and liquid liability) as threshold variables. Based on the Hansen (2000) sample splitting, they found that countries with private credit above a value of 49.7% experience a positive association between FDI flows and real GDP growth while those below the 49.7% mark experience a negative impact of FDI on growth. Different threshold values were established for the other indicators. Thus, they concluded that “the effects of FDI on growth are non-linear in nature and only ‘kick in’ after financial development exceeds a threshold level” (Azman-Saini et al. 2010, pp. 212). On a different indicator of capital flows, Bangake and Eggoh (2020) found the effect of remittances on growth to be positive and significant only beyond a threshold level of financial development. Relying on the Hansen (1999) panel threshold regression, the estimated threshold variables were 46.3%, 35.3%, and 28% for broad money, private credit, and bank credit, respectively.

By the same application of the Hansen (2000) sample splitting model, Slesman et al. (2015) maintained that institutional quality presents an important threshold variable in the capital flows economic growth nexus. With the same dependent variable and data span as in Azman-Saini et al. (2010), the principal capital flows indicators included FDI, Portfolio equity, and portfolio debt flows. The study covered 80 countries with 17 African countries involved. After a bootstrap of 1000 iterations, the null hypothesis of a no-threshold was rejected at a 1% significance level for both indicators of institutional quality, with threshold values set at 6.0271 and 6.1815 for aggregate ICRG and economic freedom index respectively. They show that for all components of private capital flows, countries that lie above the threshold values experience growth impact from capital flows. In contrast, those below the thresholds experienced either adverse or insignificant effects. Thus, the same conclusion holds that the benefits of capital flows on growth only kicks in after a threshold level of institutional quality has been attained.

The presumption is that the growth benefits of capital flows are far from conclusion, especially in the wake of the financial crisis, as many are convinced that indirect impact outweighs the direct orthodox mode of a direct association between finance and growth. Based on the above, Kose et al. (2011) sought to examine the indirect and threshold values of specific values that mediate the association between financial integration and growth. The study measured growth by the real GDP per capita, financial integration by stock data of capital account from Lane and Milesi-Ferretti (2007), and financial depth, institutions, regulation, trade openness, macroeconomic policies (inflation and government expenditure) and the initial level of GDP per capita as threshold variables. Using both parametric and non-parametric linear and quadratic interaction procedures that allow for nonlinear effects of the threshold variables, they contend the threshold variables exist for all the mediating variables at varying levels of importance, placing much emphasis on financial and institutional quality. Based on the marginal effects, they further note lower threshold values for the mediating variables between the FDI, portfolio equity and debt flows, and GDP per capita, with many developing countries below the threshold points.

Using the GDP per capita to measure growth and independent variables from Lane and Milesi-Ferretti (2007) as in the case of Kose et al. (2011), Karadam and Ocal (2014) examined nonlinear and threshold relationship between financial integration and economic growth, for 82 countries between 1970 and 2010. The study employed the panel smooth transition regression model as the primary estimation model and threshold variables that included financial development, institutional quality, trade openness, inflation, and budget deficit. Grouping the data into various country categories, they note that except for developing economies, there is evidence of nonlinear asymmetric relationships between growth and financial integration, based on the different threshold values of the mediating variables. They further show that countries with strong institutions, sound macro policies, and financial development reap the positive benefits of financial integration, and the nonlinear effects are evident for emerging industrial countries.

Since our prime focus was on a mediating variable such as human capital, we reviewed studies that have sought to deploy human capital as a mediating variable. Using a linear multiplicative model, Borenstein et al. (1998) examined the conditional and nonlinear impact of human capital in the linkage between FDI and economic growth on a set of 69 developing countries between 1970 and 1989. The study employed the initial year level of average years of the male secondary school from Barro and Lee (1993) as the proxy for human capital. They show a positive correlation of the interaction of education attainment and FDI on GDP per capita. Through the process of partial derivative, they concluded that without a minimum threshold of human capital development, countries could not enjoy the growth enhancement of foreign direct investment. They posit threshold values that ranged between 0.52 to 1.13 based on the entire sample and different country groupings, which included controlling for Sub-Saharan Africa.

Using an interaction model approach, Ford et al. (2008) note that a minimum level of human capital development is required for FDI to positively affect growth in the United States. The study covered 48 states from 1978 to 1997. They measured human capital by the percentage of the population with at least some college education. The study established two thresholds through the process of the first-order derivative of growth concerning FDI and setting the equation to zero to solve for human capital. They established a minimum threshold for education at 12.04 and a maximum threshold of 15.56. They found six states to lie below the minimum threshold, 23 within the minimum and maximum thresholds, with the rest above the maximum.

Assessing the impact of FDI from different sources on ASEAN countries, Yu and Tan (2012) sought to employ Borensztein's (1998) framework to study the role of FDI on the development patterns of ASEAN, and whether human stock matters in the association. The study used annual time-series data between 1990 and 2008 and measured human stock by the yearly national gross enrolment ratio of secondary education. They employed interactive models like Borensztein et al. (1998) to test threshold effects. They note that countries need to attain a certain threshold level of human capital to reap the economic benefits of FDI, whether its intra ASEAN FDI, FDI from other regions, or FDI from China. They show that FDI from outside ASEAN and intra ASEAN FDI requires high human capital thresholds than FDI from China. They further indicated that Thailand, Brunei, and Singapore have human capital above the required threshold to benefit from outside FDI. Again, only Vietnam, Thailand, Singapore, and Brunei have the required human capital to benefit from intra ASEAN FDI. Moreover, on FDI from China, all sample countries except for Singapore exceed the threshold value.

Kottaridi and Stengos (2010) identified the existence of non-linear effects of human capital and initial income as necessary threshold variables in the association between foreign direct investments and economic growth. The study modelled the relationships by the application of a nonlinear semi-parametric partially linear additive regression procedure on a dataset that spanned between 1970 and 2004 that included twenty-five OECD and twenty non-OECD countries, with further analysis along the lines of high, middle, and low-income countries. Though there exists a nonlinear impact of FDI on growth, only developed countries seem to benefit from the positive effect of FDI. On thresholds, the conclusion of the study sought to contradict the broad assertion that countries can only benefit from the positive effect of FDI on growth after attaining a certain threshold level and that there exist a two-regime impact of absorptive capacities on the effect of FDI on growth in developing countries.

We ended the review with African specific studies on thresholds and non-linearities. In a recent study of 26 African countries that spanned between 1990 and 2013, Yeboua (2019) investigated how the development of the financial sector facilitates the growth-enhancing impact of foreign direct investment. The study relied on the Panel Smooth Transition (PSTR) model of Gonzalez (2005) to resolve potential issues of cross-country heterogeneity within the data. Like all previously reviewed studies, growth is measured by real GDP per capita with private credit as the primary financial development threshold variable while controlling for other determinants of growth. The study established the existence of nonlinear and threshold effects of financial development in the FDI economic growth equation. The results from the PSTR shows a negative effect of FDI on real GDP per capita at lower levels of private sector credit. Specifically, unless financial development reaches a threshold of 16% of GDP, there will be no beneficial impact of FDI on growth. In as much as the study focused on Africa, gaps still exist in terms of sample size, the methodology adopted, as well as the focus on aggregate growth.

Again, specific to Africa, Mensah et al. (2019) and Ndoricimpa (2017) established thresholds in the association between debt flows and economic growth. Mensah et al. (2019) employed Chudik et al. (2017) panel autoregressive distributed lag (ARDL) model to test for nonlinearity. They noted a threshold value that ranges between 20% to 80% of debt to GDP. Specifically, they contend that a debt to GDP ratio between 50% to 80% is harmful to economic growth. Ndoricimpa (2017) asserts that though nonlinearities cannot be overlooked in debt - growth nexus, the methodological procedures adopted are also critical. The study notes of debt being harmful to growth at increasing levels. However, both studies focused on public debt flows with no emphasis on private capital flows. Again, they did not account for the threshold impact of mediating variables.

The study took a new twist on the capital flows growth nexus by contributing to the literature on nonlinearities within the linkage between FDI flows and economic growth. We employed a different growth indicator to arrest the diverse heterogeneous impact of capital flows on Africa's real economy, as there is a lack of previous studies to analyze nonlinearity at a lower level of growth. Second is the use of mediating variables to analyze threshold effects in the association at the level of the real economy, and whether there exist threshold values with regards to the initial levels of capital flows, domestic savings, and human capital development. Specifically, we threw the spotlight on Africa's rising real sector, and private capital flows. We investigated non-linear and threshold values of human capital development and foreign direct investment as necessary capital flows-real sector growth threshold variables. Also, most studies are still limited in terms of methodological rigor involving the use of linear interactive models of capital flow variables with mediating variables or squared terms of capital flows in the standard growth equation to capture nonlinearity.

Departing from the above methodological laps has led to models assessing thresholds and nonlinearity. First, we applied threshold models to estimate the capital flows – growth relationship. Distinct from the linear interactive models where cut-off points are not visible, threshold models help to ascertain the specific cut-offs of threshold or regime dependent variables. Again, threshold estimations account for parameter heterogeneity within many cross-country growth estimations, unlike the assumption of homogenous parameters under linear interactive models. Secondly, applying the appropriate threshold models to growth is challenging as these many threshold procedures did not consider the dynamic nature of growth, issues of endogeneity of both independent and threshold variables.

We, therefore, sought to apply a methodological procedure that overcomes the limitations of previous estimations procedures such as the assumption of regressors and threshold variables as exogenous as purported by earlier procedures such as Hansen (2000) and Seo and Linton (2007). Also is the assumption of endogenous regressors but exogenous threshold variables as in Caner and Hansen (2004) as well as the non-dynamic and static estimation models such as Hansen (1999; 2000) and Kourtellos et al. (2016). As indicated by Ndoricimpa (2017), nonlinearities and thresholds respond to methodological procedures, making the application of alternate procedures appropriate. We thus relied on Seo and Shin (2016) dynamic panels with threshold effect and endogeneity as well as Seo at al. (2019) estimation of dynamic panel threshold model using Stata to resolve the above methodological gaps. The procedures allowed the modelling of nonlinear asymmetric dynamics and unobserved individual heterogeneity simultaneously through the first difference GMM transformation and allowed for endogeneity in both regressors and threshold variables.

5.3 Data and methodology

We used a set of 36 African countries over the period 1990 to 2018 given data availability. We deployed annual data from two primary sources. These are the Penn World Tables and The World Development Indicators of the World Bank. We measured growth by the real sector, which consists of four leading indicators and an index comprising of an equal weight of all four indicators. These include annual growth of agriculture value additions, industrial value additions, manufacturing value additions, and services value additions. The last indicator is an equal weight of all four indicators, known as the real sector growth index. We measured capital flows by annual net inflows of foreign direct investment (FDI). FDI is the decision by a foreign entity to acquire a lasting interest in another entity other than one in its home country, where such interest usually is not less than a 10% stake. FDI is expressed in terms of annual GDP growth.

Our main threshold variables were foreign direct investment inflows and human capital development. We employed three indicators of human capital. The primary human capital measure was proxied by the mean years of schooling and returns to education. The data is from The Penn World Tables (Feenstra, Inklaar, and Timmer, 2015). According to Potančoková et al. (2014), the mean year of schooling is “often used for cross-country comparisons as well as in economic and environmental models as the unique indicator of educational attainment and human capital stock" (Potančoková et al., 2014, pp. 5). UNDP (2010) also notes the relevance of the mean years of schooling in the Human Development Index. This indicator is like Borenstein et al., (1998) and Kottaridi and Stengos (2010), who measured human capital by the total mean years of schooling. For robustness, we make use of two additional indicators employed in the literature from The World Development Indicators of the World Bank. The first is gross annual national secondary school enrolment as consistent with Ibrahim and Alagidede (2018), Tu and Tan (2012), and Ford et al. (2008). Again, the indicator is consistent with proxies used by previous studies such as Urata and Kawai (2000), and Xu et al. (2000). However, these studies focused on male secondary school attainment or enrolment, which has fewer data points than the total secondary school enrolment. Our second robustness indicator is a qualitative measure of human capital development, which measures hours of contact between pupils and their tutors at the primary level. This indicator is the pupil to teacher ratio as consistent with Ibrahim and Alagidede (2018).

Besides, we made use of control variables consistent with the capital flows growth literature, especially those in the line threshold and nonlinear studies. These include government consumption expenditure (Yeboua, 2019; Tu and Tan, 2012; Borenstein et al., 1998), financial development, and inflation (Yeboua, 2019; Borenstein et al., 1998), Trade openness (Yeboua, 2019). We also included our primary indicator of human capital as control variables.

5.3.1 Estimation procedures

We specify two main models. A simple growth model that evaluates the direct and indirect impact of capital flows on the growth of the real economy, amidst a set of controls. We further estimated a dynamic threshold model following Seo and Shin (2016), to account for threshold effects in the real sector growth-capital flows nexus.

5.3.1.1 Dynamic linear growth regression (Interactive models)

We began with a simple linear dynamic growth model in the view of the neoclassicals where economic growth is a function of capital, technology, and labor, indicative of a direct relationship. However, in the view of the endogenous theory, the effect of capital on economic growth can occur indirectly through the level of human capital. We represented capital in this case, in the form of foreign direct investment flows (FDI).

We specified our baseline growth model in equation (5.1) where growth is dependent on a set of variables:

$$Y_{it} = \alpha Y_{it-1} + \mathrm{H}\Sigma_{i=1}^{n}\mathrm{X}_{it} + \Omega_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (5.1)$$

From equation (5.1), Y_{it} represents economic growth proxied by gross domestic product for country *i* at time t; X_{it} denotes a set of control variables in a standard growth model; Ω_{it} is the error term, while *i* and *t* denote country and time-specific variables. Following Blanchard et al. (2016) growth equation, the direct effect of capital on growth based on annual data is shown below. Thus, we estimated equation (5.2) below:

$$Y_{it} = \alpha Y_{it-1} + \mathrm{H}\Sigma_{i=1}^{n}\mathrm{X}_{it} + \mathrm{T}\Sigma_{i=1}^{n}\mathrm{K}_{it} + \Omega_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots. (5.2)$$

Where, Y_{it} represents GDP growth, X_{it} represents a set of control variables, K_{it} represents a set of capital. H and T denotes the coefficients of capital and the set of control variables respectively. We altered equation (5.2) to include measures of the real sector and private capital flows (FDI). We further decomposed the error term in equations (5.1) and (5.2) into country effects, a time-varying idiosyncratic shock with the standard *iid* assumption, and an error term. We thus estimated equation (3) as follows:

$$RSG_{it} = \alpha RSG_{it-1} + \mathrm{H}\Sigma_{i=1}^{n}\mathrm{X}_{it} + \mathrm{T}_{j}\Sigma_{i=1}^{n}\mathrm{FDI}_{it} + U_i + \lambda_t + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots\dots (5.3)$$

Equation (5.3), we evaluated the effect of foreign direct investment (FDI) on the real sector, in which real sector growth depends on its one-period lag, FDI, and other growth control variables. From the above equation, RSG_{it} measures annual growth in the real sector for country i at time t. These are annual growth in manufacturing, industrial, agriculture, and service value additions. We also constructed an index measure of real sector growth from the four components, called the Real Sector Growth Index. Consistent with the literature, the real sector growth index is an equal weight of the four components, as consistent with Asamoah and Alagidede (2020), Asamoah et al. (2016), and Asiedu (2013). RSG_{it-1} is a lag of growth of the real sector testing for convergence and reinforcing effects as indicated by growth models. X_{it} denotes a set of control variables known to influence the growth of the real sector. These include government expenditure, trade, inflation, per capita income, financial depth and human capital development (HCD); FDI_{it} denotes a measure of private capital flows. Where j corresponds to low and high levels of FDI, which can be ascertained with the inclusion of the squared term of capital flows (FDI * FDI). Where U_i is also a time-varying idiosyncratic shock with the standard *iid* assumption, λ_t is country specific effects, ε_{it} is the model error time. The above equation can be estimated with a difference or systems GMM estimator. The GMM estimator is best known to resolve issues of reverse causality and endogeneity of lagged dependent variables, and any unobserved country effects eminent in a standard growth model.

The empirical conclusions on the relevance of home country's absorptive capacities in the attraction and the impact of capital flow on growth render the assumption of a linear relationship a significant limitation in most capital flows-economic growth studies. The argument is that the positive impact of capital flows on growth may either start or end after a certain threshold level of a mediating variable. Based on the assumption of the indirect impact of capital flows on growth, we considered the existence of a mediating variable in the growth capital flows equation. One critical mediating variable that has received attention is the indirect impact of human capital (Boreinstein et al. 1998; Xu, 2000; Ford et al. 2008; Tu and Tan, 2012). Under the assumption that the impact on capital flows may be conditioned on the country's level of human capital development (HCD), we assessed whether an increase in the levels of human capital development combined with private capital flows can enhance the growth of the real sector. We thus looked at the impact of capital flows on the real sector for countries with high human capital development and low human capital development. In line with many of the studies stated above, we included an interaction term of human capital, and FDI flows in equation (5.3) to account for the indirect effect of capital flows conditioned on human capital development (HCD). This leads us to equation (5.4):

$$RSG_{it} = \alpha RSG_{it-1} + \mathrm{H}\Sigma_{i=1}^{n}\mathrm{X}_{it} + \mathrm{T}_{j}\Sigma_{i=1}^{n}\mathrm{FDI}_{it} + \delta HCD + \Psi(FDI * HCD)_{it} + U_i + \lambda_t + \varepsilon_{it} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots .. (5.4)$$

In equation (5.4), δ and Τ test the direct effects of human capital development and FDI flows on the real sector. At the same time, Ψ evaluates the changes in real sector growth conditioned on instantaneous variations in private capital flows at degrees of human capital development. To check nonlinearity, we took the marginal effect of FDI flows on growth to be $\mathrm{T} + \Psi HCD$. The theoretical position on this form of nonlinearity ascertains that increasing degrees of human capital should lead to higher growth of the real sector via the increasing FDI flows, given that human capital will lead to an efficient allocation of FDI. Thus, countries with high human capital will attract high FDI to grow the real sector. In extreme cases, where FDI flows exert adverse effects on the real sector, increasing degrees of human capital could potentially reduce the adverse effect, and if possible, lead to a positive impact of FDI flows on the real sector.

5.3.2 Dynamic threshold model

Though the linear interactive models may provide some evidence on nonlinearity, they fall short of estimating the exact turning point or thresholds at which the nonlinear effect sets in or take off. Again, evidence of nonlinearity is less robust. We applied a dynamic model as against static model because it helps in capturing news about the evolving growth of the real sector and its components. We thus postulate that the exact impact of capital flows may be conditioned on initial levels of capital flows and human capital. In the light of new evolving procedures, we present the main estimation procedure per Seo and Shin (2016) dynamic panels with thresholds effect and endogeneity. Unlike traditional dynamic models that capture the average impact of an independent variable on dependent variables, a dynamic threshold model accounts for the effect of structural breaks or discontinuities between the independent and dependent variables. The model extends the earlier static panel threshold estimations of Hansen (1999) and Caner and Hansen (2014), as well as the dynamic panel threshold estimation by Kremer et al. (2013) as it permits the treatment of both regressors and transitional variables as endogenous, and also allows for individual unobserved heterogeneity. The dynamic panels with thresholds effect and endogeneity relax the assumption of either exogenous transition variables or regressors or both, as such an assumption could hamper the relevance of threshold estimations, as well as obstructive regarding many real-world applications (Seo et al. 2019). Seo and Shin (2016) further posit that similar to Hansen (2000), the estimator relies on the asymptotic theory and standard fixed threshold asymptotics in developing thresholds. The model employs the first-difference general method of moments (FD-GMM) estimator, which follows a normal distribution asymptotically. Seo and Shin (2016) note the superiority of the dynamic panels with thresholds effect and endogeneity to the traditional multiplicative and least square estimations. Seo and Shin (2016) contend that "more importantly, the asymptotic normality holds irrespective of whether the regression function is continuous or not. Hence, the standard inference on the threshold and other parameters based on the Wald statistic can be carried out. This contrasts with the least-squares approach in which the discontinuity of the regression function changes the asymptotic distribution in a dramatic way" (Seo and Shin, 2016, pp 2). The estimation technique has recently been deployed by Zhu et al. (2020), Chen et al. (2019; 2018), Caner et al. (2019), Botev et al. (2019), Luan et al. (2019) to analysis nonlinearity and threshold effects.

5.3.2.1 Parameter heterogeneity: Does the level of FDI flow matter?

We began our dynamic threshold estimation by asking whether the relationship between real sector growth and FDI flows is conditioned on the levels of FDI. Thus we ascertained the tipping point at which too many inflows of FDI could be detrimental to the growth of the real sector. Therefore, our dynamic panel model was estimated, starting from the real sector growth model in equation (5.3):

$$RSG_{it} = \alpha RSG_{it-1} + \mathrm{T}_{\phi}\mathrm{FDI}_{it}\mathrm{I}(\mathrm{FDI}_{it} \leq \gamma) + \mathrm{T}_{\psi}\mathrm{FDI}_{it}\mathrm{I}(\mathrm{FDI}_{it} > \gamma) + \mathrm{H}\Sigma_{i=1}^{n}\mathrm{X}_{it} + U_i + \lambda_t + \varepsilon_{it} \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots \dots .. \dots (5.5)$$

From equation (5.5), FDI is our threshold and regime independent variable, $\mathrm{I}(.)$ Indicates the said regime, represented by $\phi\ and\ \psi$ for the lower and upper regimes. γ is the threshold parameter or value. The other values in equation (5.5) remain as previously defined. It is the case that our threshold variable and control variables could be endogenous and therefore requires instrumentation. We, therefore, used lagged values of the threshold variable, and explanatory variables as instruments. Consistent with capital flows, we used exogenous exchange rate and exchange rate volatility as additional instruments, as was with Alfaro et al.

(2004), Agbloyor et al. (2014) and Asamoah and Alagidede (2020), as these variables could affect the investment decisions on foreign investors.

We thus determined the single threshold or tipping point of FDI flows in equation 5.6 below:

$$RSG_{it} = \begin{cases} \alpha_{1,0} + RSG_{it-1} + \mathrm{T}_1 \mathrm{Z}_{i,t} + \varepsilon_{1,it} & if \quad FDI < \gamma \\ \alpha_{2,0} + RSG_{it-1} + \mathrm{T}_2 \mathrm{Z}_{i,t} + \varepsilon_{2,it} & if \quad FDI \geq \gamma \end{cases} \ldots\ldots\ldots\ldots\ldots\ldots (5.6)$$

As stated earlier, γ is the threshold parameter, or value at which we determined when the benefits of FDI flow on the real sector kicks in, or the tipping point at which excess inflow of FDI is harmful to the growth of the real sector. FDI_{it} is the endogenous threshold variable that splits our sample into two separate regimes (below and aboveγ). T_1 and T_2 denotes the coefficients of both threshold variable and control variables at the two separate regimes on either side of the threshold ($\gamma.$). Z_{it} denotes a vector of covariates that includes both our threshold variables and all set of control variables.

5.3.2.2 Parameter heterogeneity: Does human capital development matter?

We further assessed if the effect of capital flows on the real sector is conditioned on the levels of human capital development. Does the impact of FDI flows on the real sector vary when countries have attained a certain level of human capital? The simple argument is that human capital development may magnify the positive impact of FDI flows on the real sector, or in cases whether capital flows exert an adverse impact on the real sector, human capital development may nullify the negative impact. We, therefore, considered human capital as our threshold variable and capital flows as our transition or independent regime variable, whose impact on the real sector depends on the varying threshold of human capital development. Human capital was proxied by mean years of schooling and returns to education, gross national secondary school enrollment, and pupil-teacher ratio. From equation (5.4), we specified the linear threshold model involving human capital as a mediating variable. This leads to equation (5.7) below where we specify a dynamic threshold estimator below:

$$RSG_{it} = \alpha RSG_{it-1} + \Psi_{\mu}\mathrm{FDI}_{it} * \mathrm{I}(\mathrm{HCD}_{it} \leq \gamma) + \Psi_{v}\mathrm{FDI}_{it} * \mathrm{I}(\mathrm{HCD}_{it} > \gamma) + \mathrm{H}\Sigma_{i=1}^{n}\mathrm{X}_{it}$$
$$+ U_i + \lambda_t + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (5.7)$$

We further evaluated the single threshold or tipping point of human capital development at which capital flows impact the growth of the real sector. To control for potential endogeneity, we used the first lags of our threshold variable (human capital) and regime transition variables (FDI), and all control variables. At what points does human capital complement FDI flows in enhancing the growth of the real sector? Equation 5.8 illustrates the tipping point.

$$RSG_{it} = \begin{Bmatrix} \alpha_{1,0} + RSG_{it-1} + \mathrm{T}_1\mathrm{Z}_{i,t} + \varepsilon_{1,it} & if \quad HCD < \gamma \\ \alpha_{2,0} + RSG_{it-1} + \mathrm{T}_2\mathrm{Z}_{i,t} + \varepsilon_{2,it} & if \quad HCD \geq \gamma \end{Bmatrix} \ldots\ldots\ldots\ldots\ldots\ldots (5.8)$$

From the above equation, HCD_{it} denotes the endogenous threshold variable that splits our sample into two separate regimes. γ is the turning point at which human capital magnifies the effect of FDI flows on the growth of the real sector. T_1 and T_2 denotes the coefficients of both threshold variable and control variables at the two separate regimes. Z_{it} is a vector of covariates that includes our threshold variable, the interaction of human capital and capital flows $(FDI\ X\ HCD)$, and all set of control variables.

To ensure the validity of our estimations in equations (5.5) and (5.7) above, we performed the test of linearity based on the supremum wald statistics, which is obtained through a bootstrap iteration. Under the null hypothesis of a no-threshold effect, there is evidence of nonlinearity if the p-values attained through a bootstrap mechanism is deemed close to zero. According to Seo and Shin (2016), the application of the supremum statistics is consistent with Lee et al. (2011) and Hansen (2000;1996). We stated the nonlinearity test in the form: supW =

$supW_n\ (\gamma)$ under the null hypothesis that $\mathrm{T}_\phi = \mathrm{T}_\psi$; and $\Psi_\mu = \Psi_\nu = 0$; against the alternate that $\mathrm{T}_\phi \neq \mathrm{T}_\psi$; and $\Psi_\mu \neq \Psi_\nu$. $W_n\ (\gamma)$ represents the standard Wald statistics for each threshold value (γ). We computed the linearity test within a 95% confidence interval of the threshold values. We further obtained our threshold values with a grid search. Consistent to Zhu et al. (2020), Luan et al. (2019), Arcabic (2018), and Dang et al. (2012), we picked two extreme points in determining our threshold values through a grid search. Precisely, we followed Luan et al. (2019) and employed a trim rate of 0.2 that starts the grid search at the 10^{th} quantile and ends at the 90^{th} quantile. We set the endpoints to ensure that extreme outliers do not impact the results, but at the same time, many observations were accounted for within the two regimes of the threshold value as much as possible. We further followed Botev et al. (2019) and Luan et al. (2019) and executed our analysis with the Stata command "xthenreg" for Seo and Shin (2016) as developed by Seo et al. (2019). According to Seo et al. (2019), "xtrenreg" produces consistent and asymptotically normal estimates than the erstwhile "xtreg," as it dealt with fixed-effect estimations. However, Seo et al. (2019) posit that xthenreg requires a solidly balanced panel dataset. Because of that, and given the availability of gaps in our dataset, we filled up the missing data points as consistent with Luan et al. (2019). Following Meijering (2002), we applied the Stata command ipolate and epolate in order the fill the missing values within our data through the process of chronological interpolation.

5.4 Discussion of results

From chapter two of this thesis, we have already established a linear relationship between the real sector and FDI flows as well as the associated controls as consistent with equation (5.3). Furthermore, we have established a non-linear interactive relationship and squared terms with respect to equation (5.4) in chapters three and four. We, therefore, performed a dynamic threshold estimation procedure to establish nonlinearity. We executed the procedure in two separate steps. First, we established thresholds and nonlinearity in the direct association between the growth of the real sector and FDI, as we considered thresholds in capital flow variables (FDI). We executed this with models (5.5) and (5.6). We then identified thresholds in mediating variables as we considered the conditional effect of human capital in the association between capital flows and growth of the real sector. From equation (5.7) and (5.8), we considered the possibility of thresholds in three different indicators of human capital, namely, the years of schooling and returns to education, gross national secondary school enrolment, and pupil-teacher ratio.

5.5 Dynamic threshold estimation: Evidence of nonlinearity

We presented our estimation of the threshold values at which FDI flows directly affect the growth of the real sector. We further ascertained the threshold values at which capital flows impacts the growth of the real sector in the presence of the mediating or conditional variable, and human capital development indirectly. A brief description of the data is presented in Table 5.1. From Table 5.1, the summary statistics are averaged over the study period between 1990 and 2018. The average growth of the combined real sector over the study period is 1.66% on an annual basis. The combined real sector grew far less than the overall GDP growth of 3.88%. Individually, we found that the services sector expanded more than all the other individual sectors, the combined real sector, and even the overall GDP over the study period. The result confirms the recent surge in Africa's services sector. The sector also recorded less volatility relative to return in growth, as indicated by the coefficient of variation. The industrial sector also grew by 2.20%, surpassing the combined real sector, agriculture, and manufacturing sectors. The sector that grew less was the agriculture sector, with a dip in growth by 0.86%. Again, the fall in agriculture growth supports the recent decline and lack of policy direction in Africa's agriculture sector. Although the African

Union seeks to "consolidate the modernization of Africa's agriculture and agro-business through scaled-up value addition and productivity, and by 2025" (AU, 2015), the current state of the agricultural sector means a lot needs to be done. Among the four sectors, manufacturing growth seemed to be the most volatile according to the coefficient of variation. Average foreign direct investment into Africa over the study period stood at 2.86% of GDP, with a risk per return of 1.55%.

Table 5.1: Summary Statistics

Variable	Mean.	Median	Std. Dev	C.V	Skewness	Kurtosis	N
Real sector growth index	1.660	4.037	14.470	8.717	-3.029	19.951	1044
Manufacturing growth	0.909	3.432	28.279	31.110	-1.264	61.957	1015
Industrial growth	2.195	3.824	24.360	11.098	-1.893	25.191	1044
Agriculture growth	-0.815	3.000	23.957	29.395	-4.615	29.518	1044
Services growth	4.379	4.993	7.927	1.811	-1.326	13.869	1044
GDP Growth	3.884	4.296	4.591	1.182	-2.425	30.160	1044
Foreign direct investment	2.864	1.821	4.441	1.551	4.063	29.787	1044
Government expenditure	15.410	14.250	8.610	0.559	2.850	20.444	1044
Real GDP per capita	1.378	1.800	4.492	3.260	-1.875	26.404	1044
Inflation	78.263	75.918	53.442	0.683	2.030	12.923	1044
Trade openness	67.961	60.069	32.002	0.471	1.079	3.967	1044
Financial depth (M2)	32.450	24.412	22.445	0.692	1.640	5.596	1044
Mean years of schooling	1.713	1.640	0.415	0.242	0.562	2.608	1044
Gross secondary school enrolment	38.792	34.671	23.967	0.618	0.858	3.096	1015
Primary pupil – teacher ratio	42.115	41.091	15.021	0.357	0.746	3.859	986

Government expenditure also recorded a mean value of 15.41%. Many countries continue to exhibit signs of hyperinflation over the study period as the average inflation value stood at 78.26% of GDP. On average most countries are open to trade as the average trade openness was 67.96% of GDP. Among the three indicators of human capital, the average mean year of schooling is 1.71, while gross secondary school enrolment and the pupil to teacher ratio recorded averages of 38.79% and 42.12%, respectively. In terms of return per risk, the mean year of schooling is a more stable indicator of human capital development. All the indicators of growth as well as real GDP per capita are skewed to the left, while all the other variables are positively skewed. This skewness, in addition to the kurtosis, shows that the variables are not normally distributed and could be described as leptokurtic.

5.5.1 Dynamic threshold estimation: The real sector, foreign direct investment, and human capital development

We considered thresholds in the linkages between real sector components and foreign direct investment, with human capital development as a mediating variable. Adjusting equations (5.7) and (5.8), human capital development was our threshold, while foreign direct investment was our regime independent variable. Based on the estimated threshold value, the threshold variable (HCD) splits our regression into two regimes (low and high) of the threshold values providing two regime specific coefficients for each variable. We evaluated the mediating role of three human capital indicators. For all results, the threshold values for the threshold variables were estimated within a 95% confidence interval with an associated p-value for the non-linear bootstrap iteration, which tests the null hypothesis of no threshold effects.

From both theoretical and empirical propositions, the effect of capital flows on economic growth can be mediated or, at best, conditioned on the level of human capital development of the host country. The human capital argument is justified in instances where the host country’s labour force is educated, it aids in the attraction of capital flows for efficient productivity and growth, mainly if multinational enterprises cannot transport the needed labour force. The required level of host country human capital is a requirement for the application of technological advancement from outside, especially in the conversion of unfinished to finished products. Consistent with the capital flows – growth literature, we employed two measures of human capital and an additional indicator based on growth – threshold literature. Based on the capital flows growth literature, we followed Borenztein et al. (1998), Urata and Kawai (2000), Xu et al. (2000), Kottaridi and Stengos (2010), and Slesman et al. (2015), all employ means of schooling as our primary indicator of human capital development. For robustness, we used secondary school enrolment as consistent with Yebona (2019) and Tu and Tan (2012), as well as primary school enrolment in line with the growth threshold literature as used by Ibrahim and Alagidede (2018).

5.5.1.1 Threshold based on The Mean Years of Schooling

From Tables 5.2A and 5.2B, we ascertained the threshold value of how human capital, based on the mean years of schooling, mediate the real sector growth – FDI relationship. Barro and Lee (1994) contend that in terms of growth, the average years of schooling is the most correlated indicator of human capital with growth. We sought to ascertain the existence of possible complementarities between the level of domestic human capacity and the inflow of foreign direct investments in enhancing the growth of the four individual components of the real sector. We first ascertained the effect of FDI on the growth of the combined real sector, and for robustness, we employed real GDP growth as an alternate indicator of growth. Secondly, given that the combined or overall real sector growth is a composite measure of four indicators, we further assessed the impact of FDI at the level of the individual components of the real sector. We included other growth determinants as controls in our analysis. These results are displayed in Tables 5.2A and 5.2B, respectively.

From Table 5.2A, we reject the null hypothesis of no threshold effect at a 1% significance level under both specifications of growth, signifying the existence of thresholds in terms of the mean years of schooling in the FDI-growth nexus. The rejection of linearity was obtained under the bootstrapped value of 199 interactions and subsequent trimming rate of 10%. Within a 95% confidence interval, we found threshold values of mean years of schooling that lie within the bandwidth of the confidence interval under both specifications of growth. The existence of thresholds regarding mean years of education in the association between FDI and growth is consistent with the views of Borensztein et al. (1998) and Kottaridi and Stengos (2010). It further supports the substantial argument that a guaranteed minimum of human capital is required for countries to benefit from FDI inflows (Bengos and Sanchez-Robles, 2003). The values of coefficients in the lower regime show the effect of the independent variables on the growth of the real sector and real GDP growth when the mean years of schooling are below the threshold value, or when countries are below the threshold value of human capital. From the results, we obtained threshold values for the mean years of education at 2.188 when the real sector measures growth, and a threshold value of 1.170 when growth is indicated by GDP growth. These threshold values are obtained at 1% significance levels. Focusing on our variable of interest, the value of FDI in the lower regime shows the impact of FDI on growth when human capital is below the threshold value of the mean years of school. Values in the upper regime look at the impact of FDI on growth when human capital exceeds the threshold values of mean years of schooling. The two regimes further tell how economies will benefit from FDI should they obtain human capital development above or below the threshold value of human capital development.

At the growth of the real sector, the independent regime variable of foreign direct investment (FDI) variable was found to be positive in the lower regime, though insignificant but negative and significant beyond the threshold value at a 1% significance level. We found the same evidence under GDP growth. However, the coefficient of FDI below the threshold value is positive and significant, and the effect is negative and significant beyond the threshold points. While we found only 16 out of the 36 countries to have mean years of schooling above the threshold value under GDP growth, only 8 countries lied beyond the threshold value when the real sector measures growth. Overall, the results indicate that countries stand to only benefit from FDI when the stock of human capital, as indicated by the mean years of schooling, is below the threshold values, however, as the stock of human capital develops, the impact of FDI on growth becomes detrimental. The results show that for the 16 countries under GDP growth and the subsequent 8 under the growth of the real sector, the average years attained in school above the threshold value do not compliment FDI in enhancing economic growth. In the lower regime, the results indicate that a unit-percentage rise in FDI will grow the real sector by 0.242% when the real sector measures growth while a unit-percentage increase in FDI will lead to a 0.36% growth in GDP. However, the former was found to be insignificant. In the high regime, we found that a unit-percentage increase in FDI flows will dampen the growth of the real sector by 1.749% and GDP growth by 0.352% both at a 1% significance level.

Even though previous studies may have concluded on the relevance of human capital development in the association between FDI and economic growth, many of the studies may not have considered the existence of threshold effects. Perhaps, the positive influence of FDI on growth could exist either above or below specific threshold points. Again, the positive bearing of FDI supports the argument that human capital is essential for FDI attraction and the subsequent impact on growth, especially when FDI does not come along with the needed capital and may thus rely on the domestic capital for productive efficiency. However, a negative impact is plausible if FDI is market seeking, and may only need unskilled human capital at a low cost of labour. As the human capital develops and gains experience, it becomes expensive to foreign investors who may look elsewhere for cheap labour, leading to a dip on FDI flows and subsequent adverse impact on growth.

Overall, the results confirm the existence of non-linearity in the association between FDI and growth, and that a certain level of human capital is needed for the growth impact of FDI to be realized. Confirming the Lucas (1990) puzzle on human capital, our results shows that a well-developed human capital is indispensable for labour productivity concerning production of goods and services, which has a direct impact on the attraction of investment and returns on investment. Also, the endogenous growth model posits that capital spurs economic growth indirectly through human capital. The critical observation now is that though human capital matters for the attraction of capital flows for growth, there is a cut-off point where human capital mediates the capital flows – growth relationship. Until the human capital threshold has been attained, the spill over effect of capital flows on growth in Africa cannot be realised. The new evidence we proffered was that under certain circumstances, too much human capital could hinder external capital, especially where excessive human capital is not a necessary pre-requisite for the growth enhancement of capital flows to be realised. The threshold estimation shows that human capital development beyond certain years of schooling may be insignificant in attracting external capital to Africa. Though Human capital is essential in the conversion of raw materials to finished goods, the new evidence may also explain why some studies have found capital flows to adversely impact growth when they control for human capital development. Our results align with the conclusion of Kottaridi and Stengos (2010) that the benefits of FDI on economic growth do not only exist for countries above the minimum threshold value of human capital. Based on the mean years of education, the study shows that countries below the threshold value of human capital can still benefit from FDI inflows. However, it contradicts the conclusion of Boresztein et al. (1998) that the benefit of FDI on growth is only realized when countries are above the minimum threshold of mean years of schooling. Our results may not be surprising as many of the sample countries were found to be below the threshold values. A possible reason could be attributed to the assertion that the type of FDI that comes into Africa are mostly market seeking, and as such, may not require sophisticated human capital to enhance growth. Thus, although human capital is essential, just a minimal human capital development is all that is required for the type of FDI that flows to Africa to affect growth. Perhaps, foreign investors do not consider too high human capital development necessary to attract FDI for enhanced growth at the overall level of the real sector or the broader economy (GDP).

Table 5.2A: Dynamic Panel Threshold results when the Human Capital Index (Based on years of schooling and returns to education) is the threshold variable.

Dependent Variable:	**Real Sector Growth**		**GDP Growth**	
Threshold value	2.188 *** (0.059)		1.170 *** (0.011)	
95% Conf. Interval	[2.153, 2.222]		[1.147, 1.192]	
Variables	**Low**	**High**	**Low**	**High**
Lag Dependent variable	0.661 *** (0.053)	-1.509 *** (0.278)	-0.256 *** (0.082)	0.299 *** (0.080)
Gov't Expenditure	0.028 (0.061)	-4.250 *** (0.221)	0.159 *** (0.058)	-0.135 ** (0.058)
Inflation	0.001 (0.012)	0.046 (0.081)	0.044 *** (0.015)	-0.043 *** (0.015)
Per capita income	0.866 *** (0.047)	-1.189 (1.042)	0.873 *** (0.057)	0.0.137 ** (0.057)
Trade	-0.110 * (0.63)	-0.033 (0.480)	-0.074 * (0.042)	0.071* (0.042)
Financial depth	-0.057 (0.046)	-1.122 ** (0.612)	0.030 (0.062)	-0.038 (0.062)
FDI	0.242 (0.216)	-1.749 *** (0.433)	0.360 *** (0.135)	-0.352 *** (0.135)
Diagnostics				
Observation		1044		1044
Bootstrap p-value		0.000		0.000
No. of moment		1269		1269

conditions				
No. of countries	28	8	20	16

Given that the real sector growth indicator is an aggregate measure of four components, we performed an individual assessment of each component. We aimed to ascertain if the impact at the overall level differed from the individuals. Again, as noted by Knack and Manning (2000), a focus mainly on aggregate indicators lose sight of precision and individual specificity. Growth, as indicated by the combined real sector or GDP growth, the aggregate growth indicator may fail to give a fair assessment on the impact of FDI on growth, conditioned on the human capital. Again, an assessment of the individual components of the real sector or growth is essential as each component measures a different sector of the economy. Table 5.2B shows the dynamic panel threshold estimation on the impact of FDI on the sub-components of the real sector when human capital (based on mean years of schooling) is the threshold variable.

From Table 5.2B, the results indicate the existence of threshold values under all sub-components of growth of the real sector, regarding the impact of FDI, conditioned on the mean years of education. For manufacturing growth, the threshold value of mean years of schooling is estimated at 2.072, at a 1% significance level. Similar threshold values at a 1% significance level are estimated for industrial growth (1.885), agricultural growth (1.837), and service sector growth (1.238). Like growth at the aggregate level, all threshold values lie within the 95% confidence interval and was attained at a bootstrap iteration of 199 and subsequent trimming rate of 10%. Regarding our regime dependent variable of FDI, we found different results from the aggregate growth for the manufacturing and service sectors' growth. However, that of industrial and agriculture growth was strongly consistent with the aggregate growth in terms of significance and direction, as the impact of FDI below the threshold value was found to be positive and negative above the threshold values. Under industrial sector growth, a unit-percentage increase in FDI will lead to the growth of the sector by 1.745% for countries below the threshold value. But a unit-percentage increase in FDI will lead to a dip in the growth of the sector by 1.609% for countries above the threshold value. A similar pattern is seen for agriculture sector growth where a unit-percentage surge in FDI leads to a 1.169% rise in the growth of the sector for countries below the mean years of education. However, for countries above the mean years of schooling, a unit-percentage increase in FDI flows deters the growth of the sector by 2.345%, all at a 1% significance level.

We found the number of countries in the low regime to be almost twice as those above the threshold value for both agriculture and industrial sectors. One plausible explanation for the observed patterns under agriculture could be that given the subsistence nature of most agriculture-related activities in Africa, many consider it as jobs for the less educated. As the populace spend more time in school, their minds may be tune to white collar jobs than agriculture related ones. The above phenomenon could explain the recent drop in Africa's vibrant agriculture sector. Moreover, many agriculture products from Africa are exported in their raw state with no value addition that will require significant human capital. About industrial growth, the observed pattern could be attributed to the type of FDI that flows into the sector as most FDI goes into the extractives. Since value is not added to the extracted products, the type of FDI may not require sophisticated human capital. In most cases, the extractive industry in Africa is more export oriented than value adding. Thus, the human capital required will not be sophisticated. Asiedu (2013) contends that Africa stands to benefit from extractive FDI if they invest in physical infrastructure and education. Although Kodongo and Ojah (2017) found FDI to be detrimental to the growth of the agriculture sector but supportive for industrial growth, the study did not consider the possibility of threshold based on the averages number of years of schooling.

Regarding manufacturing sector growth, we found FDI to be positive but flatly insignificant for countries below the threshold value of the mean years of education. Interestingly, the impact of FDI on the growth of manufacturing is positive for countries in the high regime where a unit-percentage rise in FDI leads to a 1.91 % expansion in the growth of manufacturing value-added. The finding supports the assertion that countries benefit from FDI beyond a minimum threshold level of human capital, as indicated by Borensztein et al. (1998). The possible intuition lies in the fact that a certain level of human capital is required to convert raw materials into finished goods. Below the minimum threshold value, foreign investors are irresponsive to the demands of the manufacturing sector. However, as the level of human capital inches up, foreign investors gain confidence in the ability of the human capital to convert raw materials to finished goods and are therefore willing to commit funds. Surprisingly, we found that over 77% of the sampled countries lie below the threshold value of 2.072. The low number of countries below the threshold value could perhaps explain the gradual fall in manufacturing related FDI to the continent. As the global manufacturing component of FDI dropped from 41% to 26% from 1990 to 2012 (UNCTAD, 2015), GAFT (2017) contends that Africa's share of global manufacturing FDI stands at a meagre 5%. The situation may not be overwhelming, as UNIDO (2017) contends that as at close of the year 2016, Africa's share of global manufacturing stood at just 4.4%. Perhaps as the human capital develops, there will be a rise in manufacturing related FDI, leading to the growth of the sector. Again, the adverse FDI effect under industrial growth and the subsequent positive effect of FDI on manufacturing beyond the threshold point could suggest that the adverse impact on industrial growth could be due to the other components aside manufacturing. However, the findings assure that developing the human capacity of the populace for those above the attained threshold value is a good incentive for foreign investors to invest in the growth of the manufacturing sector in Africa. It also suggests that for the sample countries and period under study, mean years of schooling beneath a threshold value of 2.027 at a 1% significance level is a requirement for FDI to spur the growth of the manufacturing sector in Africa.

Table 5.2B: Dynamic Panel Threshold when Human Capital (Mean years of schooling and returns to education) is the threshold variable.

Dependent Variable:	**Manufacturing**	**Growth**	**Industrial**	**Growth**	**Agriculture**	**Growth**	**Service**	**Growth**
Threshold value	2.072 ***		1.885 ***		1.837 ***		1.238 ***	
	(0.058)		(0.079)		(0.014)		(0.021)	
95% Conf. Interval	[1.957, 2.188]		[1.730, 2.040]		[1.809, 1.865]		[1.197, 1.280]	
Variables / Regimes	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**
Lag Dependent variable	0.502 ***	-0.784 ***	0.267 ***	0.274 ***	-0.063 ***	-0.907 ***	1.257 ***	-1.057 **
	(0.033)	(0.088)	(0.060)	(0.086)	(0.160)	(0.226)	(0.459)	(0.449)
Gov't Expenditure	-0.679 ***	1.257 **	-0.461 ***	0.627 ***	1.359 **	-1.459 **	-0.656	0.460
	(0.151)	(0.603)	(0.170)	(0.182)	(0.642)	(0.600)	(1.009)	(1.041)
Inflation	-0.049	-0.031	0.215 ***	-0.237 ***	0.108 **	-0.217 **	0.625 **	-0.619 **
	(0.047)	(0.314)	(0.016)	(0.052)	(0.050)	(0.109)	(0.279)	(0.281)
Per capita income	1.127 ***	-2.308 ***	0.870 ***	0.575 ***	1.416 ***	-0.939 *	-1.372 ***	2.312 ***
	(0.113)	(0.382)	(0.118)	(0.176)	(0.169)	(0.527)	(0.467)	(0.470)
Trade	-0.034	0.014	-0.272 ***	0.252 **	-0.600 ***	0.837 ***	0.105	-0.103
	(0.091)	(0.257)	(0.082)	(0.118)	(0.178)	(0.193)	(0.295)	(0.285)
Financial depth	-0.062	1.891***	0.146	-0.214	-0.511 **	1.734 ***	0.621	-0.635
	(0.135)	(0.701)	(0.144)	(0.161)	(0.204)	(0.410)	(0.905)	(0.868)
FDI	0.046	1.911***	1.745 ***	-1.609 ***	1.169 ***	-2.355 ***	-3.723 **	3.808 ***
	(0.191)	(0.626)	(0.291)	(0.312)	(0.285)	(0.437)	(1.810)	(1.752)
Diagnostics								
Observation		1044		1044		1044		1044
Bootstrap p-value		0.000		0.000		0.000		0.000
No. of moment conditions		1269		1269		1269		1269
No. of countries	28	8	23	13	23	13	4	32

Just like manufacturing, the results under services value additions imply that a minimum threshold of human capital is needed for FDI to exert a positive impact on the growth of the sector. At convention levels of significance, we found that a unit-percentage rise in FDI is harmful to the growth of the services sector for countries below that threshold value of mean years of schooling by 3.723 %. However, as countries exceed the minimum threshold values, there is a higher benefit to the growth of the services sector by 3.808 %, given a unit-percentage increase in FDI inflows. The higher coefficient regarding the services sector collaborates with the recent surge in services related FDI to the content. For instance, available data shows that the service sector FDI in Africa quadrupled between 2001 and 2012. By 2012, the services sector controlled 48% of FDI stock to Africa, while the primary and manufacturing sectors controlled 32% and 20%, respectively. By 2014, FDI to Africa consisted of 51% services, 20% manufacturing, and 28% primary sector (UNCTAD, 2016; 2015). Significantly, it is the only sector that has more countries (32) lying above the threshold value, suggesting that most African countries are more convinced about developing their human capital to benefit from services related FDI. The findings are consistent with the Borensztein et al. (1998) and further by Kottaridi and Stengos (2010) that there is a minimum threshold of human capital beyond which countries benefit from FDI. Again, the findings under the growth of the services support the assertion that countries above the minimum threshold value of 1.238 stand to benefit from any positive effect of FDI on economic growth.

5.5.1.2 Threshold based on Gross Secondary School Enrolment

Again, aside from the mean years of schooling, we sought to ascertain whether the impact of FDI on growth could be mediated by another human capital indicator in the form of gross secondary school enrolment. This indicator has been used as a proxy for human capital in the

FDI – growth literature by Yebona (2019), Tu and Tan (2012), Ford (2008). While the latter two studies adopted the rudimentary interaction and first-order derivative mechanism to establish thresholds, Yebona (2019) deployed the PSTR procedure to established thresholds regarding school enrolment, even though human capital was not the threshold variable. Again, we ascertained the mediating role of gross secondary school enrolment at the overall level of the real sector and GDP growth. Our empirical results are presented in Table 5.3A.

From Table 5.3A below, human capital, as indicated by the gross secondary school enrolment, shows the existence of thresholds in the FDI-growth nexus. At the overall level of the real sector, a threshold of value of 14.569% that lies within a 95% confidence interval of 10.935 and 18.203, moderates the linkages between FDI and the growth of the real sector. This threshold was significant at a 1% significance level. We established that a minimum threshold of human capital is needed for FDI to positively impact real sector growth, as we found that below the threshold value, the impact of FDI on growth is negative and utterly insignificant. With a high coefficient, we found that as countries passed the threshold value, FDI has a definite positive relationship with the growth of the real sector. We found that a unit-percentage surge in FDI flows depletes the real sector by 0.285% for the countries below the threshold value. However, as countries exceed the minimum threshold of gross national enrolment, a unit-percentage rise in FDI flows leads to a 0.926% increase in the growth of the sector, though marginally at 10% significant. Significantly, we found only 3 out of the 36 countries to lie below the threshold. For robustness check, we found similar results when we measured growth by GDP, where we established a gross national enrolment threshold of 28.484% with a 5% significance level that lies within a confidence interval of 2.807 and 54.160 respectively. Again, in the low regime, we found that for the 14 countries that laid below the threshold, the impact of FDI on GDP growth was negative, albeit insignificant. In the high regime, we found that for the 22 countries above the threshold, GDP growth is positively sensitive to the attraction of FDI inflows. Under this regime, a unit-percentage surge in FDI flows will positively impact GDP growth by 0.040 % at a 5% significance level. The above corroborates the conclusion of Ford et al. (2008) that a minimum level of gross national enrolment, and for that matter, human capital to contribute to economic growth. Thus, below the minimum of gross secondary school enrolment, FDI is largely oblivious to growth, irrespective of the indicator. However, as countries achieve the minimum required threshold, the FDI has a definite positive effect on growth.

Table 5.3A: Dynamic Panel Threshold results when the Human Capital Index (Based on gross secondary school enrolment) is the threshold variable.

Dependent Variable:	**Real Sector Growth**		**GDP Growth**	
Threshold value	14.569 ***		28.484 **	
	(1.854)		(13.100)	
95% Conf. Interval	[10.935, 18.203]		[2.807, 54.160]	
Variables	**Low**	**High**	**Low**	**High**
Lag Dependent variable	0.642 ***	-0.219	0.021 **	0.067 ***
	(0.186)	(0.177)	(0.011)	(0.006)
Gov't Expenditure	-0.860 **	1.586 ***	0.007	0.039 ***
	(0.374)	(0.374)	(0.006)	(0.007)
Inflation	-0.243 ***	0.299 ***	0.002 **	0.001
	(0.049)	(0.052)	(0.001)	(0.001)
Per capita income	0.379 *	0.611 ***	1.027 ***	0.009 **
	(0.218)	(0.226)	(0.003)	(0.005)
Trade	0.771 ***	-0.677 ***	0.006	-0.029 ***
	(0.166)	(0.162)	(0.007)	(0.005)
Financial depth	-0.307	0.527	0.014 *	-0.057 ***
	(0.510)	(0.559)	(0.008)	(0.020)
FDI	-0.285	0.926 *	-0.006	0.040 ***

	(0.558)	(0.552)	(0.013)	(0.010)
Diagnostics				
Observation		1044		1044
Bootstrap p-value		0.000		0.000
No. of moment conditions		1296		1269
No. of countries	3	33	15	21

Aware that our primary measure of growth (the real sector) consists of four components, we ascertained the possibility of threshold when we proxied growth by each component. The breakdown also allowed determining which of the individual sectors mimic the combined real sector or GDP growth. For all sectors, we found the existence of threshold effects regarding gross national enrolment when we considered the impact of foreign direct investment on the growth of each sector. From Table 5.3B, all thresholds fall within the 95% confidence interval, an indication of the extent of precision in the estimation of the thresholds, along with bootstrap p – values. We found all thresholds to be significant at the 1% level with the highest threshold value of 43.70% gross secondary enrolment recorded under industrial growth, followed by manufacturing growth with a gross enrolment of 35.03%, 26.91% for agriculture growth and a lower threshold value of 24.72% under services' growth.

At the individual sectoral level, we found growth in manufacturing to mimic the results of the overall real sector index and GDP growth, where the impact of FDI on growth was found to be negative and significant for countries below the threshold value of gross secondary enrolment. However, as countries exceed the threshold, the impact of FDI on growth on manufacturing is positive and significant at a 1% significance level. Specifically, beyond the threshold, a unit-percentage surge in FDI grows Africa's manufacturing sector by 1.416 %. Thus, Africa's manufacturing sector can attract the needed FDI only if the populace can attain a certain gross average of secondary school enrolment. The conclusion is not different from the results obtained when we proxied human capital by mean years of schooling, where the impact of FDI on the growth of manufacturing was deemed to be positive and significant only for countries above the threshold value.

Turning our attention to the services sector, again, we found that the impact of FDI on the sector becomes positive and significant after the threshold, just like in the case of the overall real sector, GDP growth, and manufacturing sector growth. However, for countries below the threshold, the impact of FDI on the growth of the services sector was negative and significant at conventional levels. From Table 5.3B, we ascertain that below the threshold, a unit-percentage rise in FDI will dampen the services' sector by 0.693 %. As countries exceed the threshold, a unit-percentage surge in FDI flows is likely to expand the services' sector by 0.599 %. For the given threshold, we noted that there are twice as many countries above the threshold as are below the threshold value. More importantly, the findings regarding gross secondary school enrolment corroborate the earlier observations when human capital is proxied by mean years of schooling, where the FDI stifles services' sector below the threshold of human capital but enhances the growth of the sector for countries above the threshold. Again, we found that more countries lie above the threshold than below. It further confirms the increase in services related FDI to Africa, as investors have found the rising human capital instrumental in the provision of services.

Although we have established thresholds also for growth in both the industrial and agriculture sectors, we found results consistent with when human capital is proxied by the mean years of education. Contrary to growths of the other two sectors and the aggregate growth, we found FDI to improve both industrial and agriculture growth when countries are below the threshold of gross secondary school enrolment, at 1% significant levels, where many countries benefit below the threshold. However, as countries exceed the thresholds, the impact of FDI on agriculture and industrial growth becomes negative, although insignificant for the latter. The results give credence to the earlier conclusion when human capital is represented by the mean years of school. In both cases, we found FDI to have a positive and significant impact on the growth of the two sectors for countries below the thresholds and harmful to growth when countries exceed the thresholds. The results support the existence of cut-offs on the impact of FDI on these sectors, and that beyond the cut-offs, more FDI will harm these sectors.

Thus, for the growth of these sectors, the results point to one direction, whether human capital is proxied by the mean years of schooling or gross national secondary school enrolment. Broadly, there exist thresholds in the FDI growth nexus. Both indicators show that below the threshold, the impact of FDI on the growth of manufacturing is insignificant, but above the threshold, the impact is deemed positive and highly significant. For services, the impact of FDI is significantly harmful to countries below the threshold; however, once countries attain the threshold, FDI will enhance services' growth. In the case of industrial and agriculture sectors' growth, we found that countries stand to significantly benefit from FDI inflows once they are beneath the threshold of human capital. But as human capital exceeds the given threshold, FDI is found to be detrimental to the growth of agriculture and industry.

Table 5.3B: Dynamic Panel Threshold when the Human Capital Index (Gross secondary school enrolment) is the threshold variable.

Dependent Variable:	**Manufacturing**	**Growth**	**Industrial**	**Growth**	**Agriculture**	**Growth**	**Service**	**Growth**
Threshold value	35.028 ***		43.703 ***		26.913 ***		24.716 ***	
	(3.287)		(2.065)		(1.797)		(8.739)	
95% Conf. Interval	[28.586, 41.471]		[39.655, 47.750]		[23.391, 30.434]		[7.589, 41.844]	
Variables / Regimes	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**
Lag Dependent variable	0.512 ***	-0.606 ***	0.532 ***	0.486	0.315 ***	-1.094 ***	0.262 ***	-0.106 *
	(0.081)	(0.081)	(0.044)	(0.349)	(0.106)	(0.162)	(0.099)	(0.056)
Gov't Expenditure	-0.356 ***	0.479	0.054	-2.707 *	0.421 **	-0.706 *	0.010	-0.093
	(0.074)	(0.433)	(0.158)	(1.528)	(0.171)	(0.392)	(0.099)	(0.256)
Inflation	-0.050	-0.113 *	0.116 ***	-0.231 *	0.060 ***	-0.127 ***	0.020	-0.008
	(0.057)	(0.065)	(0.037)	(0.122)	(0.014)	(0.028)	(0.018)	(0.032)
Per capita income	1.252 ***	-1.276 ***	0.709 ***	-0.323	1.439 ***	-0.209	0.645 ***	0.195
	(0.056)	(0.240)	(0.076)	(1.320)	(0.131)	(0.496)	(0.130)	(0.247)
Trade	-0.168 **	0.126	-0.095	0.429 **	-0.383 ***	0.451**	0.326 **	-0.333 ***
	(0.083)	(0.182)	(0.061)	(0.212)	(0.098)	(0.226)	(0.142)	(0.098)
Financial depth	-0.159 ***	-0.231	-0.377 ***	-0.041	-0.299	1.134 *	-0.090	-0.058
	(0.059)	(0.394)	(0.071)	(0.596)	(0.279)	(0.611)	(0.101)	(0.171)
FDI	-0.401	1.416 ***	0.453 ***	-0.0004	0.613 ***	-1.356 **	-0.693 ***	0.559 **
	(0.337)	(0.494)	(0.112)	(0.459)	(0.185)	(0.581)	(0.241)	(0.270)
Diagnostics								
Observation		1044		1044		1044		1044
Bootstrap p-value		0.000		0.000		0.000		0.000
No. of moment conditions		1269		1296		1269		1323
No. of countries	19	17	25	11	14	22	12	24

5.5.1.3 Threshold based on The Pupil to Teacher Ratio

Aside from the known and most frequently used indicators of human capital (mean years of schooling or school enrolment) in the FDI-growth literature, we sought to examine the impact of FDI on growth when human capital is proxied by a rarely used indicator of human capital. We, therefore, employed the pupil to teacher ratio as the last indicator of human capital. While mean years of schooling measures the average duration spent in school, enrolment may only be indicative of the numbers in the classroom, for a given population. Thus, these two indicators are deemed quantitative-based measures of human capital. However, Ibrahim and Alagidede (2018) contend that the pupil to teacher ratio is a qualitative measure of human capital depicting the quality of teaching and impartation students receive from teachers which emanate from teacher-student contact hours, or the average number of students per teacher. All things being equal, a small ratio could mean more contact with students and perhaps better impartation of knowledge. Again, given that the two quantitative indicators gave us the same results at the levels of the individual components, the impact of the FDI based on a qualitative indicator will present us with a different perspective.

We present our empirical results in relation to the pupil-teacher ratio as the human capital threshold. We start at the overall real sector and GDP growth, and further at the individual indicators of the real sector. The results are displayed in Tables 5.3A and 5.4B, respectively. Yet again, we established thresholds under both indicators of aggregate growth based on the pupil-teacher ratio, at 1% significance levels. At the overall level of the real sector, we found a threshold of 45.56% within a 95% confidence bandwidth of 38.81 and 52.30, respectively.

Similarly, a threshold value of 44.80% was ascertained under GDP growth, also falling within the 95% confidence interval of 42.84 and 46.78. The associated bootstrapped p-value confirms the existence of threshold effects. Evaluating our independent regime variable of FDI, we found it to have an unmitigated adverse impact of aggregate growth (both real sector and GDP) when the pupil to teacher ratio is below the threshold. For the real sector, a unit-percentage increase will dampen growth by 0.594% at a 1% significance level, while GDP growth will dip by 0.003% though flatly insignificant. However, as countries exceed the minimum threshold for the pupil to teacher ratio, FDI has a positive and significant effect on growth at the aggregate level. While the impact of a unit-percentage surge in FDI boosts GDP growth by 0.03%, the boost is significant for the growth of the real sector at 0.86%. More importantly, the results confirm our earlier results when human capital is proxied by gross secondary school enrolment, where the impact of FDI on aggregate growth was detrimental to growth for countries below the threshold level but positive once countries attained the threshold level. It, however, contradicts the results when human capital is proxied by the mean years of schooling, where the impact of FDI on aggregate growth is positive below the threshold but negative once countries exceed the threshold. Nevertheless, all three estimations confirm the assertions that a minimum threshold level of human capital is required for capital flows and for that matter FDI to have an unfettered effect on growth, whether the real sector or GDP growth (Borensztein et al., 1998; Xu et al., 2000; Ford et al., 2008; Kottaridi and Stengos, 2010; Tu and Tan, 2012).

Table 5.4A: Dynamic Panel Threshold results when the Human Capital Index (Based on the pupil-teacher ratio) is the threshold variable.

Dependent Variable:	**Real Sector Growth**		**GDP Growth**	
Threshold value	45.559 *** (3.442)		44.803 *** (1.002)	
95% Conf. Interval	[38.814, 52.304]		[42.839, 46.767]	
Variables	**Low**	**High**	**Low**	**High**
Lag Dependent variable	0.221 *** (0.065)	-0.169 *** (0.051)	0.0001 (0.009)	0.062 *** (0.012)
Gov't Expenditure	0.094 (0.135)	-0.175 (0.164)	0.027 *** (0.005)	-0.012 * (0.007)
Inflation	-0.073 ** (0.034)	0.146 *** (0.040)	-0.003 ** (0.002)	0.007 * (0.004)
Per capita income	0.687 *** (0.143)	0.061 (0.158)	0.987 *** (0.018)	0.036 * (0.019)
Trade	0.164 **	-0.208 ***	-0.002	0.007

	(0.083)	(0.071)	(0.004)	(0.005)
Financial depth	-0.330	0.512 ***	-0.013	0.034 **
	(0.212)	(0.215)	(0.021)	(0.017)
FDI	-0.594 ***	0.861 ***	-0.003	0.025 ***
	(0.215)	(0.174)	(0.006)	(0.009)
Diagnostics				
Observation		1044		1044
Bootstrap p-value		0.000		0.000
No. of moment conditions		1296		1296
No. of countries	24	12	23	13

Consistent with the previous indicators, we ascertained if the threshold for pupil-teacher ratio existed at the decomposed sectors of the real sector. We performed such analysis to find out which sector or sectors are responsible for the observed direction and significance at the growth of the real sector. We present the results in Table 5.4B. Concerning manufacturing sector growth, we found consistent results regarding the existence of thresholds (45.27%) at a 1% significance level, as in the case of the previous two indicators. Again, the results indicate that below the threshold, the impact of FDI was significantly detrimental to growth marginally at a 10% significance level. However, as found under the two other indicators, countries above the threshold found the impact of FDI to be positive and significant at 1% significant level. While a unit-percentage increase hinders growth by 1.43% for countries below the value, but as countries exceed the threshold, a unit-percentage rise in FDI flows leads to a 2.17 percentage surge in manufacturing sector growth. Like the combined real sector, we found only one-third of countries to lie above the threshold value. Moreover, the direction of FDI results under the manufacturing sector mimics those obtained under the combined real sector and GDP growth in Table 5.4A.

Contrary to the two other indicators of human capital, but consistent with the results for the combined real sector, GDP growth, manufacturing, and services sector growth, we found the impact of FDI on industrial sector growth to be positive and significant, marginally at 10%

above the threshold level of the pupil to teacher ratio. Though the impact of FDI on industrial growth was still positive beneath the threshold, the effect was insignificant. The threshold value of 48.584 was, however, significant at a 1% significance level, as consistent with all other results.

The results for agriculture growth under pupil teacher ratio do not differ from the earlier results under mean years of schooling and gross secondary enrolment. The evidence shows the existence of a threshold value at 1% significance level, where the effect of FDI on the growth of the sector is positive beneath the threshold but harmful above the threshold value. Below the threshold, a unit-percentage rise in FDI enhances the growth of agriculture by 0.913%. Yet for countries above the threshold, a unit-percentage surge harms the growth of the sector by 0.265%, though flatly insignificant.

Regarding services sector growth, we found results comparable to the combined real sector, GDP growth, manufacturing growth, and identical to the two previous indicators of human capital. We found a threshold value of 23.454% at conventional levels of significance well within the 95% confidence interval. We further found regarding FDI that while the associated impact on the growth of the sector was detrimental for countries below the threshold, countries above the threshold experienced a positive impact of FDI on services sector growth, both at 1% significance levels. The nature of direction and level of significance for the impact of FDI on services sector growth has been consistent under all the indicators of human capital.

Table 5.4B: Dynamic Panel Threshold results when the Human Capital Index (Based on the pupil-teacher ratio) is the threshold variable.

Dependent Variable:	**Manufacturing**	**Growth**	**Industrial**	**Growth**	**Agriculture**	**Growth**	**Service**	**Growth**
Threshold value	45.278 ***		48.584 ***		47.610 ***		23.454 ***	
	(5.860)		(3.049)		(3.997)		(0.151)	
95% Conf. Interval	[33.793, 56.762]		[42.609, 54.560]		[23.391, 30.434]		[23.159, 23.749]	
Variables / Regimes	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**
Lag Dependent variable	0.311	0.391 **	0.778 ***	-1.013 ***	-0.650 ***	0.627 ***	1.327	-1.134
	(0.153)	(0.184)	(0.213)	(0.183)	(0.219)	(0.199)	(4.930)	(4.924)
Gov't Expenditure	-0.073	-0.933	1.194 ***	-1.110 ***	0.651 **	-0.369	-26.565 ***	26.258 ***
	(1.247)	(1.098)	(0.179)	(0.379)	(0.197)	(0.299)	(9.032)	(9.068)
Inflation	-0.444 ***	0.567 ***	-0.174 ***	0.397 ***	0.101 ***	-0.104 *	1.205 *	-1.167 *
	(0.165)	(0.166)	(0.054)	(0.055)	(0.027)	(0.055)	(0.686)	(0.691)
Per capita income	-0.4486	1.427 ***	0.491 *	0.531 **	-0.981 **	1.754 ***	9.409	-8.409
	(0.444)	(0.440)	(0.274)	(0.261)	(0.431)	(0.411)	(7.811)	(7.818)
Trade	1.127 ***	-1.291 ***	0.229***	-0.486 ***	0.631 ***	-0.314 ***	2.651 **	-2.576 **
	(0.422)	(0.356)	(0.061)	(0.070)	(0.127)	(0.122)	(1.256)	(1.243)
Financial depth	-2.727 ***	3.049 ***	-0.397 ***	-0.033	-1.520 ***	0.916 ***	1.569	-1.252
	(0.942)	(0.933)	(0.144)	(0.237)	(0.341)	(0.323)	(1.379)	(1.380)
FDI	-1.430 *	2.173 ***	0.163	0.621 *	0.913 **	-0.265	-10.111 ***	9.804 ***
	(0.824)	(0.693)	(0.147)	(0.357)	(0.443)	(0.444)	(3.445)	(3.446)
Diagnostics								
Observation		1044		1044		1044		1044
Bootstrap p-value		0.000		0.000		0.000		0.000
No. of moment conditions		1350		1296		1296		1323
No. of countries	24	12	27	9	26	10	4	32

5.5.1.4 Effects of controls on growth when human capital is the threshold

Though our arguments are predominantly on the relationship between FDI conditioned on the existence of thresholds in human capital, we considered the results briefly on the impact of the other control variables, given our threshold variable of human capital and the threshold values. We began at the aggregate level of the real sector and GDP growth. We found that irrespective of the indicator of human capital, the reinforcing nature of the real sector was positive and significant when countries are below the thresholds and detrimental (2 out of 3) when countries exceed the threshold of human capital. However, we found the lag of GDP to have a positive impact on current GDP growth under all three human capital indicators, with mixed results below the threshold values. Government expenditure was mostly positive (5/6) and significant (2/5) below the thresholds but negative (6/6) and significant (4/6) above the thresholds of human capital. We ascertained that for half (3/6) of the results, the effect of inflation was deemed negative and significant for countries beneath the threshold but positive and significant above the thresholds. Countries below the estimated threshold value of human capital experience a positive impact of GDP per capita of aggregate growth (6/6). Similarly, the positive impact exists also for countries above the threshold (4/6).

Primarily, the effect of trade on growth is a deterrent to growth above the thresholds and beneficial before the ascertained thresholds. At the disaggregated level of the real sector, the impact of these indicators largely depends on the indicator of human capital and the measure of sectoral growth. Starting with growth in manufacturing, the reinforcing nature of manufacturing was beneficial to current manufacturing for countries below the thresholds but detrimental to countries above the thresholds. However, we found that increases in government expenditure was predominantly harmful if countries are beneath the thresholds, but positive once countries exceed the threshold value of human capital. Similar observations prevailed on the effects of trade and financial depth on the growth of manufacturing. Just like lagged growth in manufacturing, the impact of GDP per capita appeared positive and mostly significant for those countries below the thresholds but damaging beneath the threshold. The impact of inflation on manufacturing growth was negative both below and above the thresholds, though mostly insignificant.

Regarding industrial growth, we found the lagged growth to be positive and significant under all human capital indicators when countries are below the threshold values. Beneath the threshold value, the reinforcing nature of industrial growth was positive under two out of the three human capital indicators and detrimental under one. We further found that both lagged agriculture and services sector growths have significant effects on current sectoral growth; however, the indicator of human capital as a threshold variable was also significant. Government expenditure provided mixed results, where the impact on industrial growth happens to be blow the threshold of mean years but positive and significant above the mean years of education. The effect was, however, beneficial below the threshold values of gross enrolment and pupil-teacher ratio while harmful after the two thresholds. Again, we found GDP per capita to benefit the industrial growth of countries both below and above the thresholds of human capital. We found trade openness to be positive and significant to industrial growth for countries above two of the three human capital indicators. Growth in services and agriculture also experienced similar results as the impact of most controls were significant to sectoral growth for countries below the thresholds.

5.5.2 Dynamic threshold estimation: The real sector and foreign direct investment

Given the lack of consensus in the literature on the impact of FDI on growth, we perceived that potential thresholds could influence the association between FDI and growth within FDI itself. Here we discuss the existence of thresholds in the linkages between real sector components and foreign direct investment when foreign direct investment is the mediating variable. Adjusting equations (5.5) and (5.6), foreign direct investment (FDI) is both our threshold and regime dependent variable. Now, based on the estimated threshold value, the threshold variable (FDI) splits our regression into two regimes (low and high) of the threshold values providing two regime specific coefficients for each variable. The low regimes ascertain the impact of all variables on growth when countries are beneath the threshold value of FDI. Similarly, the high regimes determine the effect of all variables on growth when countries are directly above the threshold value of FDI. Unlike the previous results, we deployed human capital proxied by the mean years of schooling as an explanatory variable. As noted by Potančoková et al. (2014), the mean years of schooling is "often used for cross-country comparisons as well as in economic and environmental models as the unique indicator of educational attainment and human capital stock" (Potančoková et al., (2014, pp. 5). UNDP (2010) also notes the relevance of the mean years of schooling in the Human Development Index. We performed the analysis at the aggregate level of the real sector and GDP growth, and the levels of the individual components of the real sector. For all results, the threshold values for the threshold variable (FDI) are estimated within a 95% confidence interval with an associated p-value for the non-linear bootstrap iteration, which tests the null hypothesis of no threshold effects. The results are presented in Tables 5.5A and 5.5B.

At the aggregate level of the combined real sector, we found an estimated threshold value of FDI at 3.28%, falling within a 95% confidence bandwidth of 2.16 and 4.41, and at a 1% significant level. Beneath the threshold value, where the majority of countries (25) lie, we found the impact of FDI on the overall growth of the real sector to be significantly negative at 1%. At this point, a unit-percentage surge in FDI inflows stifles the growth of the real sector by 0.914%. However, at the upper end of the threshold value, we observe a significant positive relationship between FDI inflows and the growth of the real sector. Beyond the threshold, where few countries (11) lie, a unit percentage rise in FDI inflows will enhance the growth of the overall real sector by 1.82%. Given our estimated threshold value, the evidence thus implies that FDI inflows into the real sector that does not exceed a threshold of 3.28% of GDP will be detrimental to the growth. But as the real sector attracts FDI inflows above 3.28% of GDP, FDI positively enhances the real sector. Our results thus suggest that the beneficial impact of FDI kicks in after a specific quantum of FDI has been attained and that above the estimated threshold, economies stand to benefit from larger inflows of FDI actively. However, below the minimum FDI threshold, inflows of FDI will be damaging to the growth and expansion of the real sector. Thus, the call is for countries akin to growing the real sector through the attraction of FDI to put in measures that will give them a competitive advantage and attract more FDI for enhanced growth. We tested for the magnitude of the effect using our data at both ends of the thresholds by employing our results in Table 5.5A and Table 5.1. Below the threshold of FDI inflows, a unit increase in the standard deviation of total FDI inflows (std. dev = 4.441; table 5.1) stifles the growth of the real sector by approximately 4.090 percentages point [-0.921 X 4.441 = -4.090]. However, above the FDI threshold, a unit surge in the standard deviation of FDI inflows (std. dev = 4.441; table 5.1) leads to growth and expansion of the combined real sector by approximately 8.060 percentages point [1.815 X 4.441 = 8.060]. From our data, evidence shows that beyond the estimated FDI thresholds, the positive effect from FDI inflows far outweighs the adverse impact experienced below the threshold. The results again support the assertion that FDI can indeed enhance Africa's real sector, but only after a given threshold of FDI relative to GDP has been attained.

Table 5.5A: Dynamic Panel Threshold results when the foreign direct investment (FDI) is the threshold variable.

Dependent Variable:	**Real Sector Growth**		**GDP Growth**	
Threshold value	3.281 *** (3.442)		3.380 *** (0.868)	
95% Conf. Interval	[2.157, 4.405]		[1.679, 5.080]	
Variables	**Low**	**High**	**Low**	**High**
Lag Dependent variable	0.840 *** (0.147)	-0.547 *** (0.104)	0.021 *** (0.002)	-0.062 ** (0.003)
Gov't Expenditure	0.133 (0.127)	0.485 *** (0.165)	0.008 ** (0.004)	0.013 * (0.007)
Inflation	-0.034 *** (0.013)	0.014 (0.017)	0.001 (0.001)	-0.003 *** (0.001)
Per capita income	0.796 *** (0.080)	-0.279 * (0.168)	1.005 *** (0.006)	-0.005 (0.007)
Trade	0.107 ** (0.041)	0.063 (0.050)	-0.002 (0.004)	0.005 ** (0.002)
Financial depth	0.053 (0.127)	-0151 (0.135)	-0.002 (0.008)	0.023 *** (0.006)
Human Capital	2.615 (2.002)	1.796 (2.510)	0.401 (0.299)	-1.089 *** (0.186)
FDI	-0.921 *** (0.232)	1.815 *** (0.495)	0.040 *** (0.011)	-0.035 ** (0.014)
Diagnostics				
Observation		1044		1044
Bootstrap p-value		0.000		0.000
No. of moment conditions		1674		1674
No. of countries	25	11	25	11

Turning our attention to GDP as an alternate indicator of aggregate growth, again, we established the existence of thresholds of 3.28%, which falls within a 95% confidence interval bandwidth of 1.679 and 5.080 at a 1% significance level. We, however, found opposing results in terms of direction on the effect of FDI. At the low end of the bandwidth, the results show a positive and significant impact of FDI on GDP growth once the inflow of foreign direct investment into Africa does not exceed 3.28% of annual GDP growth. Below the estimated threshold value, a unit-percentage increase in foreign direct investment leads to a 0.040% increase in GDP at a 1% significance level, where we found most countries (25). At the high regime where we estimated the effect of FDI on GDP growth when FDI exceeds the threshold value, we found that a unit-percentage rise in FDI dampens GDP growth by 0.05% at a 5% significance level with just 11 countries falling above the estimated threshold.

All in all, the results show that foreign direct investment matters for advancements in GDP growth as FDI enhances growth at the lower end of the threshold. Yet, countries should be very cautious in terms of the quantum of foreign direct investment relative to GDP growth they attract, as the benefits of FDI to an economy become harmful beyond certain thresholds. We found that FDI beyond 3.28% of GDP will lead to crowding out of domestic investments, exchange rate uncertainties and may eventually derail growth. Thus, though the fortunes of FDI may entice countries, the initial gains may be eroded beyond the estimated thresholds.

Again, we tested for the magnitude of the effect using our data at both ends of the thresholds by employing our results in Table 5.5A and Table 5.1. Below the threshold of FDI inflows, a unit increase in the standard deviation of total FDI inflows (std. dev = 4.441; table 5.1) should enhance GDP growth by approximately 0.178 percentages point [0.040 X 4.441 = 0.178]. However, above the FDI threshold, a unit surge in the standard deviation of FDI inflows (std. dev = 4.441; table 5.1) should dampen GDP growth by approximately 0.155 percentages point [0.035 X 4.441 = 0.155]. Given the results from our study, perhaps earlier studies that found a significant positive impact of FDI on GDP growth (Choong et al., 2010; Aizenman et al. 2013; Calderon and Nguyen, 2015; Alley, 2015; Iamsiraroj, 2016) or negative impact on GDP growth (Alfaro et al., 2014; Agbloyor et al., 2014; Choong et al., 2010) may have failed to recognize the possibility of thresholds in the FDI – GDP growth relationship.

Under both indicators of growth, we found the reinforcing nature of growth to be positive and significant below the threshold of FDI but significantly negative to growth above the threshold. Similar evidence exists for GDP per capita, where the impact on growth is positive below the threshold and negative above the threshold of FDI. We found that the effect of trade openness is favourable to the growth of the real sector below the threshold and favourable to GDP growth only above the threshold. Under both indicators, government expenditure benefits growth after the threshold of FDI; however, the government expenditure is still beneficial to GDP growth below the threshold. Inflation stifles the growth of the real sector below the FDI threshold and above the threshold of GDP, but favourable to the growth of the real sector above the threshold and below the threshold of GDP, although flatly insignificant in both cases. Financial depth only enhances GDP growth but above the threshold of FDI inflows.

We further assessed the relationship between FDI inflows and each of the individual components of the real sector when FDI is the threshold variable and the regime independent variable. Under all the four components, we found significant thresholds of FDI at conventional levels of significance. All thresholds again fell within the appropriate 95% confidence interval. Beginning with manufacturing sector growth, we ascertained an estimated threshold value of FDI to be 4.033% of GDP within a confidence interval of 3.071 and 4.996. Just like the combined real sector growth, we found the impact of FDI on manufacturing at the lower end of the threshold to be negative and significant to growth at 5% significance levels. At the upper end, where we found the impact of FDI to be above the thresholds, FDI inflows have a significantly positive impact on the growth of the sector at 1% significant level. We found a similar conclusion when growth is measured by agriculture at both the lower and upper ends of the threshold value, with an FDI threshold value of 2.644% of GDP. The results indicate that for the growths of both agriculture and manufacturing, FDI inflows are essential for the growth of these sectors, however, when the quantum of FDI inflows is below the thresholds, FDI is deemed harmful and damaging to these sectors. Once the initial FDI inflows exceed the thresholds, FDI is deemed to enhance the growth of these two sectors. Regarding manufacturing, our results contradict Gui-Diby and Renard (2015), as they found FDI flows to affect manufacturing. Though Opoku et al. (2019) found FDI effect on the manufacturing sector to be negative and insignificant, Alfaro (2003) also found FDI to impact growth positively, all these studies did not account for possible thresholds.

Under the industrial sector, we found an estimated FDI threshold value of 2.268%, while the estimated threshold of FDI under the services sector was 1.233%, all within the 95% confidence intervals. Contrary to the results to the combined real sector, manufacturing, and agriculture sectors, we found the impact of FDI on the growth of the sectors to be significantly positive for both sectors at the lower ends of the thresholds values. As the influx of FDI inflows exceeds the threshold value of FDI, the impact on these sectors become significantly negative. Thus, for growth in services and industry, the benefit of FDI is only experienced at the initial stages of FDI inflows up to the estimated threshold value. Beyond the threshold value, increases in FDI inflows becomes harmful to countries above the threshold values. Though Opoku et al. (2018) and Kodongo and Ojah (2017) found conflicting results on the impact of FDI on the services sector, perhaps, the different conclusions stun from the inability of both studies to consider the possibility of thresholds in FDI. Likewise, on the industrial sector, while Kodongo and Ojah (2017) found FDI to enhance industrial growth, Opoku et al. (2019) found no such relationship. The conflicting results may not be surprising as neither studies considered the likelihood of thresholds in the FDI-industrial growth relationship. Similarly, on the services sector, though Kodongo and Ojah (2017) found FDI to harm the sector, and Alfaro found no significant association, both studies ignored the prospect of thresholds from FDI.

All in all, our evidence, therefore, shows the existence of FDI thresholds in the FDI-growth connexion. At the overall level of the real sector, growth in manufacturing and agriculture, the impact of FDI for countries beneath the threshold of FDI is detrimental. However, as FDI inflows exceed the estimated FDI threshold value, the impact of FDI on the growth of these sectors becomes beneficial to countries lying above the thresholds. But, when GDP, industrial and service sectors measure growth, the positive impact of FDI is only realized for countries below the estimated thresholds, but for those above the thresholds, the impact of FDI on growth will be detrimental.

5.6 Conclusion and Policy Recommendations

The association between capital flows and growth cannot be underestimated, and it is time the right cords are stroke. The emergence of new concepts, data, and methodologies, warrant in-depth research in the wake of new evidence, especially given the lack of agreement in the literature. Aside from direct linkages between capital flows and growth, the literature posits that such association is enhanced with the existence of certain host country absorptive features. In this study, we built earlier arguments that though discontinuities exist in the capital flows – growth relationship, certain variables may mediate the capital flows – growth nexus. We thus focused on one of such mediating variables (human capital) by employing various indicators to moderate the association. A healthy and vibrant human capital is known to be vital for economic advancement and the attraction of external capital, primarily when human capital cannot be exported. Thus, in the wake of new and robust methodology, the study sought to determine the existence of human capital thresholds in the association between foreign direct investment and real sector growth in Africa. Following the works of Borensztein et al. (1998), Urata and Kawai (2000), Kottaridi and Stengos (2010), Yeboua (2019) and Asamoah and Alagidede (2020), the study employed the mean years of school as the main proxy for human capital.

Table 5.5B: Dynamic Panel Threshold results when the Foreign direct investment is the threshold variable.

Dependent Variable:	**Manufacturing**	**Growth**	**Industrial**	**Growth**	**Agriculture**	**Growth**	**Service**	**Growth**
Threshold value	4.033 ***		2.268 ***		2.644 ***		1.233 ***	
	(0.491)		(0.295)		(0.243)		(0.245)	
95% Conf. Interval	[3.071, 4.996]		[1.690, 2.848]		[2.169, 3.120]		[0.754, 1.713]	
Variables / Regimes	**Low**	**High**	**Low**	**High**	**Low**	**High**	**Low**	**High**
Lag Dependent variable	0.891 ***	-0.421 **	0.316	0.483	-0.102	0.086	-0.143	0.362 ***
	(0.048)	(0.140)	(0.304)	(0.359)	(0.239)	(0.295)	(0.114)	(0.118)
Gov't Expenditure	-0.159	-2.067 **	-1.857 ***	1.751 ***	0.803 *	-1.184 ***	-0.677 **	0.621 **
	(0466)	(0.803)	(0.572)	(0.612)	(0.425)	(0.365)	(0.302)	(0.302)
Inflation	-0.016	0.048	0.085 ***	-0.064 **	0.012	-0.009	0.056	-0.060 *
	(0.044)	(0.044)	(0.029)	(0.030)	(0.023)	(0.027)	(0.039)	(0.034)
Per capita income	0.425 **	0.692 **	-0.158	1.253 ***	1.057 ***	0.033	0.900 ***	-0.182
	(0.176)	(0.271)	(0.429)	(0.401)	(0.209)	(0.151)	(0.145)	(0.174)
Trade	0.335 *	-0.074	0.089	-0.360 *	-0.244 *	0.151	0.208 *	-0.181
	(0.183)	(0.191)	(0.194)	(0.190)	(0.127)	(0.117)	(0.110)	(0.113)
Financial depth	0.388	-0.232	-1.044 ***	0.915 ***	0.036	0.564 **	0.323 **	-0.155
	(0.257)	(0.344)	(0.399)	(0.375)	(0.186)	(0.238)	(0.137)	(0.139)
Human Capital	-14.984 *	-25.578 **	4.788	5.225	8.220	-	-16.147	13.447
	(7.763)	(9.874)	(20.411)	(19.478)	(8.648)	20.334***	(12.909)	(14.451)
						(5.897)		
FDI	-1.833 **	4.638 ***	7.189 **	-7.396 *	-4.936 ***	4.698 ***	5.002 **	-5.017 **
	(0.828)	(0.693)	(3.658)	(3.862)	(1.588)	(1.620)	(2.168)	(2.204)
Diagnostics								
Observation		1044		1044		1044		1044
Bootstrap p-value		0.000		0.000		0.000		0.000
No. of moment conditions		1755		1782		1782		1782
No. of countries	31	5	16	20	20	16	7	29

For robustness, the study employed another variable known to the capital flows – growth literature, which is gross national secondary school enrolment (Xu et al. 2000; Ford, 2008; Tu and Tan, 2012). The last indicator of human capital was a qualitative measure in the form of the pupil to teacher ratio (Ibrahim and Alagidede, 2018). We further sought to ascertain thresholds that could also influence the FDI – growth nexus when FDI inflows are the same as the threshold variable. We sought to achieve our objective with data on 36 African countries between 1990 and 2018. Setting aside the simple methodological procedure of a linear interaction and first-order derivatives, the study employed Seo and Shin's (2016) dynamic panel threshold model with endogeneity to arrive at our conclusions.

At the aggregate level of the real sector and GDP growth, all indicators of human capital showed that thresholds exist in the FDI-growth relationship. Evidence shows that the impact of FDI on growth may change course after a certain threshold level of human capital (irrespective of the measure) has been attained. Moderating the FDI – growth at the aggregate level using the mean years of schooling shows that although FDI impacts growth, the effect is detrimental to both the combined real sector and GDP growth beyond a certain level of human capital development but positive below the threshold. Significantly, we found only a few countries to lie above the mean years of schooling for which they are likely to experience the detrimental impact of FDI on aggregate growth. Perhaps, spending too many years in school does not equate to advancement in human capital development and that for Africa, foreign investors do not consider too many years in school as relevant in their decision to invest abroad. Another reason for the observed results could be that foreign investors do not need substantial human capital in host countries because either the investments are only market seeking or foreign investors come into the African market with the required human capital.

Even though the other two indicators (gross enrolment and pupil-teacher ratio) also support the existence of human capital thresholds in the FDI – growth nexus, our evidence shows that beneath the threshold levels, FDI is insensitive and even detrimental to aggregate growth. However, beyond the threshold values, increases in FDI lead to substantial growth in both real sector and GDP growth. A plausible defence is that, in cases where human capital may be essential to foreign investors; foreign investors will consider countries that have achieved a certain minimum threshold of human capital, possibly with much emphasis on the number of the population enrolled or pupil to teacher ratio. Once the required human capital exits, FDI will elucidate a positive influence on growth. Again, a developed human capital helps in the development of new ideas in terms of quality product development, innovation and service quality. Human capital enhances a country's ability to attract the right amount of FDI needed to transform the growth of an economy. The results suggest that investments in human capital are deemed beneficial in the attraction of FDI to Africa. Until the needed threshold in human capital, development has been attained in terms of gross secondary school enrolment, and the pupil-teacher ratio, increases in FDI flows will slightly hamper economic growth.

At the individual levels, we found the existence of thresholds irrespective of the indicator of human capital on the impact of FDI on growth. Regarding manufacturing sector growth, we found the impact of FDI on the sector to be mostly insignificant for countries below the thresholds but positive and significant for countries above the thresholds. Similar results show that for services' sector growth, FDI was known to be significantly harmful to growth below the thresholds of human capital, but positively enhanced growth once countries surpass the given thresholds of human capital. Regarding industrial and agriculture sectors, we found evidence to the effect that the positive impact of FDI on these sectors is attained for countries that lie beneath the human capital thresholds. Above the thresholds, FDI was found to be detrimental to the growth of both sectors. Primarily, though the evidence supports the existence of human capital thresholds in the FDI – growth nexus, the impact of FDI could be dependent on the indicator or growth, as well as the measure of human capital development.

Furthermore, the study assessed the impact of foreign direct investment on the growth of the real sector and its components when the levels of foreign direct investment mediate the relationship. Again, the empirics are quiet on nonlinearities and thresholds in the capital flows – economic growth nexus, especially when the threshold variable is also the same as the independent regime variable, in this case, foreign direct investment. Our evidence confirms that at both the aggregate level of the real sector and GDP growth, as well as the subcomponents of the real sector, the effect on foreign direct investment on growth changes course affect a certain threshold level of foreign direct investment that has been attained. We note that FDI can be both harmful and beneficial to growth; however, the measure of growth matters, especially in terms of the real sector. We note also that for specific sectors, too much influx of FDI hampers growth. At the same time, FDI inflows must surpass specific quantum before it can enhance the growth of certain sectors.

Contrary to many FDI – growth studies, the first inference is that an adverse or positive impact of FDI on growth is not a one-off impact. We provide evidence to the effect that a higher inflow of FDI is not always beneficial to growth, and neither is two small FDI inflows always detrimental to growth. Beyond a given level of FDI flows, growth could expand or contract. All in all, we have shown that thresholds levels in terms of human capital (irrespective of the indicator) as well as FDI inflows matter in the capital flows – economic growth relationships.

The study provides specific recommendations for policy implementations. Though human capital and foreign direct investment matter for the attraction and retention of capital flows, especially FDI, the optimal levels of these two are critical. Though the level of human capital development may be deemed necessary for the attraction of FDI, investments in human capital may turn out to be harmful to the attraction of FDI. This is possible where FDI is market seeking or when foreign investors can come along with the required human capital. But more importantly, sector-specific policies are most important as increasing levels of human capital enhances the attraction of FDI to specific sectors. For policy directions, the indicator of human capital also matters. Though many studies recommend the implementation of FDI policies to attract higher inflows, such recommendations may have ignored the possibility of thresholds arising from FDI itself. We recommend a shift from such a policy initiative, and those policymakers should first bear in mind that beyond certain levels of FDI inflows, growth may derail. Thus, policies should be aimed at attracting the right levels of FDI inflows. Again, sectoral differences should be given the needed consideration.

Further studies could focus on a decomposition of FDI and other forms of capital flows, especially when human capital is the threshold variable. Also, several studies contend that certain variables such as financial development, trade, domestic investment and institutional quality are known to moderate the FDI – growth relationship, studies regarding thresholds with endogeneity regarding the above indicators may perhaps change current policy directions and inform better directions. Future studies can also consider the presence of a kinked effect in the thresholds rather than discontinuities of the regression functions or jumps.

CHAPTER SIX

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

"I have fought the good fight, I have finished the race, I have kept the faith. Now there is in store for me the crown of righteousness, which the Lord, the righteous Judge, will award to me on that day—and not only to me, but also to all who have longed for his appearing". – 2 Timothy 4: 7 – 8

6.1 Introduction

In the concluding part of this thesis, we provide a snapshot of all the preceding chapters as we introduce the chapter. In brief, we provide a summary and conclusion to all chapters, offer some recommendations for policy implementation and areas requiring further research.

6.2 Summaries and conclusions

In this study, the prime focus was on the association between private capital flows and the real sector in Africa with focus on specific thematic aspects that has received less attention within the broader capital flows – economic growth literature. The study sought to among other things explore the empirical evidence of the allocation puzzle and causality between private capital flows and economic growth in SSA. Also, the study analysed the effect of financial development and institutions as a transmission mechanism in the association between private capital flows and growth of the real sector in Africa. A further objective was to analyse the influence of financial development as a moderating variable on the impact of macroeconomic volatility on private capital flows. Finally, by the application of emerging methodologies, the thesis sought to assess evidence of nonlinearities and thresholds in the capital flows-real sector growth nexus. The thesis therefore sought to provide answers to the following research questions:

I. Is there empirical evidence of an allocation puzzle and causality between private capital flows and the growth of the real sector in Sub Saharan Africa?

II. What is the nature and channels (Financial Development and Institutions) through which private capital flows affect growth of the real sector in Africa?

III. Is there non-linearities in the association between macroeconomic volatility and private capital flows in Africa, and how does financial development moderate the macroeconomic volatility and private capital flows dynamics.

IV. Do thresholds exist in the capital flows – real sector growth relationship?

We provide a summary of the four thematic areas of the study.

6.2.1 Exploring the causal relationships and allocation puzzle between private capital flows and real sector growth in SSA

This study explored the causal dynamics and allocation puzzles between real sector growth and private capital flows (FDI, portfolio equity and private debt) in Sub Saharan Africa (SSA). Specifically, the study examined how the influx of private capital affects the broader economy through its impact on real economic sectors in a panel of 42 SSA countries over 1980–2017. Using a dynamic panel model and decomposing the real sector into its parts, we test for the possibility of a two-way causality between growth in agriculture, manufacturing, industry and service value additions, and private capital flows (FDI, portfolio equity and private debt). There is no evidence of allocation puzzle at the overall level of the real sector and private capital flows, which suggests that SSA countries with relatively high growth in the real sector will attract more private capital flows (FDI, portfolio equity and private debt). However, at the disaggregate level of both real sector and capital flows, we found interesting results. While the effect of FDI on the real sector is positive at the disaggregated level, there is a positive bi-directional effect between FDI and growths in manufacturing, industry and service value additions. We also established a bi-directional relationship of a positive association between private debt flows and growth in agriculture and services, with no evidence of an allocation puzzle. Though there is a causal relationship between private debt flows and industrial growth, the relationship is harmful in both ways. Regarding portfolio equity flows, the study established a two-way positive causality between equity flows and growths in industrial and services value additions while there was a bi-directional inverse relationship with manufacturing value additions. The results are robust to key determinants of the growth-private capital flows nexus.

6.2.2 Real sector growth and private capital flows in Africa: Does financial development and institutional quality matter?

The second chapter had two broad aims merged into one. The first of the two objectives investigated the linkage between private capital flows and real sector growth, and whether financial sector development fortifies such association. The study covered 30 African countries over the period 1990 – 2017. Departing from previous capital flows – growth studies, the current study employed a newly developed indicator of financial development to moderate the private capital - real sector connexion. We further deployed private sector credit as alternative measure to financial development. We established our empirical relation with a Lewbel instrumental variable general method of moments (IV-GMM) two-step robust estimator with Kleibergen-Paap robust standard errors and orthogonal statistics that relies on heteroscedasticity for identification, while dealing with instrument insufficiency, unavailability, endogeneity and omitted variable bias. At the combined level of the real sector, we established that both foreign direct investment and portfolio equity have no significant impact on growth, while portfolio debt flows have an inverse impact on growth. We also established at the overall real sector that financial development stifles growth, albeit insignificant under FDI and debt flows. Under portfolio equity flows, financial development enhances overall real sector growth. At the individual components of the real sector, we found varying results. We found foreign direct investment to have no significant impact on growth in manufacturing and industrial sectors whiles stifling agriculture sector growth but positively enhancing services sector growth. The study also found private debt flows to be detrimental to manufacturing, industry and services sectors; but beneficial to agriculture sector growth, although largely insignificant. While portfolio equity was deemed beneficial to growths in manufacturing, industry and agriculture, it was harmful to services' sector growth. By multiplicative interaction and first-order derivative, we found the interaction between FDI and financial development to enhance the growth of the real sector and its components at face value. We found similar observations under portfolio equity flows and private debt flows. We further assessed the impact of private capital flows on growth of the real sector and its components at varying or increasing levels of financial development. The objective was to determine the optimal financial development that enhances real sector growth. Under the newly developed financial development index, our marginal effect analysis shows that the growth impact of FDI on the overall real sector, industry, and service sector growth starts at the threshold level of the 25th percentile of the financial development index to the 90th percentiles, while the growth impact on manufacturing is only evident at the 90th percentile of financial development index. When financial development is proxied by private credit, the marginal analysis for the overall real sector, manufacturing, industry and services indicates that FDI flows enhances growth from the 25th percentile of private credit through to the 90th percentile. The adverse of FDI flows on agriculture growth is only reduced at increasing levels of financial development (index and private credit) but cannot be completely eradicated. Again, the marginal analysis shows that the positive impact of portfolio equity begins at the 25th percentile of the financial development index for the overall real sector and the individual components. For private credit, the impact of portfolio equity on the overall real sector, growths in industry and services is evident at the 25th percentile of private credit. Private credit may not eradicate the adverse impact of portfolio equity on agriculture growth but could reduce the negative effect. Finally, we observe that any potential adverse impact of private debt flows can only be reduced at increasing levels of financial development but cannot be eradicated. All in all, we concede that although financial development reinforces the conservative view that capital flows enhance economic growth, the reinforcement depends on the type of sector, the impact of private capital, and the percentile levels of financial development.

On the same tangent as the first, the second objective of chapter two examined the dynamics between private capital flows, real sector growth and institutional quality in Africa. With the same sample size and data span, we tested our empirical analysis with an instrumental variable GMM two-step estimator (IV-GMM) that resolves issues of instrument unavailability and insufficiency while producing robust estimates. At the overall level of the real sector, evidence shows that foreign direct investment had an insignificant negative impact on growth, while institutional quality had a significant positive effect on growth. Though we found both portfolio equity and private debt flows to have a positive association with the overall real growth, the effect was flatly insignificant, but the effect of institutions remained positive. When we decomposed the real sector, we established that foreign direct investment stiles growth of both industry and agriculture whiles institutions boost growth of those sectors. However, we found opposing effects in terms of services sector growth. We further ascertained that portfolio equity hampered growth of all sectors, though largely insignificant while institutions enhanced growths in manufacturing, agriculture and services. We obtained similar results under private debt where its impact on all sectors was negative with significant impact on manufacturing and industrial. Again, institutions enhanced growth of all sectors. Initial assessments through our multiplicative interactions show that countries with vigorous institutional frameworks stand to benefit momentously from private capital flows, as we found institutions do moderate the positive impact of capital flows on the overall growth of the real sector and the individual components. At the combined real sector, increasing in institutional quality reduces the potential adverse impact of all forms of private capital flows (FDI, portfolio equity and debt) as early as the 25th percentile of institutions. Our marginal analysis and test of joint significance posits that the impact of private capital on the individual components of the real sector takes into account the type of capital (FDI, portfolio equity or debt), and the percentile level on institutions, in some cases, as far as the 90th percentile. In some cases, institutions may reduce the harmful effect of capital flows, but may not eliminate it in totality. The outcome of the study in terms of policy implementation reminds us that sector-specific capital flow institutional policies is the best way to improve the quantum of private capital flows to Africa. We controlled for GDP per capita, trade openness, government expenditure, inflation, and financial development.

6.2.3 Macroeconomic volatility, private capital flows and financial development in Africa.

The third stand-alone study investigated the role of financial development in the association between exchange rate uncertainty and private capital flows in Africa. The main areas of emphasis were: Is the exchange rate uncertainty – capital flows nexus sternly linear? Does the exchange rate volatility deter private capital inflows? Can financial development alleviate the negative impact of exchange rate uncertainty on private capital? What is the required threshold of financial development that can ditch the negative impact on the exchange rate volatility on private capital? We achieved our empirical objectives through a methodological application of the system GMM two-step robust estimator with orthogonal deviations. We found evidence in support of a non-linear relationship between uncertainty and all forms of private capital. The results further indicated that the impact of uncertainty on capital flows depends on varying levels of uncertainty, that is, increasing volatility reduces the impact of volatility of private capital inflows. A deeper assessment shows that the volatility of the domestic rate derail increases private capital into Africa. However, for countries that have a well-functioning financial development system, the adverse impact of the volatility on private capital can be curtailed at increasing levels of financial development. Reducing the adverse effect of the domestic exchange rate should take into consideration the type of private capital (FDI, portfolio equity or debt), the indicator of financial development (bank or stock market) as well as the critical value of financial development.

6.2.4 Thresholds in private capital flows and real sector growth: A dynamic panel analysis.

We examined the possibility of thresholds in the private capital flows – growth dynamics, and whether the thresholds are functions of mediating variables such as human capital and private capital. We paid attention to the growth of the real sector and foreign direct investments as indicators of growth and private capital respectively. Measuring human capital development by three separate indicators, namely, the mean years of schooling, gross secondary school enrolment and the pupil – teaching ratio, our findings from the dynamic panel threshold model with endogeneity showed the existence of significant relevant human capital thresholds in the real sector growth – FDI connexion. At the overall level of the real sector, we established that below the thresholds of gross enrolment and the pupil – teacher ratio, foreign direct investment is significantly harmful to growth. However, above the threshold values, foreign direct investment has an unambiguous positive and significant impact on growth of the real sector. At the individual components of the real sector, the dynamic threshold model shows that foreign direct investment is positively sensitive to growths in industry and agriculture below the thresholds of human capital but harmful beyond the threshold. For growths in manufacturing and services, foreign direct investment was found to be harmful to these sectors below the estimated thresholds but for countries above the human capital thresholds, foreign capital in positively correlated with growth. When foreign direct investment is the threshold variable, the findings show that below the threshold foreign direct investment is damaging to the overall real sector, manufacturing and agriculture sectors but beneficial to countries above the estimated threshold. However, for industrial and services' sectors, the positive impact of foreign direct investment is only realized beneath the estimated threshold. The obvious conclusion is that large inflows of foreign direct investment is not always beneficial to certain sectors and as such sector-specific thresholds need to be considered.

6.3 Policy recommendations

Given that we have already proffered recommendations under each of the preceding chapters, we provide abridged recommendations for each chapter to aid policy directions. Overall, we have established the relevance of private capital flows for economic growth and sustainability of Africa's real sector, hitherto has received minimal attention within the capital flows – growth literature. A good understanding of how each component of the real sector reacts to the various components of private capital flows will inform sector specific – capital flows policies. This requires policy makers to conduct sector-specific needs assessment in order to avoid the implementation of blanket capital flows – growth policies and to identify the sectors that actually need external capital injection. Given that we have established a causal relationship between certain sectors and capital flows, it affords policy makers two-sided opportunities. Implement strong sector growth enhancement policies that will be able to attract external capital or attract sector specific capital flows to boost growth. We strongly recommend the shift towards the former, as investors will be much more akin to investing in growing sectors than investing in potential growing sectors. We also recommend a broader macroeconomic growth policy as the growth of the larger economy will spur growth of individual sectors and thus attract external capital to these sectors. We recommend that countries pay more attention to portfolio equity and debt flows as against the fixated focus of traditional foreign direct investment. Certainly, different sectors respond to different sources of external capital for growth and expansion.

Given that domestic structural frameworks matter in the real sector – capital flows dynamics and that these frameworks mediate the relationship, it is important that countries proffer new ways of strengthening promoting the efficiency of such frameworks. Importantly, the development of strong financial sector in terms of local content, minimum capital requirements, capital adequacy ratios, and efficient corporate governance will boost the confidence of external financial providers in partnering local industries. Policies should be developed by financial service providers to facilitate the extension of credit to the real sector. Though universal banking seems to be the new wave of banking, countries should build at least three sector specific banks to aid credit facilitation to these sectors. Furthermore, other aspects of the financial sector such as insurance, stock market, bonds, and credit unions should be highly involved in supporting the financing of the real sector. This will free the pressure associated with financing these sectors mostly by the banking sector. Another essential structural framework is the development of institutions as we found it to enhance the growth of the real sector, but more importantly in the attraction of external capital in augmenting the growth of these sectors. It is thus essential that policy makers have ways of improving Africa's weakening institutional framework as a conduit to the attraction of external capital. Heads of state institutions should be detached from political tenures and be given fixed term mandates that overlap election periods. This will give heads of such institutions the ability to work freely. Strong institutions also have a bearing on the development of the financial sector.

Another major finding is that volatility of the domestic exchange rate hinders the attraction of external capital to Africa, however, persistent volatility could also attract investors given the higher expected return in the face of uncertainty. To the extent that volatility is well managed, the adverse impact of the attraction of foreign capital will be minimised. We recommend strong policy measures aimed at managing the domestic exchange rate to curb persistent volatilities. Central banks should be given the laxity to operate without much political interferences. Governments in Africa should move from being import dependent to manufacturing dependent, as this will lessen the demand for foreign currency for imports. A strong financial sector can also mitigate the adverse impact of volatility of capital flows. Policy frameworks in dealing with the impact of volatility through the financial sector will go a long way in attracting external capital. As much as possible, banks should discourage the rise of dollarization in most African economies. Though we found the development of the banking sector to be the most efficient way of doing this, strengthening other financial aspects will be a further boost of minimizing the volatility – capital flows connection.

Recognizing that thresholds in the form of human capital development and capital flows mediate the capital flows – growth dynamics, it essential for policy makers to note that the hitherto assertions of one cap fits all will not hold for future policies. Once the given thresholds have been attained, the impact of foreign direct investment, and for that matter capital flows spurs real sector growth. Threshold analysis has also deepened our understanding of the current lack of consensus in the literature regarding the direction and impact of foreign direct investment on growth. We have shown that human capital development is essential in the ability of capital flows to enhance growth. We thus recommend that countries in Africa invest more in education. More of the populace should be given the chance to enrol in school and be encouraged to spend at least a minimum number of years in school. To enhance the impartation of knowledge, we recommend a reduction of the pupil – teacher ratio in all schools, both public and private. There is the need to improve infrastructure in all schools to modernize teaching and learning. Teachers and educational heads should be encouraged to seek higher qualification to improve their knowledge. Frequent upgrade of school curricular should be enforced. While certain sectors of the economy benefit from capital flows beyond a threshold of human capital, some sectors also benefit from capital flows beneath a threshold of human capital. Mediated by foreign direct investment also shows that excessive investment in foreign capital could also be harmful to the growth of certain sectors. It calls on countries to identify the sectors that need more external capital for growth and those that require only minimal foreign capital injection to enhance growth. Thus, policies aimed at attracting capital flows should consider the existence of capital flows thresholds. Once a sector exceeds the required thresholds, the quest for additional external capital should pause.

6.4 Potential future research areas

We also recommend few areas for further studies. First, an assessment of the impact of capital flows on other key sectors of the economy will be beneficial for policy direction. Among these sectors include construction, mining and extraction, financial, government, transportation, wholesale and retail, real estates, telecommunication and public utilities. Secondly, a test of the hypothesis involving other forms of capital flows such as remittances, public debt and the various components of foreign direct investment will deepen the capital flows – real sector growth understanding. Thirdly, given that Volatility is a concern for policy making, our study on the volatility foreign direct investment dynamics could be extended to the other types of capital flows and other indicators of macroeconomic volatility such as growth, interest rate and inflation. Other ways of assessing volatility such as the spline-GARCH and other risk mitigating factors such as deposit insurance and institutions offer avenues for further studies.

Regarding our threshold, a comparative analysis involving other threshold estimation techniques such as the sample splitting, panel smooth transition and dynamic panel with endogeneity will all enhance our understanding of thresholds. The application of a threshold model to involve more than just two end points such as panel kink estimation with unknown thresholds should be explored. Again, the application of the dynamic threshold to other inconclusive studies such as the natural resources curse on economic growth, productivity and capital flows will be welcoming.

Finally, a more nuanced data that performs regional analysis such as Asia, OECD, and European Union with that of Africa will be welcoming. Even on Africa, a detail analysis of the subject in terms of economic blocs, oil exporting and middle-income countries, conflict and non-conflict countries as well as legal systems origin will do enhanced policy direction.

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