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ESSAYS ON THE IMPACT OF FOREIGN DIRECT INVESTMENT IN AFRICAN ECONOMIES

By

Prosper Chitambara

Supervisor:

Professor Christopher Malikane

A dissertation submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, Johannesburg, in fulfilment of the Requirements for the Degree of Doctor of Philosophy

19 August 2015

DECLARATION

I, Prosper Chitambara, do hereby declare that the research work contained in this thesis is my own work, except where otherwise acknowledged or indicated. It is submitted for the degree of Doctor of Philosophy in Economics, University of the Witwatersrand, Johannesburg. This thesis has not, either partially or wholly, been submitted to this university or any other university for a degree or diploma.

Name of Student: Prosper Chitambara

Signed: 

Date: 19 August 2015

DEDICATION

This work is dedicated to my Lord and Savior, Jesus Christ, for His love and grace upon my life and also to my wife and family for their unwavering support and encouragement.

ACKNOWLEDGEMENTS

I am greatly indebted to my supervisor, Professor Christopher Malikane for his guidance, constructive comments and patience throughout this journey. I am also grateful to the World Bank, the IMF and the UNCTAD for making available the data used in this thesis.

ABSTRACT

This thesis focusses on the impact of Foreign Direct Investment (FDI) on economic performance in selected African countries over the period 1980-2012. The thesis is divided into five chapters and three of them are empirical. Chapter 1 is the introduction. Chapters 2, 3 and 4 are empirical chapters examining the impact of FDI on various indicators of economic performance. Chapter 5 concludes by giving policy recommendations.

In chapter 1 we provide a background, motivation, objectives, hypothesis to be tested, gaps in the literature, contributions of the study and the main findings. Chapter 2 examines the link between FDI and domestic investment and the role of host country factors namely financial development, institutional development and trade openness. We use the ordinary least squares, random effects, fixed effects and the system GMM methodologies on a panel of 48 African countries over the period 1980 to 2012. The results show that FDI has a crowding out effect on domestic investment and that improved institutions and trade openness do mitigate the substitutionary effect of FDI on domestic investment. This implies a need to come up with policies to improve local conditions by strengthening institutional quality and enhancing trade openness.

Chapter 3 investigates the impact of FDI on productivity growth and the role of relative backwardness (the technology gap) on a panel of 45 African countries over the period 1980-2012. We use two measures of relative backwardness namely: the distance from technological frontier and the income gap. We apply the fixed effects, random effects and system GMM method to account for the issues of endogeneity. The results show a general insignificant effect of FDI on TFP growth. This suggests that FDI has a limited effect on productivity growth. The analysis of the advantage of relative backwardness does not support the convergence theory of Findlay (1978) and Wang and Blomstrom (1992). The large technology gaps in African countries hinder their ability to absorb foreign technologies from advanced countries.

Chapter 4 analyses the long run dynamic relationship between FDI, exports, imports and profit outflows in 47 African countries over the period 1980-2012 by means of panel cointegration techniques. The results from the panel cointegration tests show that a long run relationship exists

between the variables. Our findings provide evidence on the adverse long run effects of FDI on the current account in African economies. In particular, the results show that, FDI inflows lead to a decrease in exports and an increase in both imports and profit remittances. These findings confirm that indeed profit outflows by multinational companies are one of the main factors driving current account deficits in African countries.

Chapter 5 is the conclusion. We provide a key summary of the key issues covered, the main findings, the key contributions of the study and the policy recommendations. We also suggest areas for further research in the future.

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LIST OF ACRONYMS

ADF	Augmented Dickey Fuller
AIC	Akaike Information Criterion
ARDL	Auto Regressive Distributed Lag
BOP	Balance of Payments
BRICS	Brazil, Russia, India, China and South Africa
DOLS	Dynamic Ordinary Least Square
DPD	Dynamic Panel Data
DRC	Democratic Republic of Congo
DTF	Distance to Technological Frontier
ECOWAS	Economic Community of West African States
EU	European Union
FDI	Foreign Direct Investment
FE	Fixed Effects
FMOLS	Fully Modified Ordinary Least Square
GFCF	Gross Fixed Capital Formation
GMM	Generalised Method of Moments
IMF	International Monetary Fund
LDCs	Least Developed Countries
M&As	Mergers and Acquisitions
MNCs	Multinational Corporations
MNEs	Multinational Enterprises
NEPAD	New Partnership for Africa's Development
OECD	Organisation for Economic Cooperation and Development
OLS	Ordinary Least Squares
RGDP	Real Gross Domestic Product
R&D	Research and Development
RE	Random Effects
SIC	Schwartz Information Criterion
SSA	Sub Saharan Africa

TFP	Total Factor Productivity
UK	United Kingdom
UNCTAD	United Nations Conference on Trade and Development
US	United States
USD	United States Dollar
VAR	Vector Auto Regressive
VECM	Vector Error Correction Model
WB	World Bank
WDI	World Development Indicator

CHAPTER 1: INTRODUCTION

1.1 Background

FDI can be defined as 'a category of international investment that reflects the objective of a resident in one economy (the direct investor) obtaining a lasting interest in an enterprise resident in another economy (the direct investment enterprise). The lasting interest implies the existence of a long-term relationship between the direct investor and the direct investment enterprise, and a significant degree of influence by the investor on the management of the enterprise. A direct investment relationship is established when the direct investor has acquired 10 percent or more of the ordinary shares or voting power of an enterprise abroad' (IMF, 1993: p. 86). The notion of FDI does not necessarily imply total control of the domestic firm, as only a threshold of 10 percent ownership is required to establish a direct investment relationship. FDI comes in two basic forms namely: greenfield investments which involve the creation of new production processes and mergers and acquisitions (M&As) which involve the purchase of assets of existing local companies. FDI can also be classified according to its purpose namely: natural resource seeking, market seeking, efficiency seeking and strategic asset seeking (Dunning, 1993).

Over the past few decades there has been a significant increase in FDI flows on the African continent. FDI inflows into Africa have targeted the extractive sectors and have therefore been concentrated in a few resource rich countries. According to the 2014 Africa Economic Outlook, resource intense countries accounted for 65 percent of total FDI flows in 2013 down from 78 percent in 2008. The United States (US), the United Kingdom (UK) and France accounted for 64 percent of total FDI stock in Africa in 2012, while the share of the BRICS in Africa's total FDI stock rose from 8 percent in 2009 to 12 percent in 2012 (OECD, 2014). Table 1.1 shows the trends in FDI flows into SSA for selected periods as a percentage of gross domestic product (GDP) and gross fixed capital formation (GFCF). The share of FDI flows as a percentage of GDP provides an indicator of the significance of FDI in the economy. On the other hand, the share of FDI flows in GFCF measures the importance of FDI in total domestic investment.

As presented in Table 1.1, FDI inflows as a percentage of both GDP and GFCF have grown considerably in SSA since 1980. In 1980, FDI accounted for only 0.09 percent of the continent's GDP and by 2000 this figure had risen to 1.94 percent. In 2012, the share of FDI in GDP had risen to 3.29 percent. Meanwhile, the share of FDI in GFCF rose from 0.5 percent in 1980 to 11.54 percent in 2000 and then to 16.39 percent in 2012. According to the 2014 Africa Economic Outlook, over the period 2001-2011 FDI, accounted for about 16 percent of GFCF in Africa surpassing the global average of 11 percent. Over the past few years FDI inflows have become more diversified. The Herfindahl index for sectoral concentration of FDI for 39 sectors went down from 0.43 in 2003 to 0.14 in 2012 with the share of projects in the services sector rising markedly (AfDB, 2014). Ernst & Young (2013) reports that in 2012, 73.5 percent of the total value of greenfield investments to Africa was concentrated in manufacturing and infrastructure-related activities, up from 68.3 percent over the previous decade**.**

Table 1.1: Trends in FDI in SSA.

Year	FDI/GDP (%)	FDI/GFCF (%)
1980	0.09	0.5
1990	0.42	2.13
2000	1.94	11.54
2010	2.75	14.45
2011	3.29	17.37
2012	3.19	16.39

Source: World Development Indicators (WDI) database.

1.2 The Problem Statement

The growth in FDI flows into African countries has stimulated debate about the impact of FDI on economic performance (Adams, 2009). Economic theory highlights the importance of FDI in promoting economic development (Apergis et al, 2006). FDI can generate positive externalities through providing financing, complementing domestic investment and enhancing competitiveness (Adams, 2009; Kobrin, 2005). The various channels through which positive externalities associated with FDI can take place are summarised by Hermes and Lensink (2003) as follows: (i) competition channel, where increased competition is likely to result in improved productivity, efficiency and investment in human and physical capital; (ii) linkages channel, whereby foreign

investment is often accompanied by technology diffusion into the host country; and (iii) demonstration channel, whereby domestic firms learn and adopt technologies used by multinational companies. Empirical evidence on the impact of FDI on economic performance however remains inconclusive and mixed (Ang, 2009).

Despite the huge increase in FDI and other capital flows, these resources have not had a meaningful impact on development in Africa (Asiedu, 2002). Moreover, FDI inflows to Africa have been volatile, concentrated in a few resource rich countries and targeting the extractive sectors (Ndikumana and Verick, 2008). Lim (2001) argues that FDI in the extractive sector may have limited positive impact on growth because of the involvement of mega projects that often are not labour-intensive and do not utilise locally produced intermediate inputs. Hsiao and Hsiao (2006) observe that FDI inflows have resulted in the development of an enclave economy. On the other hand, domestic investment in Africa remains low and insufficient and there is a huge technology gap (UNCTAD, 2003).

Most African countries also continue to experience high current account deficits, foreign exchange shortages and growing indebtedness. FDI has a negative effect on the current account through profit remittances by multinational companies (Jansen, 1995; Seabra and Flach, 2005; Mencinger, 2008). UNCTAD (1999) reports that for every USD1 transferred to developing countries in the form of FDI, around USD0.30 leaves in the form of repatriated earnings. Mold (2008) argues that once profit remittances are taken as a proxy for the price of FDI, FDI becomes an expensive form of financing. The UNDP (2011), reports that total remitted profits and dividends from FDI in the developing world increased by about 736 percent from $33 billion in 1995 to $276 billion in 2008. The report also observes that profit remittances are increasing at a faster pace than FDI inflows, for instance, while profit remittances constituted about 29 percent of FDI inflows in 1995, by 2008 the figure had risen to 36 percent.

A number of scholars argue that FDI spillovers depend on the host country's 'absorptive capacity.' Absorptive capacity refers to local conditions in the host country such as: human capital development; financial market development; the level of institutional quality; the technological gap; the level of economic development and trade openness. Borensztein et al (1998) find that FDI

contributes to economic growth only when the host country has achieved a certain threshold in terms of human capital development. They show that FDI has a positive impact on growth when the average years of secondary schooling of the male population above 25 years of age exceeds the threshold of 0.52. Insufficient human capital development limits the diffusion of technology by multinational companies in the host country. Balusubramayam et al (1999) show that trade openness increases the contribution of FDI to economic growth. Using panel data for Arab countries from 1975-2000, Sadik and Bolbol (2003) find that a certain threshold of financial market development must be reached to gain from FDI inflows.

Durham (2004) demonstrates the role of institutions in enhancing the positive influence of FDI on growth. Li and Liu (2005) demonstrate that the lower the level of technological development in the host country, the smaller is the positive impact of FDI on growth. They calculate a threshold value for the technology gap of 12.6, above which FDI is no longer beneficial for the recipient country. Massoud (2008) observes that the level of financial development is important because lack of financial market development may prevent foreign and domestic investors from accessing the necessary financial resources.

In contrast, scholars such Carkovic and Levine (2002), argue that host country factors do not have a significant impact on the relationship between inward FDI and economic growth. Using the system GMM, they find that neither FDI nor the interaction terms are statistically significant. They note that previous studies that show that FDI has a positive effect on growth have to be viewed with caution because they do not adequately control for endogeneity. In view of the above contradictions, the question that needs to be answered is how the spillovers from FDI can be realised in Africa. This helps to strengthen the developmental role of FDI. This thesis therefore seeks to determine the impact of FDI on economic performance in African economies and examine the local conditions under which FDI can be more beneficial to African countries.

1.3 Motivation of the Study

The role of FDI as a source of capital is particularly important for Africa owing to the prevailing huge financing gap and widening current account and fiscal deficits. This has been exacerbated by the low gross national savings and the binding budget constraint facing most African economies. Scholars such as Todaro and Smith (2003) argue that the inflow of FDI could fill the gap between the desired investment and domestically mobilised savings. Moreover, since the majority of African countries do not have ready access to international financial markets they have to rely on alternative sources of finance which include FDI and aid (Adeleke, 2014). Kosova (2010) highlights that from the mid-1990s FDI has become the major source of external finance for developing countries and is twice as large as official development aid.

FDI is also viewed as an important channel for the transmission of technology for many developing countries. This is because FDI often entails the transfer of knowledge from one country to another by establishing production units using advanced technologies in the recipient country (Borensztein et al, 1998). A number of studies such as Klenow and Rodriguez-Clare (1997) and Hall and Jones (1999), show that differences in technological growth are key to explaining divergences in economic growth among countries. Empirical literature has also identified the importance of the host country's absorptive capability in absorbing the spillovers of foreign firms' technology. This implies that FDI contributes to productivity growth when a sufficient absorptive capability of the advanced technologies is available in the developing host countries (Lai et al, 2006). In particular, Sub-Saharan Africa is lagging not just in terms of volume but also in terms of technological content in its manufacturing activity (UNCTAD, 2003).

It has also been argued that FDI can have an effect on current account through three different channels, namely exports, imports as well as profit remittances. Although FDI may seem beneficial as a source of financing means for the current account deficit, it can also have adverse effects on current account because of profit outflows of foreign companies (Yalta, 2011). The problem of the increasing current account deficit coupled with a huge increase in profit remittances has recently become a major concern in many African countries. It is therefore important to investigate the impact of foreign direct investment flows on the components of the current account balance.

The development experiences of a number of fast-growing East Asian economies have also buttressed the notion that FDI is vital for bridging the resource and technological gaps in African economies. Many African countries have therefore, intensified their efforts to attract FDI by providing a number of generous tax and non-tax incentives to multinational companies (Carkovic and Levine 2002). On the other hand, a number of scholars find that differences in productivity growth account for the huge cross country variations in growth (Acemoglu, 2009; Caselli 2005; Easterly and Levine 2001; Parente and Prescott 2001). Since FDI is regarded as an important channel for technology transfer a study of the impact of FDI on productivity growth is of great significance to policy makers in Africa as it provides evidence on one key factor that can help African countries to develop.

Some studies have however questioned the role and sustainability of FDI. Turner (1991) explains that capital flows magnify current account disequilibria, with deficit countries confronted by capital outflows and surplus countries by capital inflows. Calvo et al. (1996) observe that the widening current account deficit is one of major problems associated with capital inflows. UNCTAD (2002) reports that rising FDI inflows can affect the balance of payments because of profit outflows by multinational companies. Bhinda and Martin (2009) note that FDI inflows in Africa are often surpassed by profits repatriated raising questions about whether FDI is sustainable. Guerin (2012) argues that the unsustainable current account deficit is one of the undesirable effects of capital flows in developing countries.

The role of FDI in Africa is particularly important as it has been shown that FDI can create positive externalities under certain conditions (Kobrin, 2005). These host country factors determine the extent to which host countries can absorb and hence benefit from FDI (Krogstrup and Matar, 2005). It is therefore, important to determine whether those conditions exist in Africa and what African countries need to do to create favourable conditions and hence benefit from FDI inflows. The increase in the volume and share of FDI inflows into Africa provides motivation to empirically investigate the role of FDI and its developmental impact. More importantly, as mentioned by Amighini et al. (2015), assessing the role of FDI and the conditions under which FDI is likely to be beneficial or detrimental to development has far-reaching policy implications for African

governments. Firstly, it enables African governments to review and evaluate the efficiency, effectiveness and sustainability of the incentives being provided to multinational companies. Secondly, in the light of growing discussions among African policymakers on the need for the continent to industrialise it is pertinent to provide clarity on the developmental role of FDI so as to enhance evidence-based policy formulation.

1.4 Objectives of the Study

- To find out whether there are positive externalities and spillovers from FDI on African economies.
- To examine the role of absorptive capacity and to determine how to maximise the potential spillovers.
- To suggest policy proposals on how to improve the developmental impact of FDI in Africa.

Specific Objectives

Chapter 2

- To investigate the impact of FDI on domestic investment.
- To analyse the role of absorptive capacity in the FDI-domestic investment nexus.

Chapter 3

- To examine the effects of FDI on productivity growth in Africa.
- To determine the role of the technology gap on the FDI-productivity growth nexus.

Chapter 4

- To investigate the impact of FDI on exports, imports and profit outflows.

1.5 Research Questions and Hypotheses Testing

Research Questions

- **Chapter 2:** Does FDI crowd-in domestic investment in Africa?
- **Chapter 3:** Does FDI enhance productivity growth in Africa?
- **Chapter 4:** Does FDI improve the current account in Africa?

Hypotheses Testing

- $H1_0$: FDI does not crowd in domestic investment in Africa.
- $H2_0$: FDI does not improve productivity growth in Africa.
- $H3_0$: FDI does not improve the current account in Africa.

1.6 Gaps in the Literature

While there is a lot of literature on the impact of FDI on economic growth in developing countries, surprisingly little has been published on the effect of FDI on domestic investment at the macro level (Adams, 2009; Al Sadig, 2013; Ashraf and Herzer, 2014; Mutenyo et al, 2010). There are also few studies that investigate the role of host country factors on the relationship between FDI and domestic investment. Two such studies are by, Farla et al (2014) and Morrissey and Udomkerdmongkol (2012). Morrissey and Udomkerdmongkol (2012) use annual aggregate data for 46 developing countries covering the period 1996-2009 to investigate whether the relationship between FDI and private investment is affected by governance. Farla et al (2014) investigate the role of institutions on the relationship between FDI and domestic investment using the same dataset as Morrissey and Udomkerdmongkol (2012).

While results from such studies may be informative, it can be argued that they may be biased and not representative enough of some countries because of the huge disparities in economic, social and political conditions among countries in the sample. The studies also only investigate the role of institutions and yet there are other host country factors that could affect the relationship between

FDI and domestic investment. Chapter 2 therefore, is an investigation of the role of a number of host country factors that may influence the nexus between FDI and domestic investment in African economies both separately and simultaneously. In particular, the chapter analyses how institutional quality, financial development and trade openness separately and simultaneously affect the impact of FDI on domestic investment in Africa.

Studies on the impact of FDI inflows on productivity have been mainly concentrated at the micro level. There is a paucity of literature assessing the role of FDI on productivity growth at cross-country level (Roy, 2008). Importantly, the role of the technology gap is often neglected. Some of the studies that attempt to address this issue are Baltabaev (2014); Roy (2008) and Senbeta (2008). Baltabaev (2014) uses data for 49 countries (including both developed and developing countries) over the period 1974-2008. The study by Baltabaev (2014) however only includes a few developing countries. Roy (2008) uses data for a sample of 89 countries in Latin America and Africa. Senbeta (2008) examines the FDI-productivity nexus for 22 SSA countries for the period 1970-2000. However, the study does not consider the role of the technology gap. Chapter 3 therefore, aims to provide clarity on the impact of FDI on productivity growth conditional on relative backwardness in 45 African countries over the period 1980-2012.

Chapter 4 provides empirical evidence on the relationship between FDI, exports, imports and profit outflows in Africa. This is an area that remains largely unexplored in literature. Strauss (2015) observes that the notion of how profit outflows associated with FDI are driving developing economies' current account deficits 'remains heavily under researched.' Most of the existing studies only examine the relationship between FDI and the current account through exports and imports separately while neglecting the potential role of profit outflows. Hence, the studies do not consider the overall effect of FDI on the current account deficit through other channels (Kaur et al, 2012).

Some of the studies that consider the relationship between FDI and profit remittances include: Seabra and Flach (2005), Yalta (2012) and Strauss (2015). These studies are based on time series data and do not consider African economies. Seabra and Flach (2005) examine the relationship between FDI and profit remittances in Brazil while Yalta (2012) analyses the various channels

through which FDI affects the current account in Turkey. Strauss (2015) studies the contribution of income repatriations from FDI to South Africa's current account deficit post-1994. It is therefore necessary to investigate the relationship between FDI flows and the various components of the current account in African economies using panel data analysis. Hence, Chapter 4 is an analysis of the impact of FDI on exports, imports and profit outflows based on panel cointegration and causality tests.

1.7 Contributions of the Study

Chapter 2 contributes to the existing literature in a number of ways. Firstly, it has been noted by some scholars, Kumar and Pradhan (2002 and Sylwester (2005), that FDI has differential effects in different regions. This implies that findings based on cross-regional studies must be interpreted with caution as they may not be representative enough. For instance, Sylwester (2005) uses a sample of 29 countries with only two African countries, Tanzania and South Africa. The focus on African countries therefore helps to reduce any bias that may arise due to sample selection. Our study builds on the work by Adams (2009) in a number of ways. Firstly, we update the dataset up to 2012 and use a longer time frame.

Secondly, we incorporate more variables to capture host country factors. Thirdly, we use the system GMM estimation to control for possible endogeneity among the regressors. Lastly, we examine how the absorptive capacity factors influence the relationship between FDI and domestic investment both separately and simultaneously. Previous studies only focus on one absorptive capacity factor. Solomon (2011) posits that a model that includes multiple interactions of the absorptive capacity factors and FDI helps to address the problem of omitted variable bias which may arise owing to the correlation between the absorptive capacity factors. By using a large panel of 48 African countries over a longer time period (1980-2012) we are able to clarify the impact of FDI on domestic investment in Africa and the role of host country factors in influencing this relationship.

Chapter 3 contributes to literature in many ways. Firstly, as in Chapter 2, we narrow our focus to African countries (45) to help reduce any bias that may arise due to sample selection. This is

important because of the differential effects of FDI on productivity growth in different regions (Kumar and Pradhan, 2002 and Sylwester, 2005). This chapter builds on the study by Baltabaev (2014) who uses a panel of 49 countries (both developed and developing) to examine the relationship between FDI and productivity growth over the period 1974-2008. We use a dummy variable for the existence of Investment and Export Promotion Agencies (IPA). We update the dataset to 2012 and we use two measures of relative backwardness namely: the distance to the technology leader and the income gap. We analyse both the individual and simultaneous interactions of FDI with these relative backwardness measures and their impact on productivity growth. We control for endogeneity, by using the system GMM estimation. We also use the fixed effects estimation to check for the robustness of the results.

Chapter 4 contributes to literature by uncovering the possible different channels through which FDI affects the current account in Africa. By focusing on Africa the study captures the unique characteristics of the region and provides regional-specific policy recommendations. We build on the work by Yalta (2012) who examines the different channels through which FDI affects the current account in Turkey. We use panel cointegration techniques that are robust to omitted variables to estimate the long run relationship between FDI, exports, imports and profit outflows. Given that we include 47 countries over the period 1980-2012 our sample includes more countries over a longer time period than the samples used in previous studies in this area. Moreover, by including lagged explanatory variables panel procedures allow control for potential endogeneity problems.

1.8 Main Findings of the Study

In Chapter 2, we find that FDI has a negative and mostly significant impact on domestic investment. In other words FDI has a crowding out effect on domestic investment. These results are in line with Adams (2009) who finds that a one percent increase in FDI is associated with a decrease in domestic investment. The interaction terms FDIFree (capturing institutions) and FDIOpen (capturing trade openness) have a positive and significant effect on domestic investment. This implies that institutional quality and trade openness play a positive role in mitigating the substitutionary effect of FDI on domestic investment. Durham (2004) stresses the role of

institutional development in enhancing the capacity of host countries to absorb superior technologies. Balasubramanyam et al. (1999) find that FDI is more significant for economic growth in countries with more open trade regimes. This means that trade openness positively affects the role of FDI in growth.

In Chapter 3, we find that FDI has general positive but insignificant effect on productivity growth. This suggests that FDI has a limited impact on productivity growth in Africa. This is line with findings by, Woo (2009), Ang (2009), Ng (2007) and Ng (2006). Our analysis of the advantage of relative backwardness does not support the convergence theory of Findlay (1978) and Wang and Blomstrom (1992). This is seen from the negative and significant sign of the relative backwardness variables, distance to technological frontier (DTF) and income gap (GAP). Also the interaction variables FDIDTF and FDIGAP are negative and significant in most of the columns. This is in line with findings by Li and Liu (2005). This suggests that the lower the technological development in the host country the smaller is the spillovers from FDI. Therefore, the larger the technological gap between the US and the African countries, the smaller the spillovers. This observation is also shared by Glass and Saggi (1998) who posit that relative backwardness is a deterrent as it limits the kind of technology that can be transferred. Falvey et al (2005) emphasise that having a huge technological gap is unlikely to lead to greater knowledge diffusion and catch-up, unless certain preconditions exist that allow countries to absorb the inflow of foreign ideas and knowledge.

In Chapter 4, we find that there is a long run relationship among the variables. Our findings provide evidence on the adverse long run effects of FDI on the current account in African economies. In particular, the results show that, FDI inflows lead to a decrease in exports; and an increase in both imports and profit remittances. These findings confirm that indeed profit outflows by multinational companies are a main factor driving current account deficits in African countries. The findings are in line with the results from Yalta (2012); Mencinger (2008); Seabra and Flach (2005); Woodward (2003) and Campbell (2001)

1.9 Organisation of the Study

The rest of the study is organised as follows: Chapter 2 examines the 'The Impact of Foreign Direct Investment on Domestic Investment in African Economies.' Chapter 3, focusses on, 'The Impact of Foreign Direct Investment on Productivity in African Economies.' Chapter 4 analyses the 'The Impact of Foreign Direct Investment on Exports, Imports and Profit in African Economies.' Finally, Chapter 5 concludes the study with some policy implications and areas for future research.

CHAPTER 2: THE IMPACT OF FOREIGN DIRECT INVESTMENT ON DOMESTIC INVESTMENT IN AFRICAN ECONOMIES

2.1 Introduction

This chapter examines the relationship between FDI and domestic investment conditional on host country factors, on a panel of 48 African countries over the period 1980-2012. FDI can generate positive externalities through providing financing, complementing domestic investment and enhancing competitiveness (Adams, 2009; Kobrin, 2005). The role of FDI as a source of capital is particularly important for Africa owing to the prevailing huge financing gap and widening current account and fiscal deficits. This has been exacerbated by the low private domestic savings and the binding budget constraint facing most African economies. Scholars such as Todaro and Smith (2003) argue that the inflow of FDI could fill the gap between the desired investment and domestically mobilised savings. Furthermore, since the majority of African countries do not have ready access to international financial markets they have to rely on alternative sources of finance which include, FDI and aid (Adeleke, 2014). Kosova (2010) highlights that from the mid-1990s FDI has become the major source of external finance for developing countries and is twice as large as official development aid.

Scholars such as Asiedu (2002) observe that in spite of the huge increase in FDI and its potential benefits, these resources have not had meaningful impact on development in Africa. Moreover, FDI inflows to Africa are volatile, concentrated in a few resource rich countries and targeting the extractive sectors (Pigato, 2000 and Ndikumana and Verick, 2008). Lim (2001) argues that FDI in the extractive sector may have limited positive impact on growth because of the involvement of mega projects that often are not labour-intensive and do not utilise locally produced intermediate inputs. Consequently, as Hsiao and Hsiao (2006) point out, FDI inflows have resulted in the development of an enclave economy. This concentration of FDI in the extractive sector may therefore account for the limited positive spillovers from FDI (UNECA, 2006).

The objective of this study is to investigate the impact of FDI on domestic investment in African economies, taking into account the role of host country factors. These host country factors determine the extent to which host countries can absorb and hence benefit from FDI (Krogstrup

and Matar, 2005). The increase in the volume and share of FDI inflows into Africa provides motivation to empirically investigate the role of FDI and its developmental impact. More importantly, as mentioned by Amighini et al. (2015), assessing the role of FDI and the conditions under which FDI is likely to be beneficial or detrimental to development has far-reaching policy implications for African governments. This is especially pertinent in light of the growing discussions among African policymakers on the need for the continent to industrialise.

Most studies examine the determinants of FDI flows and their impact on growth. However, there are surprisingly few studies on the impact of FDI on domestic investment in African countries. These few studies are also based on a few countries and on dated datasets (see Adams, 2009 and Herzer et al., 2008). Besides Adams (2009), the limited existing studies on the impact of FDI on domestic investment do not examine the role of country factors (local conditions). This chapter therefore aims to fill this gap by providing a clearer understanding on the link between FDI and domestic investment and the possible role that host country factors may play in shaping this link. We analyse both the individual and simultaneous interactions of FDI with other domestic investment determinants and their impact on domestic investment. This entails examining individually and simultaneously the local conditions that could generate the most auspicious environment for positive spillovers from FDI. We provide policy-relevant evidence on local conditions that enhance or hinder the impact of FDI on domestic investment in Africa.

The chapter contributes to the existing literature in a number of ways. Firstly, it has been noted by some scholars, Kumar and Pradhan (2002 and Sylwester (2005), that FDI has differential effects in different regions. This implies that findings based on cross-regional studies must be interpreted with caution as they may not be representative enough. For instance, Sylwester (2005) uses a sample of 29 countries with only two African countries, Tanzania and South Africa. The focus on African countries may therefore help to reduce any bias that may arise due to sample selection. Our study builds on the work by Adams (2009) in a number of ways. Firstly, we update the dataset up to 2012 and use a longer time frame. Secondly, we incorporate more variables to capture host country factors. Thirdly, we use the system GMM estimation to control for possible endogeneity among the regressors. Lastly, we examine how the host country (absorptive capacity) factors influence the relationship between FDI and domestic investment both individually and

simultaneously. Most of the previous studies only focus on one absorptive capacity factor at a time. Solomon (2011) highlights that a model that includes multiple interactions of the absorptive capacity factors and FDI helps to address the problem of omitted variable bias which may arise owing to the correlation between the absorptive capacity factors. Therefore, by including a number of host country factors this chapter clarifies the impact of FDI on domestic investment in Africa.

To conduct the empirical investigation we apply the dynamic ordinary least squares (OLS), fixed effects (FE), random effects (RE) and the system GMM models on annual data for 48 African economies from 1980 to 2012. Using different methods helps to check the robustness of the results. In particular, the use of the system GMM approach is an improvement from the estimation methodologies of past literature which used the fixed and random effects models. The system GMM methodology helps to control for the potential endogeneity of all variables and the unobserved country effects (Solomon, 2011). The rest of the chapter is organised as follows: section 2.2 details the trends and patterns of FDI inflows in Africa. Section 2.3 reviews and discusses the related literature. Section 2.4 presents the data description and model specification. Section 2.5 presents the estimation and analysis of the results and section 2.6 conducts robustness checks. Section 2.7 concludes with some policy recommendations.

2.2 Trends and Patterns of FDI inflows in Africa

FDI to Africa has grown rapidly in recent decades. Despite this, a number of studies have highlighted that Africa remains largely marginalised in terms of financial globalisation (Ndikumana and Verick, 2008; Ogunleye, 2009). Many governments in SSA have proactively sought and provided a number of generous tax and non-tax incentives to attract FDI in an effort to leverage the potential positive externalities and to close the huge financing and technology gaps. African countries have also considered FDI to be a driver of economic development. In fact, one of the principal objectives for the establishment of the New Partnership for Africa's Development (NEPAD) is to accelerate FDI inflows to the region (Funke and Nsouli, 2003).

In 1980, FDI inflows as a percentage of SSA GDP equalled 0.09 percent, while in 2012 the share had risen to 3.19 percent. On the other hand, FDI inflows as a percentage of gross fixed capital

formation equalled about 0.5 percent in 1980, and increased to 16.39 percent in 2012 (see Table 1.1). FDI inflows to Africa have been unevenly distributed with a few, mostly large and resource intensive, countries attracting a significant proportion of the FDI inflows at the expense of smaller and resource-deficient countries. As shown in Table 2.1, in 2012 the top 10 FDI recipients received 83.4 percent of the total FDI inflows to Africa. Three African countries namely: Nigeria, Mozambique and South Africa accounted for 41 percent of total FDI inflows into Africa.

Table 2.1: Top Ten Recipients of FDI in Africa, 2008, 2010 and 2012.

2008	2010	2012
South Africa (23.5%)	Nigeria (20.4%)	Nigeria (17.1%)
Nigeria (21.5%)	DRC (9.8%)	Mozambique (12.7%)
Sudan (6.8%)	Equatorial Guinea (9.1%)	South Africa (11.2%)
Congo (6.6%)	Ghana (8.4%)	DRC (8.1%)
DRC (4.5%)	Congo (7.4%)	Ghana (8.0)
Angola (4.4%)	Sudan (6.9%)	Congo (6.7%)
Tanzania (3.6%)	Tanzania (6.1%)	Sudan (6.0%)
Ghana (3.2%)	Zambia (5.8%)	Equatorial Guinea (5.2%)
Madagascar (3.0%)	South Africa (4.1%)	Uganda (4.2%)
Zambia (2.4%)	Mozambique (3.4%)	Tanzania (4.2%)
Total (79.5%)	Total (81.4%)	Total (83.4%)

Source: FDI data is from the UNCTAD database.

FDI inflows to Africa have traditionally been concentrated mainly in the extractive sectors such as oil, gas and mining. This trend is however slowly changing with a rising share of FDI targeted at the non-extractive sector such as light manufacturing and services (UNCTAD, 2012). A number of studies find that the effect of FDI on growth and development depends on the sector through which FDI enters the country (Alfaro, 2003; Alfaro and Charlton, 2007; Blalock and Gertler, 2009) and also the local conditions existing in the host country (Durham, 2004; Hermes and Lensick, 2003). Alfaro (2003) analyses data for 47 countries over the period 1981-1999 to investigate the role of the different sectors in the FDI-growth nexus. The results show that the impact of FDI on growth is conditional on the sector through which FDI enters the host country. In particular, he finds that FDI contributes to growth only when it enters the host country through the manufacturing sector and that FDI through the primary sector has a negative effect on growth. The results are however ambiguous for the services sector. In a related study, Alfaro and Charlton (2007) uses

industry level data from 29 countries for the period 1985-2000 and find that FDI increases growth when we account for the 'quality' of FDI, adding that FDI at the industry level contributes to higher growth. FDI inflows to Africa have been highly volatile and this volatility can affect the current account, increase macroeconomic uncertainty and undermine the ability of governments' ability to implement and sustain long-term development plans. Fosu (2001) argues that by introducing instability into private investment or imports, such volatility may adversely affect growth. Table 2.2 presents the regional distribution of FDI as a total share of FDI inflows to developing countries for Africa, Latin America and Asia.

Table 2.2: Regional Distribution of FDI.

	1970-1980	1980-1990	1990-2000	2000-2010
Africa	15.9	6.4	3.9	5.2
Nigeria	5.4	2.1	1.3	1.2
South Africa	1.6	0.1	0.7	1.1
Latin America	47.6	31.8	35.6	30
Argentina	2.2	2.8	5.8	1.9
Brazil	21.4	8.4	8.4	7.7
Mexico	7.6	11.6	7.2	8.1
Asia	29.3	43.3	56.2	55.4
China	0.0	7.9	7.6	12.5
Hong Kong	4.5	10.4	2.1	2.4
South Korea	1.8	1.6	2.0	3.6
Singapore	5.1	9.3	7.2	6.3

Note: FDI is measured as a share of total FDI inflows to developing countries.
Source: FDI data is from the UNCTAD database.

As shown in Table 2.2 Latin America was the biggest recipient of FDI among developing countries in the 1970s. This however changes from the 1980s as Asia overtakes Latin America. Africa on the other hand has attracted a miniscule share of FDI inflows into developing countries, averaging only a paltry 5.2 percent in the 2000s down from 15.9 percent in the 1970s. This is in spite of the fact that FDI inflows as a percentage of GDP increased from 0.09 in 1980 to 0.42 percent in 1990 and 1.94 percent in 2000 and 2.75 percent by 2010 (see Table 1.1). According to the 1999 UNCTAD Report on Foreign Direct Investment in Africa: Performance and Potential, FDI in Africa lags far behind the flows to other developing regions in part because of the generally negative image of the continent which tends to obfuscate the diverse opportunities that investors

can exploit. Moreover, growth in Africa has lagged behind other developing countries. The changes in the regional distribution of FDI over the years also reflects the rising dominance of the Asian economies notably China as economic powerhouses.

African countries that have been able to attract most FDI have been those with an abundance of natural and mineral resources as well as large domestic markets. Traditionally, foreign investors to Africa came from Europe and to a lesser extent from North America. Lately, investors from the BRICS, Malaysia, and South Korea have been increasingly engaged in African countries. Intra-Africa FDI is also increasing, led by South African company investments, particularly in Southern Africa. Nevertheless, many of these South African companies have significant foreign ownership.

Linkages between local and foreign firms in Africa have been very low (UNCTAD, 2013). The 2013 UNCTAD report highlights that the many generous incentives offered to foreign investors by many African governments have disadvantaged domestic firms and hence they have been detrimental to the growth of local enterprises and domestic entrepreneurship. Moreover, these incentives have not attracted FDI inflows into strategic and priority sectors of the African economies such as manufacturing and infrastructure development. While FDI has been on the increase, public and private investments remain inadequate. Fosu et al. (2012) find that growth in African countries has been hampered by public 'underinvestment' as actual public investment has remained below the level required to attain high growth.

2.3 Literature Review

At the theoretical level FDI has been shown to be beneficial to the host country. In the neoclassical growth model for instance, FDI promotes economic growth by augmenting the capital stock and enhancing its efficiency (Li and Liu, 2005). In the endogenous growth model, FDI raises economic growth by generating technological diffusion from the developed countries to the underdeveloped host country (Borensztein et al, 1998). Thus, FDI is often seen as a composite bundle of capital stock, knowledge and technology which can improve the existing stock of knowledge in the recipient economy through labor training, skill acquisition and diffusion, and the introduction of efficient management practices (Balasubramanyam et al, 1999 and De Mello, 1999).

Empirical literature on the impact of FDI on domestic investment is mixed. Some scholars argue that FDI complements (crowds in) domestic investment (Amighini et al, 2015; Farla et al, 2014; Al-Sadig, 2013; Ramirez, 2011; Ndikumana and Verick, 2008). On the other hand, some scholars contend that FDI crowds out domestic investment (Morrissey and Udomkerdmongkol, 2012; Mutenyo et al., 2010; Titarenko, 2006). Some studies view FDI as having a neutral effect on domestic investment (Chowdhary and Kushwaha, 2013; Sağlam and Yalta 2012; Lipsey, 2000). Studies by scholars such as Agosin and Machado (2005) and Wang (2010) find that FDI inflows have a neutral effect, crowding in effect or crowding out effect on domestic investment depending on the country. Furthermore, Agosin and Machado (2005) argue that FDI can influence the structure of the capital stock which, depending on the response by local investors, may lead to either a crowding in or crowding out effect.

The proponents of the crowding in effect argue that the entry of foreign firms creates new demand for inputs which can be provided by local firms as complements to those imported from the home countries (Cardoso and Dornbusch, 1989). De Mello (1999), highlights that competitive local firms may positively respond to FDI inflows by enhancing and updating their capital stock. Similarly, Hermes and Lensick (2003) argue that increased competition is likely to lead to increased productivity, efficiency and investment in both human and physical capital. Furthermore, the increase in competition may result in reduction in prices, changes in the industrial structure towards more competitiveness and export-oriented production.

However, FDI may also have negative effects on the host country. FDI can decrease domestic investment when it takes away investment opportunities of local investors through licenses, skilled labour, credit facilities, which may reflect the superiority of FDI over domestic investment (Markusen and Venables, 1999). Easterly (1993) observes that the generous incentives offered to foreign firms may distort incentives for domestic firms thereby discouraging investment by local firms. This effect is called, the 'adverse incentive effect.' Similarly, Colen et al (2008) highlight that offering tax and non-tax incentives to attract FDI inflows may create a distortion that negatively affects domestic investment thereby limiting the spillover effects. Gardiner (2000) argues that the 'monopolistic tendencies' of multinational enterprises (MNEs) may displace local

firms and that the larger the proportion of the economy of host countries controlled by these MNEs the greater the negative externalities. Herzer et al (2008) argue that the entry of MNEs may create unfair competition that displaces domestic firms.

Morrissey (2012) highlights the limited impact that FDI has had in African economies with respect to the creation of linkages and spillovers on the local economy. These limited effects are generally attributed to (i) limited 'absorptive capacity' of domestic firms; (ii) concentration of FDI inflows in the resource sector rather than in manufacturing; (iii) the presence of corruption and political instability, which limits the inflows of market-seeking and efficiency-seeking FDI. In turn, Amendolagine et al. (2013) examine the factors that affect linkages between foreign and local firms using firm-level data for 19 countries in SSA. They find that the lack of a vibrant domestic private sector, lack of adequate infrastructure and skilled labour, low absorptive capacity, and policy incoherence also contribute to weak linkages between local and foreign enterprises.

In a seminal paper that developed a theoretical model of FDI, Agosin and Machado (2005) analyse the extent to which FDI in developing countries crowds in or crowds out domestic investment. The study uses panel data for the period 1971–2000 based on 12 countries drawn from Africa, Asia and Latin America. The results show that, in all the three developing regions, FDI has, at best, left domestic investment unchanged, and that there are several sub-periods for specific regions where FDI crowds out domestic investment. In particular, there seems to be a clear crowding out of domestic investment in Latin America. Adams (2009) in an empirical examination of the impact of FDI and domestic investment on economic growth in 42 Sub-Saharan Africa for the period 1990-2003 also finds a net crowding out effect.

On the other hand, Elboiashi et al. (2009) examine the relationship between FDI inflows, domestic investment and economic growth in Egypt, Morocco and Tunisia during the period 1970–2006 using cointegration and causality tests. They find that FDI inflows had a short run negative effect and a long run positive effect on both domestic investment and economic growth. Additionally, they also find that there is a unidirectional causality between FDI inflows and economic growth in Egypt and Morocco and a bidirectional causality between FDI inflows and economic growth in Tunisia. FDI inflows crowded in domestic investment in the short run while FDI inflows crowded

out domestic investment in the long run. Similarly, Eregha (2012) investigates the relationship between FDI and domestic investment in the ECOWAS countries over the period 1970-2008 using panel error correction methodology. The results show that foreign direct investment crowds out domestic investment in the region during the sample period.

Some emerging literature has shown that the effect of FDI is determined by the local conditions existing in the host country (Hermes and Lensink 2003; Durham, 2004). Some of these local conditions (absorptive factors) include: the level of human capital (Lu and Liu 2005); the level of financial development (Durham, 2004; Alfaro et al, 2004); the level of institutional quality (Durham, 2004); the technological gap (De Mello, 1999); the level of economic development (Blomstrom et al, 1994) and trade openness (Makki and Somwaru, 2004). Massoud (2008) argues that the level of financial development is important because lack of financial market development may prevent foreign and domestic investors from accessing the requisite financial resources. Using panel data for Arab countries from 1975-2000 Sadik and Bolbol (2003) find that a certain threshold of financial market development must be reached to gain from FDI inflows.

Other studies for instance, Carkovic and Levine (2002), however argue that host country factors do not have a significant effect on the relationship between inward FDI and economic growth. Using the system GMM, they find that neither FDI nor the interaction terms are statistically significant. They note that previous studies that indicate that FDI has a positive effect on growth have to be viewed with caution because they do not adequately control for endogeneity.

However, while there is a lot of literature on FDI and growth in developing countries, surprisingly little has been published on the effect of FDI on domestic investment in African countries at the macro level (Adams, 2009; Al Sadig, 2013; Ashraf and Herzer, 2014; Mutenyo et al, 2010). More importantly, there are few studies that investigate the role of multiple host country factors on the relationship between FDI and domestic investment in African economies. Two such studies are by, Farla et al (2014) and Morrissey and Udomkerdmongkol (2012). Morrissey and Udomkerdmongkol (2012) use annual aggregate data for 46 developing countries covering the period 1996-2009 to investigate whether the relationship between FDI and private investment is affected by governance. Farla et al (2014) investigate the role of institutions on the relationship

between FDI and domestic investment using the same dataset as Morrissey and Udomkerdmongkol (2012). While results from such studies may be informative, it can be argued that they may be biased and not be representative enough of some countries because of the huge disparities in economic, social and political conditions between countries in the sample. The studies also only investigate the role of institutions and yet there are other host country factors that can affect the relationship between FDI and domestic investment.

This chapter therefore, investigates the role of a number of host country factors that may influence the nexus between FDI and domestic investment on African economies both individually and simultaneously. In particular, the chapter analyses how institutions, financial development and trade openness individually and simultaneously influence the impact of FDI on domestic investment in African economies. The focus on Africa with largely similar social, economic and political conditions helps to make the results more representative and reduce any bias due to sample selection (Adams, 2009).

2.4 Data and Model Specification

2.4.1 Data Description

We use annual data obtained from the World Bank World Development Indicators (WDI), the International Monetary Fund (IMF) World Economic Outlook database, the UNCTAD database and the Freedom House database for the period 1980 to 2012. We use a panel comprising 48 African countries. Table 2.3 below shows the list of countries included in our sample.

Table 2.3: List of Countries.

Algeria	Congo	Libya	Senegal
Angola	DRC	Madagascar	Seychelles
Benin	Egypt	Malawi	Sierra Leone
Botswana	Equatorial Guinea	Mali	South Africa
Burkina Faso	Ethiopia	Mauritania	Sudan
Burundi	Gabon	Mauritius	Swaziland
Cameroon	Gambia	Morocco	Tanzania
Cape Verde	Ghana	Mozambique	Togo
Central Africa Republic	Guinea	Namibia	Tunisia
Chad	Guinea-Bissau	Niger	Uganda
Cote d'Ivoire	Kenya	Nigeria	Zambia
Comoros	Lesotho	Rwanda	Zimbabwe

The choice of control variables is influenced by existing literature and importantly also the availability of data. The dependent variable is the measure of the ratio of domestic investment (DI) to gross domestic product (GDP) as a percentage. We subtract FDI inflows as a share of GDP from gross fixed capital formation (GFCF) so as to prevent double counting (Kumar and Pradhan, 2002; Nath, 2005). . In many developing countries domestic savings have been shown to play a key role in financing investment (Agenor, 2004). Hence, we use gross national savings as another control variable. We follow Roubini and Sala-i-Martin (1992) by incorporating inflation to control for macroeconomic instability and uncertainty. It is expected to have a negative effect on domestic investment.

We include the lagged GFCF/GDP to capture the fact that current investment decisions have a strong path dependence owing to depreciation and the structural dynamics in the economy (Agosin and Mayer, 2000; Kumar and Pradhan, 2002; Amighini et al, 2015). This is expected to encourage local investors to invest more since this may be a sign of a favorable investment climate (Al Sadig, 2013). Moreover, the lagged dependent variable helps to capture short run autoregressive behavior of the dependent variable (Adams, 2009). The lagged dependent variable also helps to control for the effect of potentially relevant, but omitted, variables and to control for serial correlation (Ashraf and Herzer, 2014). We use the growth rate in real GDP (RGDP) to capture the accelerator effect and it is expected to have a positive effect on domestic investment.

We use the degree of openness of the host country which is measured by the sum of exports and imports as a percentage of GDP. A high degree of trade openness is expected to lead to an increase in domestic investment. We follow Alfaro et al (2004) who use private credit as a share of gross domestic product (GDP) to measure financial development. This is expected to have a positive effect. The quality of institutions is proxied by an index of democracy from Freedom House. The index combines measures of political rights and civil liberties. The data ranges from one to seven. A rating of one implies "there are competitive parties or other political groupings, the opposition plays an important role and has actual power" and a rating of seven indicates that political rights are absent (Asiedu and Lien, 2010). We also include public investment as a percentage of GDP.

Emerging literature has shown that the impact of FDI on both economic growth and domestic investment is affected by local conditions in the host country. Some of these factors include: trade openness, the level of financial development and the level of institutional quality. The level of financial development is important because a lack of financial market development may prevent investors from accessing the financial resources required (Massoud 2008). Hermes and Lensink (2003) and Alfaro et al. (2004) argue that countries with a better financial system can exploit FDI more efficiently. They point out that a more developed financial system positively contributes to the process of technological diffusion associated with FDI inflows. Therefore, the quality of financial system may influence the impact of FDI on the diffusion of technology in the host country. The diffusion of technology is more efficient in host countries with a better financial system.

A number of scholars identify the importance of trade openness in enhancing or mitigating the effect of FDI on domestic investment and economic growth. Grossman and Helpman (1990) posit that an open trade regime is significantly related with good investment climates, technological externalities and learning effects. They emphasise that trade contributes to the diffusion of knowledge largely through the process of imitation of the knowledge capital embedded in the product. Balasubramanyam et al. (1999) and Makki and Somwaru (2004) find that the effect of FDI inflows on economic growth is dependent on the degree of openness. Edwards (1998) argues that a country with a greater degree of openness can absorb the new technology brought by FDI at a faster rate than a country with a lower degree of openness. Frankel and Romer (1999) also argue

that trade openness can help to facilitate more efficient production of goods and services through shifting production to economies that have comparative advantages. Adhikary (2011) argues that a more open trade policy framework promotes the allocative efficiency of investment by reorienting production factors to sectors that have comparative advantages in trade, thereby boosting economic growth.

Other scholars highlight the role of institutional quality. Olofsdotter (1998) argues that the ability to absorb the new technology provided by FDI inflows can be emphasised in countries with higher institutional quality. Similarly, Durham (2004) finds that FDI inflows are more beneficial in countries with higher levels of institutional (as measured by business regulation index and property rights index). Durham also finds that the host country that passes a minimum threshold of institution quality enjoys a positive impact of FDI on economic growth. Ayal and Karras (1998) examine the effect of institution quality measured by economic freedom index components on economic growth in 58 countries from 1975 to 1990 and find that economic freedom index has a positive impact on economic growth.

We therefore, include 3 interaction terms namely: FDICredit; FDIOpen and FDIFree to capture the impact of these host country factors on the FDI-domestic investment nexus. FDICredit is the interaction term between FDI and financial market development. FDIFree is the interaction term between FDI and institutions. FDIOpen is the interaction term between FDI and trade openness. The interaction terms capture the effect of host country factors. If the coefficient on the interaction term is significant, it implies that the effect of FDI on domestic investment depends on the level of absorptive capacity (Azman-Saini et al, 2010).

Table 2.4 presents the summary statistics for the variables used in the analysis. Domestic investment is on average around 17.52 percent of GDP in the 48 African countries with a minimum value of -12.4 percent in Angola in 2003 and a maximum value of 58.1 percent in the Republic of Congo in 1982. FDI averages 2.67 percent with a minimum value of -14.68 percent in Sierra Leone in 1986 and a maximum value of 90.46 in Equatorial Guinea in 1996. Gross national savings have a mean value of 15.83 percent with a minimum value of -107.36 in Cape Verde in 1980 with a maximum value of 97.02 in Sudan in 1982. RGDP averages 3.86 percent with a minimum value

of -62.08 percent in Libya in 2011 and a maximum value of 149.97 percent in in Equatorial Guinea in 1997. Inflation averages 23.71 percent over the period with huge variations ranging from -19.41 percent in Togo in 1989 to 23,773.1 percent in the DRC in 1994. Credit has an average value of 2.66 and ranges from -0.38 in Burundi in 1997 to 5.12 in South Africa in 2007 while debt averages -0.74 with a minimum value of -7.92 in Chad in 2011 and a maximum value of 4.01 in Cape Verde in 2012. Open averages 4.14 with a minimum value of 1.84 in Ghana in 1982 and a maximum value of 5.62 in Equatorial Guinea in 1998. Institutions (Free) have the lowest variation with a standard deviation of 0.49 and averages 1.5.

Table 2.4: Descriptive Statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
DI	1584	17.52	8.4	-12.4	58.1
FDI	1584	2.67	5.55	-14.68	90.46
Savings	1584	15.83	13.63	-107.36	97.02
RGDP	1584	3.86	7.75	-62.08	149.97
Inflation	1584	23.71	611.13	-19.41	23773.1
Credit*	1584	2.66	0.89	-0.38	5.12
Debt*	1584	-0.74	1.28	-7.92	4.01
Open*	1584	4.14	0.5	1.84	5.62
Free*	1584	1.5	0.49	0	1.94
FDIFree	1584	3.91	9.65	-23.63	176.02
FDIOpen	1584	12.06	27.59	-48.35	495
FDICredit	1584	6.63	12.33	-24.8	139.51

*This variable is included as ln (variable).
Source: the author calculations.

Table 2.5 presents the pair-wise correlation among the variables. The correlation matrix provides a crude expectation of the relationship between these variables. There is a negative and statistically significant relationship between domestic investment and FDI at the one percent level of significance. This preliminary result indicates that FDI has a crowding out effect on domestic investment. Domestic investment has a strong positive correlation with Savings, RGDP, Credit, and Open. While Inflation, Free, FDIFree, FDIOpen and FDICredit have a negative and statistically significant relationship with domestic investment.

Table 2.5: Pair-wise Correlation Matrix.

	DI	FDI	Savings	RGDP	Inflation	Credit
DI	1					
FDI	-0.1***	1				
Savings	0.35***	0.04*	1			
RGDP	0.07***	0.27***	0.15***	1		
Inflation	-0.04	-0.02	-0.03	-0.04*	1	
Credit	0.28***	-0.09***	0.16***	-0.08***	-0.11***	1
Debt	0.01	-0.09***	-0.1***	-0.11***	0.04	-0.07***
Open	0.24***	0.37***	0.3***	0.14***	-0.03	0.24***
Free	-0.1***	-0.04	-0.08***	-0.06***	0.03	-0.25***
FDIFree	-0.1***	0.96***	0.03	0.27***	-0.01	-0.14***
FDIOpen	-0.08***	0.99***	0.05*	0.27***	-0.02	-0.09***
FDICredit	-0.06***	0.91***	0.07***	0.19***	-0.02	0.09***
	Debt	Open	Free	FDIFree	FDIOpen	FDICredit
Debt	1					
Open	-0.02	1				
Free	0.05**	-0.22***	1			
FDIFree	-0.09**	0.32***	0.12***	1		
FDIOpen	-0.08**	0.38***	-0.03	0.97***	1	
FDICredit	-0.08**	0.38***	-0.14***	0.81***	0.89***	1

Notes: *, **, and *** indicate statistical significance at 10%, 5% and 1% levels, respectively.
Source: the author's calculations.

2.4.2 Model Specification

The theoretical model used in this study is a 'partial adjustment' model adapted from Agosin and Machado (2005). Domestic investment in the economy is the sum of the investment undertaken by the domestic firms and the investment undertaken by multinational companies (MNCs). This can be represented as follows:

$$DI_{it} = I_{d,it} + I_{f,it} \quad (2.1)$$

$I_{d,it}$ is assumed to be a stock adjustment model that responds to the difference between the desired capital stock (K*) and the actual capital stock (K). Domestic investment is assumed to adjust partially to this difference owing to the fact that domestic firms face liquidity constraints.

Following Azman-Saini et al (2010), we model the impact of FDI on domestic investment and the conditional role of absorptive country factors (ABC) as follows:

$$DI_{it} = \alpha DI_{it-1} + \beta_1 FDI_{it} + \beta_2 (FDI_{it} * ABC_{it}) + \beta_3 X_{it} + \eta_i + \varepsilon_{it} \quad (2.2)$$

where i is the home country index, t is the time index, α and β are the unknown parameters to be estimated, ABC_{it} is the absorptive capacity (host country factor) in home country, X_{it} is a vector of control variables that affect domestic investment, η_i is unobserved country-specific effect term, and ε_{it} is the error term. $(FDI_{it} * ABC_{it})$ is the interaction term. The interaction term captures the effect of the local conditions. We include the interaction terms FDI*Credit to test the role of financial market development; (FDI*Open), to test the role of trade openness; and FDI*Free to test the role of institutions.

If the coefficient on FDI (β_1) is positive and significant ($\beta_1 > 0$) then it means an increase in FDI leads to crowding in of domestic investment and if the estimated coefficient on FDI is negative and significant ($\beta_1 < 0$) then it means an increase in FDI is associated with a decrease in the country's domestic investment or a crowding out effect. If the coefficients of the interaction terms are positive and significant, then it is interpreted that FDI positively affects domestic investment through either interactions with trade openness, financial market development or institutions.

2.5 Estimation and Results

2.5.1 Methodology

This chapter applies the dynamic ordinary least squares (OLS), fixed effects (FE), random effects (RE), and the system GMM methodologies. We estimate a linear dynamic panel data (DPD) model to capture the effect of lagged domestic investment on current domestic investment. Hsiao (1986) argues that a dynamic panel model allows dynamic effects to be introduced into the model and allows feedback from current or past disturbances. Thus, by including lagged domestic investment this helps to account for the dynamic process of domestic investment. The lagged dependent variable also helps to control for the effect of potentially relevant, but omitted, variables and to deal with the problem of serial correlation (Ashraf et al, 2014).

The system GMM estimator enables us to control for the unobserved country-specific factors. FDI inflows are likely to be endogenous and determined jointly with the rate of domestic investment. That is, there is a two-way relationship between domestic investment and FDI flows. The system GMM estimator helps to solve the endogeneity problem by using internal instrumental variables based on lagged values of the dependent and independent variables. In this case, the instruments for the regression in differences are lagged levels while those for the regression in levels are the lagged differences of the corresponding variables.

Following Arellano and Bond (1991), we transform equation (2.2) into first differences to eliminate country specific effects as follows:

$$DI_{it} - DI_{it-1} = \alpha(DI_{it-1} - DI_{it-2}) + \beta_1(FDI_{it} - FDI_{it-1}) + \beta_2(FDI_{it} * ABC_{it} - FDI_{it-1} * ABC_{it-1}) + \beta_3(X_{it} - X_{it-1}) + (\varepsilon_{it} - \varepsilon_{it-1}) \quad (2.3)$$

To address the possible simultaneity bias of explanatory variables and the correlation between $(DI_{it-1} - DI_{it-2})$ and $(\varepsilon_{it} - \varepsilon_{it-1})$ we use the lagged levels of the regressors as instruments in line with Arellano and Bond (1991). However, this is only valid assuming that: the error term is not serially correlated and that the lag of the explanatory variables is weakly exogenous. This is known as difference GMM estimation and results in the following moment conditions being established:

$$\mathrm{E}[DI_{it-s} \cdot (\varepsilon_{it} - \varepsilon_{it-1})] = 0 \; for \; s \geq 2; t = 3, \dots, T \quad (2.4)$$

$$\mathrm{E}[FDI_{it-s} \cdot (\varepsilon_{it} - \varepsilon_{it-1})] = 0 \; for \; s \geq 2; t = 3, \dots, T \quad (2.5)$$

$$\mathrm{E}[ABCI_{it-s} \cdot (\varepsilon_{it} - \varepsilon_{it-1})] = 0 \; for \; s \geq 2; t = 3, \dots, T \quad (2.6)$$

$$\mathrm{E}[X_{it-s} \cdot (\varepsilon_{it} - \varepsilon_{it-1})] = 0 \; for \; s \geq 2; t = 3, \dots, T \quad (2.7)$$

The difference GMM estimation however has some problems. Alonso-Borrego and Arellano (1999) and Blundell and Bond (1998) show that when the explanatory variables are persistent the

lagged levels of the variables become weak instruments. This results in biased parameter estimates in small samples and larger variance asymptotically (Blundell and Bond, 1998). To eliminate this problem Arellano and Bover (1995) propose the system GMM which combines both the difference equation (2.3) and the level equation (2.2). Additional moment conditions for the second part of the system (the regression in levels) are established as follows:

$$\mathrm{E}[(DI_{it-s} - DI_{it-s-1}) \cdot (\eta_i + \varepsilon_{it})] = 0 \; for \; s = 1 \tag{2.8}$$

$$\mathrm{E}[(FDI_{it-s} - FDI_{it-s-1}) \cdot (\eta_i + \varepsilon_{it})] = 0 \; for \; s = 1 \tag{2.9}$$

$$\mathrm{E}[(ABC_{it-s} - ABC_{it-s-1}) \cdot (\eta_i + \varepsilon_{it})] = 0 \; for \; s = 1 \tag{2.10}$$

$$\mathrm{E}[(X_{it-s} - X_{it-s-1}) \cdot (\eta_i + \varepsilon_{it})] = 0 \; for \; s = 1 \tag{2.11}$$

2.5.2 Results

We first carry out panel unit root tests in order to determine if the variables are stationary or not. This is an important step which has however been ignored by past researchers. Since panel data methodology uses both time and cross sectional analyses it is imperative that the variables should be stationary in order to avoid possible spurious relationships among the variables (Bayar, 2014). We use the Levin, Lin and Chu (2002) and the Im, Pesaran and Shin (2003) unit root tests to test for the presence of a unit root in the panel. As shown in Table 2.6 all the variables are stationary.

Table 2.6: Panel Unit Root Tests.

	DI	FDI	Savings	RGDP	Inflation	Credit
IPS W-stat						
Levels	-2.67***	-2.48***	-9.27***	-16.46***	-13.51***	0.57
[P-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.71]
Differences	-24.66***	-27.81***	-29.72***	-37.28***	-32.69***	-17.58***
[P-values]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
LLC t*-stat						
Levels	-3.03***	-2.29***	-10.87***	-12.5***	-8.61***	-1.11*
[P-value]	[0.00]	[0.01]	[0.00]	[0.00]	[0.00]	[0.09]
Differences	-19.89***	-21.37***	-28.53***	-28.17***	-27.04***	-15.22***
[P-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
	Debt	Open	Free	FDIFree	FDIOpen	FDICredit
IPS W-stat						
Levels	3.78	-2.36***	-2.59***	-3.56***	-2.12***	-1.62**
[P-value]	[0.99]	[0.00]	[0.00]	[0.00]	[0.01]	[0.05]
Differences	-13.96***	-23.67***	-22.41***	-27.67***	-27.66***	-26.98***
[P-values]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
LLC t*-stat						
Levels	3.12*	-3.65***	-3.69***	-2.7***	-1.82**	-0.89
[P-value]	[0.09]	[0.00]	[0.00]	[0.00]	[0.03]	[0.10]
Differences	-11.92***	-21.31***	-18.85***	-21.2***	-21.13***	-19.61***
[P-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]

Notes: *, **, and *** indicate statistical significance at 10%, 5% and 1% levels, respectively. P-values are in square brackets.
Source: the author's calculations.

The estimation results for the whole sample are summarised and presented in Tables 2.7-2.11. The variables of interest are FDI and the interaction terms (FDICredit, FDIOpen and FDIFree). Firstly, we determine whether FDI has any effect on domestic investment without conditioning on the absorptive capacity. Importantly, the results in all the Tables show that FDI has a negative and mostly significant effect on domestic investment. In other words FDI has a crowding out effect on domestic investment.

The results from the dynamic ordinary least squares estimation are presented in Table 2.7. We carry out a Hausman test to determine the appropriateness of the fixed effects and random effects models. The results are not reported but show that the fixed effects is the more appropriate model

since the p-value is less than 5 percent. We however report results from both models to check for robustness. Table 2.8 presents the results of the fixed effects estimation and Table 2.9 shows the results of the random effects estimation. Table 2.10 presents the results from the one step system GMM and Table 2.11 shows the results from the two step system GMM.

As shown in Table 2.7, a one percent increase in FDI is associated with a decrease in domestic investment ranging from 0.14-0.63 percent in the current period. Likewise, in Table 2.8 we see that a one percent increase in FDI is associated with a decrease in domestic investment of between 0.09-0.65. In Table 2.9 we observe that a one percent increase in FDI is associated with a decrease in domestic investment of between 0.06-0.63 while the decrease is between 0.31-2.44 percent in Table 2.10 and 0.35-2.00 percent in Table 2.11. This therefore confirms that there is a crowding out effect of FDI on domestic investment. The results are in line with those by Adams (2009) who finds that a one percent increase in FDI is associated with a decrease in domestic investment of 0.51-0.82 percent in the current period. The results are also in line with Braunstein and Epstein (2002), Kumar and Pradhan (2002), Fedderke and Romm (2006), Titarenko (2006), Udomkerdmongkol and Morrissey (2008) who also report a crowding out effect.

The results from the dynamic OLS estimation presented in Table 2.7 show that the lagged domestic investment, savings, RGDP, credit and open all have a positive and significant effect on domestic investment in all the columns as expected. Inflation has the expected negative sign but is not significant. Debt has the expected sign only in column 5. It is however not significant in any one of the columns. This is in line with Udomkerdmongkol et al (2006) whose findings suggest that external debt has no impact on domestic investment. The results also show that current domestic investment is a function of past domestic investment reflecting a high inertia in domestic investment. Columns 3, 4 and 5 report the results after adding each of the three interaction terms separately while columns 6 and 7 report the results after adding all interaction terms simultaneously. The interaction terms between FDI and Free (column 3) and FDI and Open (column 5) have a positive and significant coefficient while the coefficient on FDI and Credit has a negative but insignificant coefficient. This implies that African countries have to attain a certain threshold in terms of trade openness and institutional quality for FDI to have a positive effect on

domestic investment. However, when considered simultaneously in columns 6 and 7 none of the interaction terms has any significant impact.

The OLS has a number of problems and hence estimates may not be consistent so we also consider results from the fixed effects, random effects and the system GMM. Table 2.8 presents the fixed effects estimation results. FDI has a negative and significant effect on domestic investment in all the models, which confirms the crowding out effect. Lagged domestic investment, savings, RGDP, credit and open have a positive and significant effect on domestic investment as expected. Free is positive and significant only in column 1 while inflation and debt have a generally negative but not significant effect on domestic investment. The interaction terms: FDI and Free (FDIFree); and FDI and Open (FDIOpen) have a positive and significant effect on FDI when considered separately as shown columns 3-5. However, when considered simultaneously only the interaction term FDIFree has a positive and significant effect on domestic investment as reported in columns 6 and 7. This confirms the role of institutional quality in mitigating the negative effect of FDI on domestic investment. The results from the random effects estimation reported in Table 2.9 confirm the results of the fixed effects estimation presented in Table 2.8. However, as shown in Table 2.9 none of the interaction terms have any significant effect on domestic investment when considered simultaneously.

Table 2.10 and Table 2.11 present the results of the estimation using the one step and two step system GMM estimation methods respectively. In both Table 2.10 and Table 2.11, FDI is shown to have a negative and significant effect on domestic investment which confirms the crowding out effect. In Table 2.10 lagged domestic investment, savings, credit, open and free have a positive and significant effect on domestic investment. Inflation has a negative but insignificant effect while both RGDP and debt have a positive but insignificant effect on domestic investment. The interaction terms FDIFree and FDIOpen both have a positive and significant effect on domestic investment while the interaction term FDICredit has a negative and significant effect on domestic investment as shown in columns 3, 4 and 5. However, when considered simultaneously (columns 6 and 7) the interaction terms FDIFree and FDIOpen have a positive and significant effect on domestic investment. This implies that institutions and trade openness play a positive role in mitigating the crowding out effect of FDI on domestic investment in Africa.

The results of the two step system GMM estimation method which are reported in Table 2.11 confirm the crowding out effect of FDI on domestic investment. This is shown by the negative and significant coefficient on FDI in columns 1, 2, 4 and 5. Lagged domestic investment, savings, RGDP, credit, open and free all have a positive and significant effect on domestic investment while inflation has a negative and significant effect on domestic investment. The interaction terms between FDIFree and FDIOpen have a positive and significant effect. This confirms the positive effect of institutions and trade openness in mitigating the deleterious effect of FDI on domestic investment. Durham (2004) stresses the role of institutional development for the capacity of host countries to absorb superior technologies. Balasubramanyam et al. (1999) find that FDI is more significant for economic growth in countries with more open trade regimes.

Table 2.7: Dynamic OLS Model Estimation Results (Dependent Variable: Domestic Investment/GDP, 1980-2012).

Independent Variables	1	2	3	4	5	6	7
lagged DI	0.77***	0.77***	0.77***	0.77***	0.77***	0.77***	0.77***
	[50.26]	[49.44]	[50.26]	[50.13]	[50.19]	[50.13]	[49.41]
FDI	-0.14***	-0.14***	-0.35***	-0.06	-0.59***	-0.6**	-0.63**
	[-5.88]	[-5.67]	[-3.52]	[-1.01]	[-2.90]	[-2.29]	[-2.34]
Savings	0.05***	0.05***	0.05***	0.05***	0.05***	0.05***	0.05***
	[5.05]	[5.18]	[5.11]	[5.13]	[5.08]	[5.11]	[5.19]
RGDP	0.05***	0.06***	0.05***	0.05***	0.05***	0.05***	0.06***
	[3.44]	[3.78]	[3.24]	[3.20]	[3.21]	[3.11]	[3.44]
Inflation	-0.002	-0.001	-0.0002	-0.0002	-0.004	-0.0003	-0.001
	[-0.15]	[-0.54]	[-0.12]	[-0.10]	[-0.19]	[-0.16]	[-0.53]
Credit	0.3**	0.25*	0.33*	0.39**	0.31**	0.33**	0.27*
	[2.06]	[1.72]	[2.23]	[2.48]	[2.10]	[2.04]	[1.66]
Debt	0.006	0.05	0.01	0.01	-0.009	0.001	0.06
	[0.06]	[0.54]	[0.14]	[0.13]	[-0.10]	[0.01]	[0.64]
Open	1.16***	1.14***	1.14***	1.15***	1.07***	1.08***	1.03***
	[4.18]	[4.06]	[4.12]	[4.12]	[3.80]	[3.85]	[3.63]
Free	0.15	0.10	-0.22	0.09	0.09	-0.15	-0.20
	[0.61]	[0.39]	[-0.73]	[0.34]	[0.35]	[-0.49]	[-0.62]
FDIFree			0.12**			0.08	0.07
			[2.16]			[1.16]	[1.22]
FDICredit				-0.04		-0.003	-0.005
				[-1.51]		[-0.09]	[-0.02]
FDIOpen					0.09**	0.07	0.09
					[2.22]	[1.46]	[1.50]
Constant	-2.36*	-1.15	-1.70	-2.36	-1.76	-1.49	-0.19
	[-1.93]	[-0.80]	[-1.35]	[-1.94]	[-1.42]	[-1.15]	[-0.13]
Time dummies	No	Yes	No	No	No	No	Yes
No. of obs.	1583	1583	1583	1583	1583	1583	1583
F test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
R-squared	69.41	69.63	69.67	69.43	69.48	69.48	69.7
Mean VIF	1.18	1.82	5.45	2.49	19.66	27.25	9.42

Notes: Multicollinearity has been tested by the creation of Variance Inflation Factors (VIF).
*, **, and *** indicate statistical significance at 10 percent, 5 percent and 1 percent levels, respectively.

Table 2.8: Fixed Effects Model Estimation Results (Dependent Variable: Domestic Investment/GDP, 1980-2012).

Independent Variables	1	2	3	4	5	6	7
lagged DI	0.65***	0.64***	0.64***	0.65***	0.65***	0.64***	0.64***
	[36.01]	[35.11]	[35.83]	[35.87]	[36.05]	[35.78]	[34.87]
FDI	-0.2***	-0.2***	-0.56***	-0.09	-0.59***	-0.65**	-0.59**
	[-8.02]	[7.56]	[-5.10]	[-1.50]	[-2.80]	[-2.44]	[-2.13]
Savings	0.03***	0.03***	0.03***	0.03***	0.03**	0.03***	0.04***
	[2.74]	[3.05]	[2.88]	[2.91]	[2.85]	[2.91]	[3.15]
RGDP	0.04**	0.04***	0.04***	0.03**	0.04	0.03**	0.04**
	[2.36]	[2.69]	[2.24]	[2.15]	[2.20]	[2.17]	[2.55]
Inflation	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001	-0.001	-0.001
	[-0.34]	[-0.71]	[-0.27]	[-0.26]	[-0.34]	[-0.27]	[-0.63]
Credit	0.59**	0.46	0.76***	0.78**	0.62**	0.77***	0.60**
	[2.45]	[1.87]	[2.50]	[2.99]	[2.57]	[2.95]	[2.26]
Debt	-0.01	0.12	-0.04	-0.03	-0.06	-0.06	0.15
	[-0.07]	[0.54]	[-0.22]	[-0.15]	[-0.34]	[-0.30]	[0.69]
Open	2.92***	3.00***	2.91***	2.87***	2.89	2.89***	2.88***
	[6.46]	[6.17]	[6.45]	[6.34]	[6.39]	[6.39]	[5.89]
Free	0.6*	0.42	-0.006	0.52	0.54	0.03	-0.13
	[1.69]	[1.08]	[-0.02]	[1.44]	[1.51]	[0.61]	[-0.30]
FDIFree			0.21***			0.19**	0.19**
			[3.07]			[2.47]	[2.45]
FDICredit				-0.05*		-0.004	-0.001
				[-1.89]		[-0.14]	[-0.02]
FDIOpen					0.08*	0.03	0.01
					[1.85]	[0.61]	[0.29]
Constant	-8.49***	-7.18***	-7.80***	-8.58	-8.30	-7.81***	-6.07***
	[-4.17]	[-3.11]	[-3.82]	[-4.22]	[-4.08]	[-3.81]	[-2.60]
Time dummies	No	Yes	No	No	No	No	Yes
No. of obs.	1583	1583	1583	1583	1583	1583	1583
No. of groups	48	48	48	48	48	48	48
F test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
R-squared	68.1	68.87	67.94	68.09	68.12	67.96	68.88

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively.

Table 2.9: Random Effects Model Estimation Results (Dependent Variable: Domestic Investment/GDP, 1980-2012).

Independent Variables	1	2	3	4	5	6	7
lagged DI	0.77***	0.77***	0.77***	0.77***	0.77***	0.77***	0.77
	[50.26]	[49.44]	[50.26]	[50.13]	[50.19]	[50.13]	[49.41]
FDI	-0.14***	-0.14***	-0.35***	-0.06	-0.59***	-0.60***	-0.63
	[-5.88]	[-5.67]	[-3.52]	[-1.01]	[-2.90]	[-2.29]	[-2.34]
Savings	0.05***	0.05***	0.05***	0.05***	0.05***	0.05***	0.05
	[5.05]	[5.18]	[5.11]	[5.13]	[5.08]	[5.11]	[5.19]
RGDP	0.05***	0.06***	0.05***	0.05***	0.05***	0.05***	0.06
	[3.44]	[3.78]	[3.24]	[3.20]	[3.21]	[3.11]	[3.44]
Inflation	-0.0002	-0.0001	-0.0002	-0.0001	-0.003	-0.0003	-0.001
	[-0.15]	[-0.54]	[-0.12]	[-0.10]	[-0.57]	[-0.16]**	[-0.53]
Credit	0.3**	0.25*	0.33**	0.39**	0.31**	0.33**	0.27
	[2.06]	[1.72]	[1.84]	[2.48]	[2.10]	[2.04]	[1.66]
Debt	0.006	0.05	0.01	0.01	-0.008	0.001	0.06
	[0.06]	[0.54]	[0.14]	[0.13]	[-0.10]	[0.01]	[0.64]
Open	1.16***	1.14***	1.14***	1.15***	1.07***	1.08***	1.03
	[4.18]	[4.06]	[4.12]	[4.12]	[3.80]	[3.85]	[3.63]
Free	0.15	0.1	-0.22	0.09	0.09	-0.15	-0.2
	[0.61]	[0.39]	[-0.73]	[0.34]	[0.35]	[-0.49]	[-0.62]
FDIFree			0.12**			0.08	0.09
			[2.16]			[1.16]	[1.22]
FDICredit				-0.04		-0.002	-0.005
				[-1.51]		[-0.09]	[-0.02]
FDIOpen					0.09**	0.07	0.07
					[2.22]	[1.46]	[1.50]
Constant	-2.36*	-1.15	-1.70	-2.36*	-1.77	-1.49	-0.19
	[-1.93]	[-0.80]	[-1.35]	[-1.94]	[-0.39]	[1.15]	[-0.13]
Time dummies	No	Yes	No	No	No	No	Yes
No. of obs.	1583	1583	1583	1583	1583	1583	1583
No. of groups	48	48	48	48	48	48	48
F test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
R-squared	69.58	70.42	69.67	69.62	69.67	69.71	70.55

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively.

Table 2.10: One step System GMM Model Estimation Results (Dependent Variable: Domestic Investment/GDP, 1980-2012).

Independent Variables	1	2	3	4	5
lagged DI	0.17***	0.18***	0.18***	0.18***	0.18***
	[7.30]	[7.63]	[7.50]	[7.66]	[7.76]
FDI	-0.31***	-1.38***	0.02	-2.35***	-2.44***
	[-9.84]	[-10.27]	[0.24]	[-9.70]	[-7.91]
Savings	0.07***	0.08***	0.08***	0.08***	0.09***
	[4.00]	[4.65]	[4.34]	[4.88]	[5.02]
RGDP	0.009	0.02	0.01	0.01	0.02
	[0.59]	[1.06]	[0.61]	[0.81]	[1.06]
Inflation	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
	[-0.49]	[-0.50]	[-0.46]	[-0.46]	[-0.48]
Credit	1.43***	1.53***	2.02***	1.47***	1.46***
	[3.13]	[3.44]	[4.29]	[3.31]	[3.17]
Debt	1.24	1.05	1.22	1.13	1.04
	[4.78]	[4.14]	[4.74]	[4.50]	[4.16]
Open	2.73***	3.01***	2.87***	2.3***	2.61***
	[3.71]	[4.20]	[3.92]	[3.22]	[3.64]
Free	4.59***	3.05***	4.2***	4.03***	3.27***
	[7.32]	[4.79]	[6.68]***	[6.60]	[5.18]
FDIFree		0.63***			0.40***
		[8.16]			[4.07]
FDICredit			-0.16***		0.01
			[-4.57]		[0.37]
FDIOpen				0.41***	0.29***
				[8.47]	[4.99]
Constant	-4.95	-4.41	-6.5**	-2.48	-2.79
	[-1.51]	[-1.38]	[-1.98]	[-0.78]	[-0.87]
No. of obs.	1488	1488	1488	1488	1488
No. of groups	48	48	48	48	48
No. of instruments	71	72	72	72	74
Sargan p-value	0.00	0.00	0.00	0.00	0.00

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively.

Table 2.11: Two step System GMM Model Estimation Results (Dependent Variable: Domestic Investment/GDP, 1980-2012).

Independent Variables	1	2	3	4	5
lagged DI	0.14***	0.14***	0.15***	0.16***	0.15***
	[6.40]	[6.74]	[6.96]	[8.29]	[6.82]
FDI	-0.35***	-1.36***	0.05	-1.96***	-2.00***
	[12.47]	[-7.31]	[0.85]	[-3.46]	[-2.82]
Savings	0.06***	0.07***	0.07***	0.06***	0.07***
	[7.34]	[5.66]	[6.24]	[5.10]	[5.27]
RGDP	0.02***	0.02***	0.01*	0.02***	0.02***
	[2.42]	[3.76]	[1.73]	[2.77]	[3.44]
Inflation	-0.0001*	-0.001***	-0.0001**	-0.0001***	-0.001*
	[1.91]	[-3.00]	[-2.48]	[-2.92]	[-1.79]
Credit	3.06***	3.09***	3.21***	2.65***	2.30***
	[3.87]	[2.82]	[3.54]	[3.70]	[2.80]
Debt	1.2	0.63	0.98	0.64	0.61
	[5.26]	[2.51]	[3.19]	[2.15]	[1.55]
Open	4.14***	4.18***	4.12***	2.93**	2.23
	[3.44]	[3.82]	[3.13]	[2.29]	[1.51]
Free	3.58***	1.56*	3.09***	2.95***	3.38***
	[5.10]	[1.94]	[4.09]	[3.77]	[3.57]
FDIFree		0.61***			0.29***
		[5.93]			[3.12]
FDICredit			-0.2***		-0.06
			[-8.13]		[-0.89]
FDIOpen				0.33***	0.26***
				[3.07]	[2.68]
Constant	-12.68***	-9.81*	-12.69**	-6.02	-3.26
	[2.74]	[-1.84]	[-2.09]	[1.08]	[-0.48]
No. of obs.	1488	1488	1488	1488	1488
No. of groups	48	48	48	48	48
No. of instruments	71	72	72	72	74
Sargan p-value	0.98	0.98	0.98	0.99	0.99
AR(1) p-value	0.00	0.00	0.00	0.00	0.00
AR(1) p-value	0.02	0.02	0.01	0.02	0.06

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively.

Overall, the results show that FDI has a crowding effect on domestic investment and that institutions and trade openness do mitigate the substitutionary impact of FDI on domestic investment.

2.6 Robustness Checks

We identify the natural resource rich countries in the sample. We follow Collier and O'Connell (2006) who classify a country as resource rich if primary commodity rents exceed 10 percent of GDP. We run regressions on this natural resource rich sub sample using the fixed effects, random effects and the system GMM regressions. Table 2.12 below shows the list of the natural resource intense countries.

Table 2.12: List of natural resource intense countries.

Algeria	Congo	Libya	South Africa
Angola	DRC	Morocco	Sudan
Botswana	Egypt	Mozambique	Zambia
Cameroon	Equatorial Guinea	Nigeria	
Cape Verde	Gabon	Senegal	
Cote d'Ivoire	Ghana	Sierra Leone	

The results are shown in Tables 2.13-2.16. The results in all the Tables confirm that FDI has a crowding out effect on domestic investment. This confirms the results from the whole sample. Table 2.13 shows that a one percent increase in FDI is associated with a decrease in domestic investment of between 0.08-1.40 percent in the current period. In Table 2.14 it is shown that a one percent increase in FDI is associated with a decrease in domestic investment of between 0.20-1.48. Similarly, Table 2.15 shows that a one percent increase in FDI is associated with a decrease in domestic investment of between 0.29-2.93 while the decrease is between 0.45-1.58 percent as shown in Table 2.16. These results are in line with the results for the whole sample reported in Tables 2.7-2.11. Adams (2009) also finds that a one percent increase in FDI is associated with a decrease in domestic investment of about 0.51-0.82 percent in the current period.

The results of the Hausman test which are not reported confirm that the fixed effects method is better than the random effects method. We however report results from both methods. Table 2.13 presents the fixed effects estimation results. FDI has a negative and significant effect on domestic investment in all the models which confirms the crowding out effect. Lagged domestic investment and open have a positive and significant effect on domestic investment. Savings and Free have a positive and significant effect on domestic investment only in column 1. The rest of the variables are not significant. The interaction terms FDIFree and FDIOpen have positive coefficients and are also significant while FDICredit is significant but has a negative effect when considered separately in columns 3, 4 and 5. However, when considered simultaneously only the interaction term FDIOpen has a positive and significant effect on domestic investment as reported in columns 6 and 7. This confirms the role of trade openness in mitigating the negative effect of FDI on domestic investment. The results from the random effects estimation reported in Table 2.14 confirm the results of the fixed effects estimation in Table 2.13.

Tables 2.15 and Table 2.16 report the results of the estimation using the one step and two step system GMM estimation methods respectively. Tables 2.15 shows that FDI has a negative and significant effect on domestic investment as shown in the columns 1, 2, 4 5 while in Table 2.16 FDI has a negative and significant effect on domestic investment only in columns 1 and 2. This confirms the crowding out effect of FDI. In Table 2.15 lagged domestic investment, savings, credit, open and free have a positive and significant effect on domestic investment. The interaction terms, FDIFree and FDIOpen both have a positive and significant effect on domestic investment while the interaction term FDICredit has a negative and significant effect on domestic investment. This implies that institutional quality and trade openness play a positive role in mitigating the crowding out effect of FDI on domestic investment.

The results of the two step system GMM estimation method reported in Table 2.16 support the crowding out effect of FDI on domestic investment only in columns 1 and 2. This is shown by the negative and significant coefficient on FDI. The rest of the variables are not significant.

Table 2.13: Fixed Effects Model Estimation Results (Dependent Variable: Domestic Investment/GDP, 1980-2012) Resource Intense Countries.

Independent Variables	1	2	3	4	5	6	7
lagged DI	0.64***	0.63***	0.63***	0.63***	0.63***	0.63***	0.62***
	[23.07]	[22.21]	[22.90]	[22.73]	[23.16]	[22.86]	[21.99]
FDI	-0.27***	-0.27***	-0.75***	-0.08	-1.40***	-1.28***	-1.30***
	[-7.37]	[-7.26]	[-4.90]	[-0.89]	[-4.73]	[-3.35]	[-3.24]
Savings	0.001*	0.01	0.002	0.004	0.004	0.005	0.01
	[0.07]	[0.83]	[0.15]	[0.25]	[0.29]	[0.32]	[0.98]
RGDP	0.01	0.02	0.01	0.009	0.006	0.006	0.01
	[0.70]	[0.74]	[0.64]	[0.45]	[0.28]	[0.30]	[0.42]
Inflation	-0.0001	-0.0001	-0.0001	-0.0001	-0.001	-0.0001	-0.001
	[-0.51]	[-0.71]	[-0.44]	[-0.38]	[-0.54]	[-0.47]	[-0.65]
Credit	0.47	0.39	0.67*	0.93**	0.53	0.72*	0.64
	[1.25]	[0.98]	[1.76]	[2.27]	[1.43]	[1.70]	[1.45]
Debt	0.07	0.33	0.02	0.06	-0.03	-0.03	0.47
	[0.26]	[0.85]	[0.07]	[0.21]	[-0.12]	[-0.12]	[1.23]
Open	3.48***	3.72***	3.56***	3.51***	3.61***	3.62***	3.54***
	[5.12]	[4.97]	[4.88]	[4.90]	[5.37]	[5.38]	[4.77]
Free	1.1*	1.02	0.10	0.96	0.82	0.39	0.38
	[1.86]	[1.63]	[0.07]	[1.62]	[1.39]	[0.58]	[0.54]
FDIFree			0.27***			0.13	0.15
			[3.23]			[1.27]	[1.41]
FDICredit				-0.11**		-0.02	-0.02
				[-2.54]		[-0.50]	[-0.41]
FDIOpen					0.22***	0.16**	0.16**
					[3.85]	[2.34]	[2.16]
Constant	-9.67***	-7.73**	-8.69****	-10.61***	-6.61***	-9.37**	-6.18*
	[-3.08]	[-2.19]	[-2.77]	[-3.37]	[-3.09]	[-2.95]	[-1.72]
Time dummies	No	Yes	No	No	No	No	Yes
No. of obs.	659	659	659	659	659	659	659
No. of groups	20	20	20	20	20	20	20
F test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
R-squared	71.09	72.09	71.34	70.96	71.90	71.75	72.41

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively.

Table 2.14: Random Effects Model Estimation Results (Dependent Variable: Domestic Investment/GDP, 1980-2012) Resource Intense Countries.

Independent Variables	1	2	3	4	5	6	7
lagged DI	0.77***	0.76***	0.77***	0.77***	0.76***	0.76***	0.76***
	[33.30]	[32.04]	[33.33]	[33.22]	[33.03]	[33.00]	[32.07]
FDI	-0.20***	-0.20***	-0.54***	-0.10	-1.34***	-1.48***	-1.41***
	[-5.85]	[-5.56]	[-3.71]	[-1.20]	[-4.59]	[-3.87]	[-3.48]
Savings	0.02	0.03**	0.02	0.02	0.02	0.02	0.03**
	[1.51]	[2.19]	[1.50]	[1.53]	[1.64]	[1.62]	[2.22]
RGDP	0.03	0.03	0.03	0.03	0.02	0.02	0.03
	[1.50]	[1.48]	[1.39]	[1.35]	[1.12]	[1.15]	[1.25]
Inflation	-0.0003	-0.0001	-0.0001	-0.0001	-0.001	-0.0006	-0.001
	[-0.14]	[-0.43]	[-0.11]	[-0.07]	[-0.25]	[-0.27]	[-0.52]
Credit	0.24	0.21	0.27	0.38	0.26	0.21	0.18
	[1.06]	[0.91]	[1.01]	[1.54]	[1.18]	[0.85]	[0.71]
Debt	-0.52**	-0.57**	-0.46**	-0.51**	-0.50**	-0.48**	-0.41
	[-2.25]	[-2.18]	[-2.00]	[-2.20]	[-1.67]	[-2.10]	[-1.54]
Open	2.33***	2.48***	2.36***	2.30***	2.23***	2.26***	2.28***
	[4.67]	[4.81]	[4.73]	[4.59]	[4.37]	[4.54]	[4.40]
Free	0.22	0.13	-0.56	0.08	-0.01	-0.22	-0.24
	[0.54]	[0.32]	[-1.08]	[0.18]	[-0.04]	[-0.41]	[-0.42]
FDIFree			0.19**			0.07	0.07
			[2.38]			[0.68]	[0.63]
FDICredit				-0.06		0.03	0.03
				[-1.47]		[0.57]	[0.65]
FDIOpen					0.22***	0.22***	0.20***
					[3.92]	[3.18]	[2.83]
Constant	-6.47***	-4.55*	-5.20**	-6.33**	-5.20**	-4.85**	-2.69
	[-2.98]	[-1.79]	[-2.34]	[-2.92]	[-1.22]	[-2.18]	[-1.01]
Time dummies	No	Yes	No	No	No	No	Yes
No. of obs.	659	659	659	659	659	659	659
No. of groups	20	20	20	20	20	20	20
F test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00	0.00
R-squared	72.67	74.19	72.91	72.76	73.30	73.33	74.67

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively.

Table 2.15: One step System GMM Model Estimation Results (Dependent Variable: Domestic Investment/GDP, 1980-2012) Resource Intense Countries.

Independent Variables	1	2	3	4	5
lagged DI	0.39***	0.39***	0.39***	0.38***	0.38***
	[12.12]	[12.41]	[12.31]	[12.21]	[12.33]
FDI	-0.29***	-1.51***	0.06	-2.93***	-2.82***
	[-6.91]	[-8.12]	[0.64]	[-8.73]	[-6.78]
Savings	0.07***	0.07***	0.07***	0.08***	0.08***
	[2.76]	[3.14]	[2.83]	[3.43]	[3.44]
RGDP	-0.006	0.005	-0.008	-0.003	0.005
	[-0.26]	[0.22]	[-0.36]	[-0.17]	[0.02]
Inflation	-0.0001	-0.0001	-0.0001	-0.0001	-0.0001
	[-0.44]	[-0.44]	[-0.42]	[-0.43]	[-0.43]
Credit	1.8***	1.89***	2.65***	1.56***	1.71***
	[3.08]	[3.37]	[4.29]	[2.82]	[2.85]
Debt	0.62	0.29	0.58	0.42	0.32
	[1.39]	[0.68]	[1.32]	[1.00]	[0.76]
Open	2.43**	2.71***	2.59**	2.13**	2.34**
	[2.30]	[2.67]	[2.47]	[2.13]	[2.34]
Free	2.53**	0.75	2.03**	1.67*	1.06
	[2.50]	[0.75]	[2.01]	[1.73]	[1.07]
FDIFree		0.69***			0.31
		[6.68]			[2.34]**
FDICredit			-0.20***		-0.01
			[-3.97]		[-0.24]
FDIOpen				0.52***	0.39***
				[7.90]	[4.77]
Constant	-7.92*	-6.85	-9.77**	-4.02	-4.6
	[-1.69]	[-1.52]	[-2.09]	[-0.90]	[-1.02]
No. of obs.	620	620	620	620	620
No. of groups	20	20	20	20	20
No. of instruments	71	72	72	72	74
Sargan p-value	0.00	0.00	0.00	0.00	0.00

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively.

Table 2.16: Two step System GMM Model Estimation Results (Dependent Variable: Domestic Investment/GDP, 1980-2012) Resource Intense Countries.

Independent Variables	1	2	3	4	5
lagged DI	0.26**	0.20**	0.26**	0.11	0.06
	[2.56]	[1.42]	[2.33]	[0.71]	[0.30]
FDI	-0.45***	-1.58**	0.14	-0.41	-3.63
	[-3.63]	[-2.02]	[0.26]	[-0.17]	[-0.82]
Savings	0.08***	0.07**	0.07**	0.04	0.04
	[3.49]	[2.42]	[2.39]	[1.17]	[0.94]
RGDP	-0.002	0.004	-0.007	-0.005	-0.03
	[-0.13]	[0.23]	[-0.41]	[-0.29]	[-1.00]
Inflation	-0.0001*	-0.0001	-0.0002	-0.0002	-0.0001
	[-1.66]	[-1.35]	[-1.83]	[-1.51]	[-1.44]
Credit	5.3	3.42	6.28	2.4	-6.66
	[1.07]	[0.77]	[1.41]	[0.35]	[-0.77]
Debt	0.78	-0.06	0.22	-2.02	2.29
	[0.77]	[-0.05]	[0.16]	[1.16]	[1.18]
Open	6.49	2.61	7.25	1.78	-2.54
	[1.09]	[0.54]	[1.40]	[0.42]	[-0.39]
Free	-1.08	-11.08	-1.78	-11.99	1.1
	[-0.18]	[-1.26]	[-0.30]	[1.50]	[0.10]
FDIFree		0.69*			0.94
		[1.74]			[0.68]
FDICredit			-0.3		0.19
			[-1.12]		[0.46]
FDIOpen				0.04	0.27
				[0.08]	[0.43]
Constant	-22.59	15.83	-26.5	23.53	49.37
	[-0.90]	[0.53]	[-1.14]		[1.02]
No. of obs.	620	620	620	620	620
No. of groups	20	20	20	20	20
No. of instruments	71	72	72	72	74
Sargan p-value	1.00	1.00	1.00	1.00	1.00
AR(1) p-value	0.00	0.00	0.00	0.00	0.00
AR(1) p-value	0.15	0.4	0.22	0.42	0.73

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively.

2.7 Conclusion and Policy Recommendations

We use a panel of 48 African countries for the period 1980 to 2012 to analyse the absorptive capacity and investigate the impact of FDI on domestic investment using the dynamic OLS, random effects, fixed effects and the system GMM. Overall, the analysis shows that FDI has a crowding out effect on domestic investment. However, the fact that the study supports the crowding out effect of FDI on domestic investment does not necessarily imply that FDI has no positive spillovers in reality or that FDI is not needed. It may as well be that the positive benefits from FDI in African economies may be as a result of an increase in productivity growth which more than compensates for the decline in domestic investment (Ndikumana and Verick, 2008). Moreover, FDI's growth-enhancing impact can only be realised when it stimulates the absorptive capacity of the host country (Carkovic and Levine, 2002; Makki and Somwaru, 2004). The study also finds that improved institutions and trade openness do mitigate the negative effects of FDI on domestic investment. This implies that there is a need to develop policies to improve local conditions by strengthening institutions and enhancing trade openness. The review of the literature also suggests that African countries will benefit from measures aimed at promoting domestic investment.

African countries should adopt a targeted approach to FDI. As Alfaro and Charlton (2007) argue, some types of FDI may be more beneficial and productive than others. Agosin and Mayer (2000) note that the reason why FDI has been more productive in Asia than in other developing countries is because of the cautious and targeted approach. In addition, Adams (2009) observes that this targeted approach should involve careful screening of projects and granting differential incentives to projects in different sectors. While FDI inflows in African countries have mainly been concentrated in the extractive sector, in most Asian countries FDI has largely been focused on the secondary sector, thereby contributing to the diversification of the export base (UNCTAD, 2007). African policy makers should consider the prioritisation of FDI to other sectors such as manufacturing so as to diversify growth and the export base.

Policy efforts aimed at attracting FDI should be balanced with the imperative of strengthening domestic firms, entrepreneurship and local innovation. Keshava (2008) shows that even in those

countries where FDI has been more productive and beneficial, domestic investment is more effective than FDI in promoting growth. Investment incentives should not discriminate against domestic investment. Policymakers should therefore implement policies that strengthen the linkages between FDI and the local industry. The objectives of multinational corporations should be synchronised with the development imperatives and goals of African countries. It is also important to expedite the implementation of regional integration in the region in line with the recommendations from UNCTAD (2005), which notes that African countries need to think regionally. Market and competition regulations to dismantle the monopolistic tendencies of some foreign investors also need to be strengthened in a number of African countries.

Further research however needs to be undertaken to investigate the impact of the different types of FDI on domestic investment in Africa. FDI comes in two basic forms namely: greenfield investments which involve the creation of new production processes and mergers and acquisitions (M&As) which involve the purchase of assets of existing local companies. FDI can also be classified as, market seeking, resource seeking, efficiency seeking and strategic asset seeking (Dunning, 1993). It is possible that these different types of investment have different effects on domestic investment. This therefore calls for empirical analysis that investigates the effects of these different types of FDI on domestic investment in African economies. In future it will also be necessary to focus on country-level and micro-level studies to provide more information on the impact of FDI and also to identify sectors where FDI may complement domestic investment.

CHAPTER 3: THE IMPACT OF FOREIGN DIRECT INVESTMENT ON PRODUCTIVITY IN AFRICAN ECONOMIES

3.1 Introduction

This chapter examines the impact of foreign direct investment on productivity growth and the role of relative backwardness (the technology gap) on a panel of 45 African countries over the period 1980-2012. FDI is often viewed as an important channel for the diffusion of technology in many developing countries. Endogenous growth theory postulates that FDI raises economic growth by generating technological diffusion from the developed world to the host country (Borensztein et al, 1998). This is particularly important for Africa, which has a huge technology gap. Productivity spillovers from FDI take place when the entry or presence of multinational corporations increases the productivity of domestic firms in a host country, and the multinational companies do not fully internalise the value of these benefits (Javorcik, 2004). Consequently, many policymakers in African countries have placed attracting FDI high on their agenda in the hope of benefitting from these technology spillovers (Woo, 2009).

A lot of scholars find that differences in total factor productivity account for the huge cross country variations in growth (Acemoglu, 2009; Caselli, 2005; Easterly and Levine, 2001; Parente and Prescott 2001). Since FDI is regarded as an important channel for technology transfer, a study of the impact of FDI on productivity growth and the role of the technology gap is of great significance to policy makers in Africa as it provides better clarity on one of the key factors that can potentially help African countries to develop. The objectives of this study therefore include: to analyse the productivity effects of FDI in Africa and to determine the role of the technology gap on the FDI-productivity nexus. We test the 'relative backwardness' hypothesis of Findlay (1978) and Wang and Blomstrom (1992) which states that the rate of technology diffusion in a relatively backward country increases the further the country is from the technological frontier. Growth therefore becomes a function of the country's technological gap. Economies far from the technological frontier are expected to adopt technologies from the advanced economies to drive growth (Aghion and Howitt, 2009).

Although it has been shown that a large part of cross-country differences in income per capita can be explained by productivity growth, most of the existing literature however, only focuses on the role of FDI on economic growth. There is a paucity of literature that examines the role of FDI on productivity growth at cross-country level (Roy, 2008). Importantly, the role of the technology gap is often neglected. Some of the studies that attempt to address this issue are by, Baltabaev (2014); Roy (2008) and Senbeta (2008). Baltabaev (2014) uses data for 49 countries (including both developed and developing countries) over the period 1974-2008 with a few developing countries in the sample. Roy (2008) uses data for a sample of 89 countries in both Latin America and Africa. Senbeta (2008) examines the FDI-productivity growth nexus for 22 SSA countries for the period 1970-2000. However, he does not consider the role of the technology gap. This chapter uses a bigger sample consisting of 45 African countries and we incorporate two measures of relative backwardness over the period 1980-2012.

This chapter contributes to literature in many ways. Firstly, we narrow our focus to only African countries (45) to help reduce any bias that may be due to sample selection. This is important because scholars such as Kumar and Pradhan (2002 and Sylwester (2005) find that FDI has differential effects in different regions. This chapter builds on the study by Baltabaev (2014) who uses a panel of 49 countries (both developed and developing) to examine the relationship between FDI and productivity growth over the period 1974-2008. We update the dataset to 2012 and we use two measures of relative backwardness namely: the distance to the technology leader and the income gap. We analyse both the individual and simultaneous interactions of FDI with these 'relative backwardness' measures and their impact on productivity growth. We control for endogeneity, using the system GMM estimation. We also use the fixed effects estimation to check for the robustness of the results.

The rest of the chapter is organised as follows: section 3.2 reviews and discusses the related literature. Section 3.3 details the model specification and data description. Section 3.4 presents the estimation and analysis of the results, section 3.5 is the robustness checks and section 3.6 is the conclusion and policy recommendations.

3.2 Literature Review

FDI is considered an important channel for the transmission of technology in many developing countries (Jyun-Yi and Chih-Chiang, 2008). The endogenous growth theory postulates that FDI raises economic growth by generating technological diffusion from the developed world to the host country (Borensztein et al, 1998). Crespo and Fontoura (2007) summarise the five main channels of technological diffusion linked to FDI flows and these include: demonstration or imitation; labor mobility; exportation; competition; and backward and forward linkages with local firms. Hence, FDI does not only help to introduce new technologies into the host economy, but may also assist in raising the skill level, reducing prices and changing the competition structure.

Studies on the FDI-productivity growth nexus have provided mixed results. Scholars such as Bitzer and Gorg (2009), Liu et al. (2000) and Woo (2009) conclude that FDI has a positive effect on productivity growth. In contrast, some researchers find that FDI negatively affects productivity (Azman-Saini et al., 2010; Ang, 2009; Alfaro et al., 2004; Aitken and Harrison, 1999; Haddad and Harrison, 1993). Aitken and Harrison (1999) find that FDI negatively affects the productivity of domestic firms. They postulate a 'market-stealing' hypothesis to explain their results. The hypothesis states that while FDI may promote technology transfer, foreign investors 'steal' market share at the expense of domestic firms and this forces domestic firms to produce smaller output at higher average costs. As a result, the overall benefit of FDI is negligible at best or even negative.

Interestingly, some studies observe that a positive effect of FDI on productivity is dependent on the sector (Sjoholm, 2008 and Buckley et al, 2008); the degree of complementarity and substitution between FDI and domestic investment (De Mello, 1999); and local conditions in the host country. For instance, Alfaro et al (2009) find that countries with well-developed financial markets gain significantly from FDI via productivity improvements. Roy (2008) shows that the distance to the technology frontier is significant in determining the ability of the host country to take advantage of spillovers from FDI. He also finds that while there is a positive and significant effect of FDI on productivity, this effect decreases the higher the technological gap.

Using a panel of seven Mediterranean countries over 1980-2000, Cecchini and Lai-Tong (2008) examine the links between trade, FDI and total factor productivity. They find that FDI has beneficial effects on productivity growth but the spillovers are conditional on a number of host country factors, such as the degree of trade openness and the level of human capital. In contrast, Woo (2009), in a study of the effect of FDI on productivity in a large sample of countries from 1970-2000 finds that though FDI has a positive effect on productivity there is no evidence that this effect is dependent on host country factors. Ng (2006) analyses the relationship between FDI and productivity growth for eight Asian economies and finds no evidence to show that FDI drives technological progress in the sample countries.

A number of studies differentiate the effect of FDI by country. For instance, Johnson (2006) examines the effect of FDI on economic growth via two channels namely: technology spillovers and physical capital accumulation. The study uses a panel dataset compromising 90 developed and developing countries over the period 1980-2002. The study finds that FDI improves economic growth in developing economies only and not in developed economies. Lee (2009) examines the long run productivity convergence for a sample of 25 countries over 1975-2004. The study uses panel unit root procedures focusing mainly on trade and FDI links and finds that FDI helps to boost productivity growth in host countries. Holland and Pain (2000) examine the linkages between FDI and productivity growth in ten Central and East European countries. They find a positive impact of FDI on productivity in these economies, with the benefits being higher in the more-market oriented countries.

Other researchers disaggregate TFP growth into different components to determine the impact of FDI on the various components. Such an approach is adopted by Ng (2007) who examines the linkage between FDI and productivity in 14 SSA countries using the Granger causality test. The study disaggregates TFP growth into two components namely: technical change and efficiency change to identify if FDI has any effect on these two components. They find that FDI has not contributed to technical change in the countries in the sample. Furthermore, the study provides evidence that FDI has contributed to higher efficiency change in only three of the countries in the sample. The findings therefore do seem to suggest that FDI has limited effect on productivity growth in the countries in the sample.

Some scholars provide insight on the dynamic differential effects of spillovers from FDI on productivity growth in terms of the short run and the long run. For instance, in a study of the nexus between FDI and productivity growth in the Chinese manufacturing sector, Liu (2008) finds that an increase in FDI in the industry lowers the short run productivity level but raises the long run rate of productivity growth of manufacturing firms. At a macro level, Senbeta (2008) studies the nexus between FDI inflow and productivity growth in 22 SSA countries over the period 1970-2000 using fixed effects and dynamic panel models. The study includes control variables such trade openness, financial sector development, the indebtedness of the country and the share of agriculture in GDP which is assumed to indicate the level of development of the country. The results show that the effect of FDI on productivity is negative in the short run but becomes positive in the long run.

On the other hand, Girma (2005) examines the relationship between FDI and productivity using firm level data from the UK. The study demonstrates that the effect of FDI on productivity depends on the technology gap which is defined as the distance from the technological leader in the industry. The study also finds that there is a non-linear relationship between the technology gap and spillovers from FDI. Similarly, Girma and Gorg (2005) examine the role of the absorptive capacity in determining whether domestic firms benefit from FDI-related productivity spillovers. The study finds that there is a U-shaped relationship between productivity growth and FDI interacted with absorptive capacity. This suggests that improvements in absorptive capacity at the firm level allow the firm to enhance the spillovers from FDI. Blalock and Gertler (2009) in a study of Indonesian firms find that while FDI on its own generally has no significant effect on a firm's productivity, manufacturing firms with larger technological gaps do benefit from FDI. This finding highlights the importance of the sector and the technology gap.

Some studies use the income gap to measure relative backwardness. For instance, Li and Liu (2005) investigate the impact of FDI on economic growth using a large sample of 84 countries for the period 1970-99 conditional on relative backwardness. They define relative backwardness using the ratio of host country GDP to US GDP. They include FDI interacted with the proxy for relative backwardness in their growth regression. They find a significantly negative coefficient for this

interaction term along with a positive coefficient for the FDI term. This implies that the higher the relative backwardness of the host country, the smaller is the effect of FDI on growth. They calculate a threshold value for relative backwardness of 12.6, below which FDI is no longer beneficial for the host country.

Generally, literature on the impact of FDI on productivity growth in African countries is scant and in particular the role of technology gap is often neglected. Some of the papers that attempt to address this issue are by, Baltabaev (2014), Roy (2008) and Senbeta (2008). Baltabaev (2014) studies the link between FDI and TFP for 49 countries (including both developed and developing countries) over the period 1974-2008. The study however only includes a few developing countries and hence it is not representative enough of African countries. Roy (2008) uses data for a sample of 89 countries in both Latin America and Africa. Senbeta (2008) on the other examines the FDI-productivity growth nexus for 22 sub-Saharan African (SSA) countries for the period 1970-2000 but does not consider the role of the technology gap.

While existing studies provide valuable insights into productivity spillovers to the host economy, they are not able to fully capture the overall effect of FDI on productivity growth in African economies. This chapter seeks to remedy this situation by providing clarity on the relationship between productivity growth and FDI conditional on relative backwardness in a sample of 45 African countries over the period 1980-2012. We use two measures of relative backwardness namely: the distance to the technology leader and the income gap.

3.3 Model Specification and Data Description

3.3.1 Model Specification

We treat FDI as a factor of production in addition to physical capital, labour and human capital. To investigate the impact of FDI on TFP the empirical model takes the following form:

$$Y_{it} = AK_{it}^{\alpha} L_{it}^{\beta} H_{it}^{\gamma} F_{it}^{\delta} e^{\varepsilon} \quad (3.1)$$

where Y_{it} is output of the economy; A is the level of productivity (TFP); K_{it} is domestic physical capital; L_{it} is the labour supply; H_{it} is human capital; F_{it} is Foreign Direct Investment (FDI) and e^{ε} is the error term. $\alpha, \beta, \gamma, \delta,$ and ε denote the elasticity of domestic physical capital, labour, human capital, FDI and the error term. Following Ashraf and Herzer (2014), we model the impact of FDI on TFP and the role of relative backwardness as follows:

$$TFP_{it} - TFP_{it-1} = (1-\alpha)TFP_{it-1} + \beta_1 DTF_{it} + \beta_2 FDI_{it} + \beta_3 FDI_{it} * DTF_{it} + \beta_4 X_{it} + \eta_i + \varepsilon_{it} \quad (3.2)$$

Equivalently, equation (3.2) may be rewritten as follows:

$$TFP_{it} = \alpha TFP_{it-1} + \beta_1 DTF_{it} + \beta_2 FDI_{it} + \beta_3 FDI_{it} * DTF_{it} + \beta_4 X_{it} + \eta_i + \varepsilon_{it} \quad (3.3)$$

where i is the home country index, t is the time index, α and β are the unknown parameters to be estimated, ABC_{it} is the absorptive capacity (relative backwardness) in home country i and time t. X_{it} is a vector of other conditional variables that affect productivity growth, η_i is unobserved country-specific effect term, and ε_{it} is the usual error term. $FDI_{it} * DTF_{it}$ is the interaction term to capture the effect of relative backwardness.

TFP growth is a function of FDI, distance to the technology frontier (DTF_{it}) and other control variables (X_{it}). Following Griffith et al. (2004) and Madsen et al. (2010), we include the distance to the technology frontier (DTF) separately to capture independent technological transfer from advanced countries to the 'relatively backward' host countries Higher relative backwardness is associated with faster catching up to the advanced countries (Findlay, 1978; Wang and Blomstrom, 1992). The distance to the technological frontier (DTF) is the ratio of the technology level in the 'leader' country (i.e. the USA) to the technology level of the host country. We also use the income gap as another proxy for the technology gap to check for robustness of the results. Following Li and Liu (2005), the income gap is calculated as follows:

$$GAP_{it} = (Ymax_{it} - Y_{it})/Y_{it} \quad (3.4)$$

where $Ymax_{it}$ is the GDP per capita of the US and Y_{it} is the GDP per capita for the host country. We use the system GMM estimator which controls for the unobserved country-specific factors. The estimated coefficients are then not subject to bias from any omitted variable. Since there is likely to be a two-way relationship between FDI and productivity, the system GMM estimator helps to solve that endogeneity problem by using a series of internal instrumental variables based on lagged values of the dependent and independent variables. In this case, the instruments for the regression in differences are lagged levels as in the original estimator, while those for the regression in levels are the lagged differences of the corresponding variables.

We transform equation (3.3) into first differences to eliminate any country specific effects (Arellano and Bond, 1991) as follows:

$$TFP_{it} - TFP_{it-1} = \alpha(TFP_{it-1} - TFP_{it-2}) + \beta_1(DTF_{it} - DTF_{it-1}) + \beta_2(FDI_{it} - FDI_{it-1}) + \beta_3(FDI_{it} * DTF_{it} - FDI_{it-1} * DTF_{it-1}) + \beta_4(X_{it} - X_{it-1}) + (\varepsilon_{it} - \varepsilon_{it-1}) \quad (3.5)$$

Arellano and Bond (1991) posit that to deal with the possible simultaneity bias of the explanatory variables the lagged levels of the regressors should be used as instruments. This is however only valid assuming that the error term is not serially correlated and also that the lag of the explanatory variables are weakly exogenous. This is known as difference GMM estimation. Following Arellano and Bond (1991), the following moment conditions are therefore set:

$$\mathrm{E}[TFP_{it-s} \cdot (\varepsilon_{it} - \varepsilon_{it-1})] = 0 \; for \; s \geq 2; t = 3, \dots, T \quad (3.6)$$

$$\mathrm{E}[DTF_{it-s} \cdot (\varepsilon_{it} - \varepsilon_{it-1})] = 0 \; for \; s \geq 2; t = 3, \dots, T \quad (3.7)$$

$$\mathrm{E}[FDI_{it-s} \cdot (\varepsilon_{it} - \varepsilon_{it-1})] = 0 \; for \; s \geq 2; t = 3, \dots, T \quad (3.8)$$

$$\mathrm{E}[X_{it-s} \cdot (\varepsilon_{it} - \varepsilon_{it-1})] = 0 \; for \; s \geq 2; t = 3, \dots, T \quad (3.9)$$

It has been shown that though the difference GMM estimation controls for country-specific effects and simultaneity bias it has some problems. Alonso-Borrego and Arellano (1999) and Blundell and Bond (1998) prove that when the explanatory variables are persistent the lagged levels of the variables become weak instruments. This results in biased parameter estimates for small samples and larger variance asymptotically. To with this problem Arellano and Bover (1995) propose the system GMM which combines both the difference equation (3.5) and the level equation (3.3). The system GMM is able to reduce biases and imprecision associated with difference GMM (Blundell and Bond, 1998). Following Arellano and Bover (1995), the additional moment conditions for the second part of the system (the regression in levels) are set as follows:

$$\mathrm{E}[(TFP_{it-s} - TFP_{it-s-1} \cdot (\eta_i + \varepsilon_{it})] = 0 \; for \; s = 1 \tag{3.10}$$

$$\mathrm{E}[(DTF_{it-s} - DTF_{it-s-1} \cdot (\eta_i + \varepsilon_{it})] = 0 \; for \; s = 1 \tag{3.11}$$

$$\mathrm{E}[(FDI_{it-s} - FDI_{it-s-1} \cdot (\eta_i + \varepsilon_{it})] = 0 \; for \; s = 1 \tag{3.12}$$

$$\mathrm{E}[(X_{it-s} - X_{it-s-1} \cdot (\eta_i + \varepsilon_{it})] = 0 \; for \; s = 1 \tag{3.13}$$

3.3.2 Data Description

We calculate the TFP growth using the Solow residual. We used the following equation from Acemoglu (2009):

$$TFP \; growth = g - \alpha_K g_K - \alpha_L g_L \tag{3.14}$$

where g is growth rate of output, g_K is the growth rate of capital and g_L is the growth rate of labour. α_K and α_L are value shares. To calculate the TFP growth rate we use data on gross fixed capital stock, the population growth and the GDP growth drawn from the World Development Indicators (WDI). Capital growth is calculated using the perpetual inventory method based on gross fixed capital formation time series data from the World Bank's World Development Indicators (WDI) as follows:

$$K_{it} = K_{it-1} + I_{it} - (K_{it-1} * \delta) \quad (3.15)$$

where K_{it} is the fixed capital stock, I_{it} is the gross fixed capital formation and δ is the depreciation rate and is assumed to be constant over time. We use the standard values of α from existing literature for all the countries in the sample. The depreciation rate and technological growth rate in aggregate is assumed to be 0.05 (Roy, 2008).

Control variables (X_{it}) used in this study are derived from existing literature. Human capital (sch) is measured by the level of secondary school attainment sourced from the World Development Indicators (WDI). Higher levels of human capital increase the capacity of host countries to absorb foreign technology (Kneller, 2005). Trade openness gives the host country better access to foreign technologies (Keller, 2004). Following Loko and Diouf (2009), we use the ratio of exports plus imports to GDP as a proxy for trade openness. Abizadeh et al. (2007) conclude that trade openness has a positive and significant impact on labour productivity. We follow Alfaro et al (2009) who use private credit as a share of gross domestic product (GDP) as a proxy for financial market development. The expected sign is positive.

We include population growth (POPG) and this is expected to affect economic growth positively. Jones (1995) argues, more people increase the potential pool of ideas and innovation. We also include lagged TFP as one of the explanatory variables. As pointed out by Hsiao (1986) a dynamic panel model allows dynamic effects to be introduced into the model and feedback from current or past shocks. Furthermore, as Ashraf et al (2014) notes, the lagged dependent variable also helps to control for the effect of potentially relevant, but omitted, variables and to control for serial correlation.

We also include the technology gap. Kokko (1992) demonstrates that the technology gap constitutes a factor affecting spillovers from FDI. There are however divergent views on the role of the technological gap (TG). Some scholars (Castellani and Zanfei, 2003 and Sjoholm, 1999) argue that a larger TG results in positive spillovers while others argue that it is moderate (Findlay, 1978) or small (Liu et al, 2000). In this study we use two measures of technological gap namely,

the the distance to the technology leader (DTF) and the income gap (GAP). The distance to technology frontier (DTF) is the ratio of the technology level in the 'leader' country (i.e. the USA) to the technology level of the country under consideration. The income gap (GAP) on the other hand is defined in equation 4.

We use a dummy variable for the existence of Investment and Export Promotion Agencies (IPA). IPA equals one if country c has an investment promotion agency at time t and zero if country c does not have an investment promotion agency at time t. Harding and Javorcik (2011), for example, show that sector targeting by IPAs leads to more FDI inflows into the particular sector. Hence, the existence of an IPA (which is a dummy variable) can be a proxy for FDI inflows. We exploit the panel data from the World Bank Census of Investment Promotion Agencies to build this variable.

The list of countries included is shown in Table 3.1.

Table 3.1: List of countries.

Algeria	Congo	Malawi	South Africa
Angola	Egypt	Mali	Sudan
Benin	Ethiopia	Mauritania	Swaziland
Botswana	Gabon	Mauritius	Tanzania
Burkina Faso	Gambia	Morocco	Togo
Burundi	Ghana	Mozambique	Tunisia
Cameroon	Guinea	Niger	Uganda
Cape Verde	Guinea-Bissau	Nigeria	Zambia
Central Africa Republic	Kenya	Rwanda	Zimbabwe
Chad	Lesotho	Senegal	
Cote d'Ivore	Liberia	Seychelles	
Comoros	Madagascar	Sierra Leone	

In Table 3.2 we report the summary statistics for the countries in our analysis. The mean value of TFP growth is 0.25 with a minimum value of 0.01 and 1.52. The average share of the FDI inflows in GDP is 2.74 percent with a standard deviation of 5.75. The mean value for first FDI-based absorptive capacity (FDIDTF) is 2.03 and it has a high variance as suggested by the standard

deviation; almost twice the size of the mean. The average value for the second FDI-based absorptive capacity (FDIGAP) is 9.83 with a very high standard deviation of 22.31. The average distance to the technology leader in our sample is 0.74 which implies that the productivity for countries on average was 0.74 times lower than that of the US.

Table 3.2: Descriptive Statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
TFP growth	1485	0.25	0.18	0.01	1.52
FDI	1485	2.74	5.75	-14.68	90.46
Distance to Technology Frontier (DTF)	1485	0.74	0.17	0.02	0.96
Income Gap (GAP)	1485	3.71	1.1	-0.43	6.13
Human Capital (Sch)*	1485	3.22	0.79	0.85	4.83
Trade Openness (Open)*	1485	4.16	0.48	1.84	5.62
Credit*	1485	2.65	0.95	-4.53	5.12
Population Growth (POPG)	1485	2.46	1.08	-7.53	9.77
Investment Promotion Agency (IPA)	1485	0.35	0.48	0	1
FDI*DTF (FDIDTF)	1485	2.03	4.51	-10.03	74.63
FDI*GAP (FDIGAP)	1485	9.83	22.31	-72.11	353.49

*This variable is included as ln (variable).
Source: the author's calculations.

Table 3.3 shows the correlation among the variables. There is a preliminary positive relationship between TFP growth and FDI though not significant. There is a negative and significant relationship between TFP growth and both measures of the FDI-based absorptive capacity i.e. FDIDTF and FDIGAP. On the other hand, sch, open, credit and IPA have a positive and significant effect on TFP growth, while POPG, FDIDTF and FDIGAP have a negative and significant relationship on TFP growth.

Table 3.3: Correlation Matrix: 1980-2012.

	TFP growth	FDI	DTF	GAP	Sch	Open
TFP growth	1					
FDI	0.03	1				
DTF	-0.92***	-0.0003	1			
GAP	-0.74***	-0.05**	0.79***	1		
Sch	0.61***	0.17***	-0.62***	-0.6***	1	
Open	0.32***	0.37***	-0.32***	-0.41***	0.44***	1
Credit	0.44***	-0.10***	-0.47***	-0.43***	0.44***	0.20***
POPG	-0.30***	-0.009	0.28***	0.22***	-0.33***	-0.15***
IPA	0.08**	0.14***	-0.03	0.04*	0.28***	0.18***
FDIDTF	-0.06***	0.99***	0.09***	0.03	0.11***	0.33***
FDIGAP	-0.07***	0.94***	0.1***	0.11***	0.07***	0.3***
	Credit	POPG	IPA	FDIDTF	FDIGAP	
Credit	1					
POPG	-0.20***	1				
IPA	0.12***	-0.18***	1			
FDIDTF	-0.14***	0.03	0.14***	1		
FDIGAP	-0.13***	0.04*	0.16***	0.97***	1	

Notes: *, **, and *** indicate statistical significance at 10%, 5% and 1% levels, respectively.
Source: the author's calculations.

3.4 Estimation and Results

We first carry out panel unit root tests to examine whether the variables are stationary (Li and Liu, 2005). Since panel data methodology uses both time and cross sectional analyses it is imperative that the variables be stationary in order to avoid possible spurious relationships among the variables (Bayar, 2014). As shown in Table 3.4 all the variables are stationary.

Table 3.4: Panel Unit Root tests.

	TFP growth	FDI	DTF	GAP	Sch
IPS W-stat					
Levels	-2.88***	-2.89***	-4.01***	-2.11**	-4.06
[P-value]	[0.00]	[0.00]	[0.00]	[0.02]	[1.00]
Differences	-27.87***	-27.01***	-18.4***	-15.58***	-11.42***
[P-values]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
LLC t*-stat					
Levels	-1.16	-2.54***	-5.3***	-2.65***	-1.78**
[P-value]	[0.12]	[0.00]	[0.00]	[0.00]	[0.03]
Differences	-21.36***	-20.85***	-14.47***	-15.14***	-8.36***
[P-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
	Open	Credit	POPG	FDIDTF	FDIGAP
IPS W-stat					
Levels	-2.5***	0.62	-2.36***	-2.72***	-3.33***
[P-value]	[0.00]	[0.73]	[0.00]	[0.00]	[0.00]
Differences	-23.27***	-17.18***	-27.53***	-26.87***	-27.20***
[P-values]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]
LLC t*-stat					
Levels	-3.63***	-1.64**	-14.25***	-2.51***	-3.2***
[P-value]	[0.00]	[0.05]	[0.00]	[0.00]	[0.00]
Differences	-20.96***	-14.92***	-29.02***	-20.71***	-21.50***
[P-value]	[0.00]	[0.00]	[0.00]	[0.00]	[0.00]

Notes: *, **, and *** indicate statistical significance at 10%, 5% and 1% levels, respectively. P-values are in square brackets.
Source: the author's calculations.

The results are summarised and presented in Tables 3.5-3.8. The variables of interest are FDI, the technology gap (DTF) and FDIDTF (the interaction of the FDI with the distance to the technological frontier). We first determine whether FDI has any effect on TFP growth without conditioning on the absorptive capacity. Table 3.5 presents the results from the fixed effects estimation method. Columns 1 and 2 present the results with no interaction term (FDIDTF). In columns 5, 6, 9 and 10 we present the results with the interaction term. We find that there is a positive effect of FDI on TFP growth in all the columns. This relationship is significant in columns 1, 2, 3, 5, 6, 9 and 10. The coefficients are positive but very small which suggests that the effect of FDI on TFP growth is not very significant. This is consistent with the findings of Li and Liu

(2005), Woo (2009) and Baltabaev (2014). However, this contrasts with the findings from Durham (2004) and Azman-Saini et al. (2010).

We also analyse the role of relative backwardness (DTF) and the interaction term of FDI with the DTF (FDIDTF). As shown in Table 3.5, both the interaction variable (FDIDTF) and relative backwardness variable (DTF) have a generally negative and significant effect in all columns. This is inconsistent with the findings of Findlay (1978) and Wang and Blomstrom (1992). The negative sign shows that both relative backwardness (DTF) and absorptive capacity (FDIDTF) have a negative effect on TFP growth. This implies that the lower the level of technological development in the host country the smaller is the impact of FDI on TFP growth (Baltabaev, 2014). There is therefore no catching up by the relatively backward countries. This finding is consistent with Sjoholm (1997) who argues that that huge technology gaps may present an impediment to the absorption of any potential spillovers from FDI. Similarly, Glass and Saggi (1998) posit that relative backwardness is a deterrent to because it limits the kind of technology that can be transferred to the host country. Additionally, Falvey et al (2005) show that a huge technology gap is unlikely to automatically translate to greater knowledge diffusion and catch-up, unless certain preconditions exist that allow countries to absorb the inflow of foreign ideas and knowledge.

As presented in Table 3.5, human capital (sch) has a positive and significant effect on TFP growth in columns 7 and 9. IPA has a positive and significant effect as presented in columns 3, 5, 6, 7 and 9. This suggests that the existence of an investment and promotion agency has a positive effect on TFP growth. Credit has a positive but insignificant effect on TFP growth while open has a negative but insignificant effect on TFP growth. Population growth has a positive effect on TFP growth but this is only significant in column 9. Higher rates of population growth increase the growth rates of TFP. This is consistent with (Jones, 1995). Kremer (1993) argues that long-run historical observation provides evidence on the positive relationship between population growth and technological progress.

The results remain robust to alternative estimation methods. Table 3.6 present the results from the random effects estimation method. Columns 1 and 2 present the results with no interaction term (FDIDTF). In columns 5, 6, 9 and 10 we present the results with the interaction term. We find a

positive effect of FDI on TFP growth. This effect is however only significant in columns 5 and 9. The interaction term (FDIDTF) has a negative but insignificant effect. The relative backwardness term (DTF) has a negative and significant effect in all the columns. This confirms that a huge technology gap presents an impediment to the absorption of any potential spillovers from FDI in African countries.

Table 3.7 and Table 3.8 report the results of the estimation using both the one step and two step system GMM methods respectively. FDI has a positive and significant effect on TFP growth as shown in most of the columns. This result is consistent with the results from the fixed and random effects estimation. As shown in both Table 3.7 and Table 3.8 the coefficient on FDI is positive but very small and therefore not significant. The interaction term (FDIDTF) and relative backwardness (DTF) term have a generally negative and significant effect in all columns included. This is also consistent with the results from the fixed and random effects estimation. This is not consistent with the convergence hypothesis of Findlay (1978). This suggests that the lower the level of technological development in the host country the smaller the capacity of the host country to absorb any potential spillovers from FDI. This implies that there is no catching up effect for African economies. As Findlay (1978) observes, the technological gap should not be huge otherwise the negative effect of the transfer of technology outweighs the benefit to the developing countries. Our results are consistent with Baltabaev (2014); Falvey et al (2005), and Sjoholm (1997) who show that that huge technology gaps presents an impediment to absorption of any potential spillovers from FDI.

Table 3.5: Fixed Effects Model Estimation Results (Dependent Variable: TFP growth, 1980-2012).

Independent Variables	1	2	3	4	5	6
lagged TFP growth	0.53***	0.52***	0.52***	0.52***	0.51***	0.52***
	[34.07]	[33.63]	[33.68]	[33.56]	[33.30]	[33.15]
FDI	0.001***	0.0003***	0.0004*	0.0003	0.01***	0.01***
	[2.73]	[1.12]	[1.72]	[1.17]	[3.98]	[3.88]
DTF	-0.26***	-0.28***	-0.27***	-0.28***	-0.25***	-0.26***
	[-10.74]	[-11.32]	[-11.20]	[-11.26]	[-10.15]	[-10.18]
IPA			0.01***	0.01	0.01***	0.01*
			[4.71]	[1.78]	[4.53]	[1.76]
FDIDTF					-0.01***	-0.01***
					[-3.39]	[-3.75]
Constant	0.31***	0.30***	0.32**	0.30***	0.30***	0.28***
	[15.85]	[14.08]	[16.21]	[14.04]	[15.25]	[13.14]
Time dummies	No	Yes	No	Yes	No	Yes
No. of obs.	1484	1484	1484	1484	1484	1484
No. of groups	45	45	45	45	45	45
F test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00
R-squared	93.04	93.30	93.11	93.29	93.01	93.18

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively. [1], [2], [3] and [4] stands for Foreign Direct Investment, Distance to Technological Frontier, Investment Promotion Agency and interaction term between Foreign Direct Investment and Distance to Technological Frontier.
Source: the author's calculations.

Table 3.5: Fixed Effects Model Estimation Results (Dependent Variable: TFP growth, 1980-2012).

Independent Variables	7	8	9	10
lagged TFP growth	052***	0.52***	0.51***	0.52***
	[33.61]	[33.30]	[33.22]	[32.96]
FDI	0.0004	0.0003	0.01***	0.01***
	[1.55]	[1.31]	[4.18]	[4.01]
DTF	-0.27***	-0.28***	-0.25***	-0.25***
	[-10.96]	[-11.02]	[-9.84]	[-9.83]
Sch	0.01***	-0.0001	0.01***	0.01
	[1.99]	[-0.06]	[12.28]	[0.39]
Open	-0.003	-0.003	-0.004	-0.004
	[-0.69]	[-0.63]	[-0.85]	[-0.72]
Credit	0.001	0.002	0.001	0.001
	[0.49]	[0.82]	[0.33]	[0.67]
POPG	0.002	0.002	0.002*	0.002
	[1.15]	[1.19]	[1.44]	[1.46]
IPA	0.01***	0.003	0.01*	0.01
	[3.02]	[0.79]	[2.81]	[1.77]
FDIDTF			-0.01***	-0.01***
			[-4.00]	[-3.86]
Constant	0.30***	0.30***	0.44***	0.28***
	[9.97]	[8.93]	[16.69]	[8.24]
Time dummies	No	Yes	No	Yes
No. of obs.	1484	1484	1484	1484
No. of groups	45	45	45	45
F test (p-value)	0.00	0.00	0.00	0.00
R-squared	93.14	93.23	93.02	93.13

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively.
[1], [2], [3], [4], [5], [6], [7], [8] and [9] stands for Total Factor Productivity (TFP), Foreign Direct Investment, Distance to Technological Frontier, School enrolment, Trade openness as a % of GDP, private sector credit as a % of GDP, population growth rate as a %, Investment Promotion Agency and the interaction term between FDI and DTF respectively.
Source: the author's calculations.

Table 3.6: Random Effects Model Estimation Results (Dependent Variable: TFP growth, 1980-2012).

Independent Variables	1	2	3	4	5	6
lagged TFP growth	0.61***	0.60***	0.60***	0.60***	0.60***	0.60***
	[40.89]	[40.01]	[40.44]	[39.95]	[40.28]	[39.82]
FDI	0.0001	0.0002	0.0003	0.0002	0.002*	0.002
	[2.27]	[0.73]	[1.64]	[0.79]	[1.34]	[1.11]
DTF	-0.41***	-0.42***	-0.42***	-0.42***	-0.41***	-0.42***
	[-24.78]	[-25.10]	[-25.15]	[-25.07]	[-24.06]	[-23.97]
IPA			0.01***	0.004	0.01***	0.04
			[4.33]	[1.21]	[4.35]	[1.25]
FDIDTF					-0.002	-0.002
					[-1.12]	[-1.00]
Constant	0.40***	0.38***	0.40***	0.38***	0.40***	0.37***
	[25.53]	[21.45]	[25.79]	[21.44]	[25.07]	[20.88]
Time dummies	No	Yes	No	Yes	No	Yes
No. of obs.	45	45	45	45	45	45
No. of groups	1484	1484	1484	1484	1484	1484
F test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00
R-squared	93.13	93.37	93.21	93.38	93.21	93.38

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively. [1], [2], [3], [4] and [5] stands for Total Factor Productivity, Foreign Direct Investment, Distance to Technological Frontier, Investment Promotion Agency and interaction term between Foreign Direct Investment and Distance to Technological Frontier respectively.
Source: the author's calculations.

Table 3.6: Random Effects Model Estimation Results (Dependent Variable: TFP growth, 1980-2012).

Independent Variables	7	8	9	10
lagged TFP growth	0.60***	0.60***	0.59***	0.60***
	[39.87]	[39.53]	[39.71]	[39.39]
FDI	0.0002	0.0001	0.002*	0.002
	[0.68]	[0.31]	[1.34]	[1.24]
DTF	-0.40***	-0.41***	-0.39***	-0.40***
	[-22.44]	[-21.96]	[-21.44]	[-20.94]
Sch	0.01***	0.004	0.01***	0.004
	[3.19]	[1.51]	[3.24]	[1.57]
Open	0.002	0.003	0.002	0.003
	[0.71]	[1.01]	[0.71]	[1.01]
Credit	-0.001	-0.001	-0.001	-0.0004
	[-0.63]	[-0.31]	[-0.56]	[-0.25]
POPG	-0.0004	-0.0002	-0.0003	-0.0001
	[-0.31]	[-0.21]	[-0.21]	[-0.10]
IPA	0.01***	0.004	0.01***	0.004
	[2.79]	[1.51]	[2.75]	[1.21]
FDIDTF			-0.002	-0.002
			[-1.25]	[-1.20]
Constant	0.36***	0.35***	0.36***	0.34***
	[15.37]	[13.54]	[14.90]	[13.10]
Time dummies	No	Yes	No	Yes
No. of obs.	1484	1484	1484	1484
No. of groups	45	45	45	45
F test (p-value)	0.00	0.00	0.00	0.00
R-squared	93.26	95.53	93.26	93.39

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively.
[1], [2], [3], [4], [5], [6], [7], [8] and [9] stands for Total Factor Productivity (TFP), Foreign Direct Investment, Distance to Technological Frontier, School enrolment, Trade openness as a % of GDP, private sector credit as a % of GDP, population growth rate as a %, Investment Promotion Agency and the interaction term between FDI and DTF respectively.
Source: the author's calculations.

Table 3.7: One step System GMM Model Estimation Results.

Independent Variables	1	2	3	4	5
lagged TFP growth	0.43***	0.44***	0.44***	0.43***	0.43***
	[22.55]	[22.40]	[22.26]	[21.68]	[21.55]
FDI	0.001***	0.0003	0.002	0.003	0.002**
	[-2.86]	[-1.29]	[1.24]	[-1.39]	[1.37]
DTF	-0.38***	-0.35***	-0.34***	-0.37***	-0.36***
	[-18.78]	[-16.13]	[-15.85]	[-16.43]	[-16.20]
Sch				-0.03**	-0.03
				[-5.49]	[-5.60]
Open				0.03***	0.03***
				[4.50]	[4.44]
Credit				0.001	0.001
				[0.40]	[0.36]
POPG				0.003**	0.003*
				[1.94]	[1.90]
IPA		-0.02***	-0.02***	-0.01	-0.01*
		[-6.16]	[-6.31]	[-1.60]	[-1.72]
FDIDTF			-0.003		-0.003***
			[-1.45]		[-1.59]
Constant	0.33***	0.30***	0.30***	0.28***	0.29***
	[18.87]	[16.10]	[15.93]	[8.03]	[8.09]
No. of obs.	1395	1395	1395	1395	1395
No. of groups	45	45	45	45	45
No. of instruments	65	66	67	70	71
Sargan p-value	0.00	0.00	0.00	0.00	0.00

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively. . [1], [2], [3], [4], [5], [6], [7], [8] and [9] stands for Total Factor Productivity (TFP), Foreign Direct Investment, Distance to Technological Frontier, School enrolment, Trade openness as a % of GDP, private sector credit as a % of GDP, population growth rate as a %, Investment Promotion Agency and the interaction term between FDI and DTF respectively.
Source: the author's calculations.

Table 3.8: Two step System GMM Model Estimation Results.

Independent Variables	1	2	3	4	5
lagged TFP growth	0.43***	0.44***	0.43***	0.43***	0.43***
	[132.52]	[107.88]	[125.36]	[65.04]	[40.47]
FDI	0.001***	0.0003***	0.002***	0.004***	0.002***
	[-34.81]	[-15.04]	[6.62]	[-7.10]	[6.61]
DTF	-0.38***	-0.34***	-0.34***	-0.35***	-0.36***
	[-99.70]	[-86.50]	[-61.73]	[-36.58]	[-47.25]
Sch				-0.03**	-0.03
				[-14.68]	[-10.38]
Open				0.02***	0.02***
				[10.69]	[10.10]
Credit				0.001	0.001
				[0.70]	[1.12]
POPG				0.003**	0.002**
				[5.03]	[2.69]
IPA		-0.02***	-0.02***	-0.01***	-0.01***
		[-18.60]	[-18.65]	[8.75]	[-7.46]
FDIDTF			-0.003***		-0.003***
			[-7.42]		[-7.71]
Constant	0.33***	0.30***	0.30***	0.27***	0.29***
	[90.16]	[108.08]	[79.81]	[16.33]	[17.14]
No. of obs.	1395	1395	1395	1395	1395
No. of groups	45	45	45	45	45
No. of instruments	65	66	67	70	71
Sargan p-value	0.95	0.97	0.97	0.98	0.97
AR(1) p-value	0.04	0.03	0.03	0.04	0.04
AR(1) p-value	0.00	0.00	0.00	0.00	0.00

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively. [1], [2], [3], [4], [5], [6], [7], [8] and [9] stands for Total Factor Productivity (TFP), Foreign Direct Investment, Distance to Technological Frontier, School enrolment, Trade openness as a % of GDP, private sector credit as a % of GDP, population growth rate as a %, Investment Promotion Agency and the interaction term between FDI and DTF respectively.
Source: the author's calculations.

3.5 Robustness Checks

To check the robustness of the results we use a different measure of relative backwardness. We follow Li and Liu (2005) in using the income gap (GAP) as a proxy for technology gap. This is defined in equation (4). The results are presented in Tables 3.9-3.12. In Table 3.9 we present our results using the fixed effects method. FDI has a positive and significant effect on TFP growth only in columns 1 and 9. The relative backwardness term (GAP) generally has a negative and statistically significant effect. This result is consistent with the results that were presented in Tables 3.5-3.8. This result confirms that there is no catching up effect for African economies. The interaction tem FDIGAP has a negative and significant effect only in column 9. The existence of an investment promotion agency has a positive and significant effect in all the columns. Population growth (POPG) has a positive and significant effect while credit only has a positive and significant effect in column 9.

Table 3.10 shows the results from the random effects estimation method. FDI is shown to have a positive and significant effect on TFP growth in columns 5 and 6 which is consistent with the results from the fixed effects method. The relative backwardness term (GAP) is negative and statistically significant in all the columns which confirms that there is no catching up. However, the interaction tem FDIGAP has no significant effect on TFP growth. Meanwhile, IPA and sch have a generally positive and significant effect on TFP growth as expected.

In Table 3.11 and Table 3.12 we report the results of the estimation using both the one step and two step system GMM methods respectively. In Table 3.11 FDI is shown to have a positive and significant effect on TFP growth in columns 1, 2, 3 and 4 whereas in Table 3.12 FDI is shown to have a positive and significant effect in all the columns. The interaction variable (FDIGAP) is only positive and significant in Table 3.12. However, the relative backward variable (GAP) has a negative and significant effect in both Table 3.11 and Table 3.12. This is consistent with the results from the other estimation methods. This means that the lower the level of technological development of the host country, the smaller is the impact of FDI on total factor productivity. The results confirm that there is no evidence of any catching up in African economies.

Table 3.9: Fixed Effects Model Estimation Results (Dependent Variable: TFP growth, 1980-2012).

Independent Variables	1	2	3	4	5	6
lagged TFP growth	0.58***	0.58***	0.57***	0.58***	0.57***	0.58***
	[38.10]	[38.02]	[37.85]	[37.89]	[37.76]	[37.79]
FDI	0.01**	0.002	0.0003	0.0003	0.001	0.001
	[2.09]	[1.05]	[1.31]	[1.15]	[1.63]	[1.20]
GAP	-0.004	-0.01**	-0.01***	-0.01***	-0.003	-0.01***
	[-1.54]	[-2.48]	[-1.90]	[-2.61]	[-1.15]	[-1.92]
IPA			0.01***	0.01***	0.01***	0.01***
			[3.72]	[2.20]	[3.64]	[2.25]
FDIGAP					-0.0003	-0.0002
					[-1.31]	[-0.92]
Constant	0.12***	0.10***	0.12***	0.10***	0.11***	0.10***
	[11.57]	[7.90]	[11.72]	[8.01]	[10.29]	[7.15]
Time dummies	No	Yes	No	Yes	No	Yes
No. of obs.	1484	1484	1484	1484	1484	1484
No. of groups	45	45	45	45	45	45
F test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00
R-squared	90.60	91.04	90.66	91.06	90.56	90.98

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively. [1], [2], [3], [4] and [5] stands for Total Factor Productivity, Foreign Direct Investment, the relative backward variable, Investment Promotion Agency and the interaction term between FDI and the relative backward term respectively.
Source: the author's calculations.

Table 3.9: Fixed Effects Model Estimation Results (Dependent Variable: TFP growth, 1980-2012).

Independent Variables	7	8	9	10
lagged TFP growth	0.57***	0.58***	0.57***	0.58***
	[37.75]	[37.71]	[37.65]	[37.62]
FDI	0.0003	0.0003	0.002**	0.001
	[1.19]	[1.16]	[2.02]	[1.60]
GAP	-0.004***	-0.01***	-0.002	-0.01*
	[-1.70]	[-2.59]	[-0.76]	[-1.68]
Sch	0.01	0.004	0.01**	0.01
	[1.93]	[0.84]	[2.27]	[1.08]
Open	-0.003	-0.0001	-0.004	-0.001
	[-0.62]	[-0.17]	[-0.71]	[-0.22]
Credit	0.002	0.003*	0.002	0.003
	[1.00]	[1.22]	[1.06]	[1.20]
POPG	0.003**	0.003**	0.004**	0.003**
	[2.18]	[2.07]	[2.37]	[2.17]
IPA	0.01**	0.01**	0.01**	0.01**
	[2.36]	[2.09]	[2.03]	[2.15]
FDIGAP			-0.0003**	-0.0003
			[-1.75]	[-1.32]
Constant	0.10***	0.08***	0.09***	0.07***
	[3.88]	[2.87]	[3.49]	[2.47]
Time dummies	No	Yes	No	Yes
No. of obs.	1484	1484	1484	1484
No. of groups	45	45	45	45
F test (p-value)	0.00	0.00	0.00	0.00
R-squared	90.87	91.17	90.73	91.09

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively. [1], [2], [3], [4], [5], [6], [7], [8] and [9] stands for Total Factor Productivity, Foreign Direct Investment, relative backwardness variable, school enrolment, trade openness as a % of GDP, private sector credit as a % of GDP, population growth, Investment Promotion Agency and the interaction term between FDI and relative backwardness.
Source: the author's calculations.

Table 3.10: Random Effects Model Estimation Results (Dependent Variable: TFP growth, 1980-2012).

Independent Variables	1	2	3	4	5	6
lagged TFP growth	0.85***	0.83***	0.84***	0.83***	0.84***	0.82***
	[73.92]	[70.51]	[72.49]	[73.52]	[71.67]	[68.74]
FDI	0.0001	-0.0001	0.0001	0.0001	0.001*	0.002**
	[0.56]	[-0.54]	[0.03]	[-0.41]	[-1.66]	[-2.19]
GAP	-0.02***	-0.02***	-0.02***	-0.03***	-0.02***	-0.03***
	[-11.00]	[-12.31]	[-11.40]	[-12.54]	[-11.18]	[-12.34]
IPA			0.01***	0.01**	0.01***	0.01***
			[3.73]	[2.57]	[3.67]	[2.30]
FDIGAP					0.0004	0.001
					[1.76]	[2.17]
Constant	0.11***	0.08***	0.11***	0.08***	0.12***	0.09***
	[12.12]	[6.77]	[12.40]	[7.01]	[12.25]	[7.42]
Time dummies	No	Yes	No	Yes	No	Yes
No. of obs.	1484	1484	1484	1484	1484	1484
No. of groups	45	45	45	45	45	45
F test (p-value)	0.00	0.00	0.00	0.00	0.00	0.00
R-squared	90.98	91.33	91.06	91.37	91.08	91.40

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively. [1], [2], [3], [4] and [5] stands for Total Factor Productivity, Foreign Direct Investment, the relative backward variable, Investment Promotion Agency and the interaction term between FDI and the relative backward term respectively. Source: the author's calculations.

Table 3.10: Random Effects Model Estimation Results (Dependent Variable: TFP growth, 1980-2012).

Independent Variables	7	8	9	10
lagged TFP growth	0.82***	0.80***	0.81***	0.81***
	[67.18]	[64.81]	[66.62]	[64.30]
FDI	-0.0001	-0.0001	-0.001	-0.001
	[-0.51]	[-0.27]	[-1.51]	[-1.47]
GAP	-0.02***	-0.02***	-0.02***	-0.02***
	[-8.14]	[-8.75]	[-7.99]	[-8.54]
Sch	0.01***	0.01**	0.01***	0.01***
	[5.37]	[4.37]	[5.35]	[4.21]
Open	0.001	0.0001	0.001	0.001
	[0.22]	[0.20]	[0.18]	[0.15]
Credit	0.003	0.003	0.002	0.002
	[1.41]	[1.49]	[1.25]	[1.36]
POPG	0.0001	0.001	0.001	0.001
	[-0.45]	[-0.55]	[-0.59]	[-0.60]
IPA	0.0007	0.01**	0.003	0.01***
	[0.23]	[2.09]	[1.04]	[1.94]
FDIGAP			-0.0003	-0.0003
			[1.43]	[1.46]
Constant	0.05**	0.03**	0.06***	0.07***
	[2.51]	[1.40]	[2.79]	[2.98]
Time dummies	No	Yes	No	Yes
No. of obs.	1484	1484	1484	1484
No. of groups	45	45	45	45
F test (p-value)	0.00	0.00	0.00	0.00
R-squared	91.26	91.50	91.27	91.52

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively. [1], [2], [3], [4], [5], [6], [7], [8] and [9] stands for Total Factor Productivity, Foreign Direct Investment, relative backwardness variable, school enrolment, trade openness as a % of GDP, private sector credit as a % of GDP, population growth, Investment Promotion Agency and the interaction term between FDI and relative backwardness.
Source: the author's calculations.

Table 3.11: One step System GMM Model Estimation Results.

Independent Variables	1	2	3	4	5
lagged TFP growth	0.55***	0.55***	0.55***	0.54***	0.54***
	[28.54]	[27.73]	[27.66]	[27.07]	[27.02]
FDI	0.001***	0.004*	0.002*	0.0001**	0.001
	[-4.13]	[-1.82]	[-1.68]	[-1.98]	[-1.56]
GAP	-0.03***	-0.02***	-0.02***	-0.02***	-0.02***
	[-7.72]	[-5.39]	[-5.52]	[-5.39]	[-5.48]
Sch				-0.02	-0.02
				[-3.50]	[-3.49]
Open				0.02***	0.02***
				[3.40]	[3.40]
Credit				0.005	0.005
				[1.38]	[1.36]
POPG				0.005**	0.005**
				[3.02]	[3.00]
IPA		0.04***	0.03***	0.02***	0.02**
		[-9.04]	[-8.78]	[-4.61]	[-4.49]
FDIGAP			-0.0003		-0.0002
			[1.20]		[1.02]
Constant	0.12***	0.09***	0.09***	0.04***	0.04
	[8.05]	[5.58]	[5.70]	[1.09]	[1.17]
No. of obs.	1395	1395	1395	1395	1395
No. of groups	45	45	45	45	45
No. of instruments	65	66	67	70	71
Sargan p-value	0.00	0.00	0.00	0.00	0.00

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively. [1], [2], [3], [4], [5], [6], [7], [8] and [9] stands for Total Factor Productivity, Foreign Direct Investment, relative backwardness variable, school enrolment, trade openness as a % of GDP, private sector credit as a % of GDP, population growth, Investment Promotion Agency and the interaction term between FDI and relative backwardness.
Source: the author's calculations.

Table 3.12: Two step System GMM Model Estimation Results.

Independent Variables	1	2	3	4	5
lagged TFP growth	0.55***	0.54***	0.54***	0.54***	0.54***
	[178.44]	[86.40]	[108.53]	[76.45]	[45.28]
FDI	0.001***	0.004***	0.001***	0.001***	0.001***
	[-27.77]	[-20.23]	[-8.98]	[-15.77]	[-7.56]
GAP	-0.03***	-0.02***	-0.02***	-0.02***	-0.02***
	[-46.22]	[-17.48]	[-17.49]	[-12.53]	[-11.55]
Sch				-0.02	-0.02
				[-10.12]	[-10.55]
Open				0.02***	0.02***
				[9.78]	[8.21]
Credit				0.004**	0.004
				[2.34]	[2.19]
POPG				0.005**	0.01***
				[3.93]	[3.36]
IPA		0.03***	0.03***	0.02***	0.02***
		[-23.59]	[-19.58]	[-13.77]	[-10.92]
FDIGAP			-0.003**		-0.0002***
			[5.91]		[4.51]
Constant	0.12***	0.09***	0.09***	0.04***	0.04***
	[49.17]	[21.03]	[20.79]	[2.95]	[3.32]
No. of obs.	1395	1395	1395	1395	1395
No. of groups	45	45	45	45	45
No. of instruments	65	66	67	70	71
Sargan p-value	0.97	0.95	0.96	0.97	0.97
AR(1) p-value	0.02	0.02	0.02	0.02	0.02
AR(1) p-value	0.00	0.00	0.00	0.00	0.00

Notes: *, **, and *** indicate statistical significance at 1 percent, 5 percent and 10 percent levels, respectively. [1], [2], [3], [4], [5], [6], [7], [8] and [9] stands for Total Factor Productivity, Foreign Direct Investment, relative backwardness variable, school enrolment, trade openness as a % of GDP, private sector credit as a % of GDP, population growth, Investment Promotion Agency and the interaction term between FDI and relative backwardness.
Source: the author's calculations

3.6 Conclusion and Policy Recommendations

Empirical literature on the relationship between FDI and productivity growth has produced mixed results. In this chapter we examine the impact of FDI on productivity growth and the role of relative backwardness (the technology gap) on a panel of 45 African countries over the period 1980-2012. We use two measures of relative backwardness namely: the distance from technological frontier (DTF) and the income gap (GAP). We apply the fixed effects, random effects and the system GMM method to account for the issues of endogeneity. The different estimation methods used help to check for the robustness of the results.

Our results show a general positive but insignificant effect of FDI on productivity growth in African countries under the sample. This suggests that FDI has a limited effect on productivity in African countries. The chapter supports previous studies that have questioned the widespread enthusiasm associated with FDI (e.g. Carkovic and Levine, 2005; Aitken and Harrison, 1999). The failure by many African countries to fully adopt foreign technologies may be because of the limited absorptive capacity. Blomstorm and Kokko (2003) observe that spillovers from FDI are not automatic and that they depend on local conditions. In particular, Borensztein et. al. (1998) and Xu (2000) show that FDI is more productive than domestic investment only when the host economy has sufficient human capital development.

African governments should focus more on improving the education and skills level of the labour force through human capital investments. Nelson and Phelps (1966) argue that human capital investments play a major role in growth via two channels namely: increasing a country's ability to undertake innovation and through enhancing the absorption and adoption of foreign technologies. Hence, as argued by (Ashraf et al, 2014), finite domestic government resources could probably be better utilised in human capital investments as opposed to offering generous tax incentives and non-tax incentives to multinational companies.

Our analysis of the advantage of relative backwardness does not support the convergence theory of Findlay (1978) and Wang and Blomstrom (1992). This is seen from the negative and significant sign of the relative backwardness variables DTF and GAP. Also, the interaction term variables

FDIDTF and FDIGAP are negative and significant. This suggests that the lower the technological development in the host country the smaller the spillovers from FDI. This observation is also shared by Glass and Saggi (1998) who show that relative backwardness is a deterrent to the absorption of spillovers from FDI as it limits the kind of technology that can be transferred.

Falvey et al (2005) emphasise that having a huge technological gap is unlikely to lead to greater knowledge diffusion and catch-up, unless certain preconditions exist that allow countries to absorb the inflow of foreign ideas and knowledge. Empirical evidence shows that institutions help in the diffusion of technology and that countries with better institutions tend to experience better technology diffusion than those countries lacking basic institutions (Manca, 2009). African governments therefore need to strengthen their institutions so as to improve their absorptive capacity and thereby close the technology gap.

Some scholars find that the potential of FDI to generate productivity effects differs across sectors and even across different countries. Nunnenkamp and Spatz (2003) find that aggregate growth in developing countries is higher if a country has a high FDI share in the machinery and electrical equipment industry rather than in the food, chemical or metal industries. Similarly, Aykut and Sayek (2005) find that a high share of agriculture in total FDI is negative for growth, whereas a high share of manufacturing FDI is significantly positive. Baltabaev (2014) argues that analysing FDI at the macro level may hide the dynamics and effects that may occur within and across sectors at the micro level. In future therefore it may be necessary to investigate the sectoral and country-level effects of FDI on productivity growth so as to provide a more holistic and comprehensive picture.

CHAPTER 4: THE IMPACT OF FOREIGN DIRECT INVESTMENT ON EXPORTS, IMPORTS AND PROFIT OUTFLOWS IN AFRICAN COUNTRIES

4.1 Introduction

This Chapter investigates the impact of FDI on exports, imports, and profit outflows in 47 African countries over the period 1980-2012. While the relationship between FDI, exports and imports has received a lot of coverage in literature, one aspect that has not received as much attention is the role of profit outflows (Yalta, 2012). Hence, FDI does not only affect the current account through trade (exports and imports) but also through profit and income repatriations from the host country. Many African governments have been offering generous incentives to foreign investors in the hope of attracting FDI inflows to finance the high current account deficits. Jansen (1995) argues that investment income payments arising from FDI complicate the relationship between FDI and the current account.

While FDI is often regarded as a driver of growth, its potential deleterious impact on the current account through profit remittances is often neglected. These profit remittances may actually cause external imbalances which may foster macroeconomic instability. As Bhinda and Martin (2009) observe, FDI inflows in SSA are often surpassed by profits repatriated raising questions about whether FDI is sustainable. Turner (1991) explains that capital flows magnify current account disequilibria, with deficit countries confronted by capital outflows and surplus countries by capital inflows. Similarly, Calvo et al. (1996) observe that the widening current account deficit is one of major problems associated with capital inflows. UNCTAD (2002) observes that the rising FDI inflows can affect the balance of payments because of profit outflows by the multinational enterprises. Guerin (2012) argues that the unsustainable current account deficit is one of the undesirable effects of capital flows in developing countries.

This chapter fills the gap in the literature by providing empirical evidence on the dynamic relationship between FDI, exports, imports and profit repatriations in Africa. This is an area that has remained largely unexplored in literature. Strauss (2015) observes that the notion of how profit repatriations associated with FDI are driving developing economies' current account deficits 'remains heavily under researched.' Most of the studies only examine the relationship between

FDI and the current account through exports and imports separately while neglecting the potential role of profit repatriations. Hence, most of the studies do not consider the overall effect of FDI on the current account deficit through other channels (Kaur et al, 2012). Some of the studies that consider the relationship between FDI and profit remittances include: Seabra and Flach (2005), Yalta (2012) and Strauss (2015). These studies are based on time series data and do not consider African economies. Seabra and Flach (2005) examine the relationship between FDI and profit remittances in Brazil while Yalta (2012) analyses the various channels through which FDI affects the current account in Turkey. Strauss (2015) studies the contribution of income repatriations from FDI to South Africa's current account deficit post-1994. It is therefore necessary to investigate the relationship between FDI flows and the current account in African economies using panel data analysis. Hence, this chapter is based on the panel cointegration and causality tests.

This chapter contributes to literature in a number of ways. By focusing on Africa the study captures the unique characteristics of the region and provides regional-specific policy recommendations. We build on the work by Yalta (2012) who examines the different channels through which FDI affects the current account in Turkey. We use panel cointegration techniques that are robust to omitted variables to estimate the long run relationship between FDI, exports, imports and profit remittances. Given that we include 47 countries over the period 1980-2012 our sample includes more countries over a longer time period than the samples used in previous studies in this area. Moreover, by including lagged explanatory variables panel procedures allow control for potential endogeneity problems.

The rest of the chapter is organised as follows: Section 4.2 is an overview of the trends in the current account and other selected macroeconomic indicators. Section 4.3 reviews and discusses the related literature. Section 4.4 details the data description and model specification. Section 4.5 presents the estimation and analysis of the results and section 4.6 is the conclusion and policy recommendations.

4.2 Trends in the Current Account and Selected Macroeconomic Indicators FDI in Africa

Widening current account deficits are a common and persistent feature in many African economies. To finance these deficits many African countries have resorted to external borrowing and capital inflows. Against the background of low savings and investments, questions have now been raised over the sustainability of the current account deficits (Osakwe and Verick, 2007). Edwards (2002) argues that high current account deficits increase the probability of a currency crisis. Table 4.1 shows trends in selected key macroeconomic indicators.

Table 4.1: Selected Macroeconomic Indicators for SSA.

Year	Current Account (% of GDP)	Fiscal Balance (% of GDP)	Gvt. Debt (% of GDP)	Exports (% of GDP)	Imports (% of GDP)	FDI (% of GDP)
2004	-1.6	-0.9	53.2	33.6	32.5	2.2
2005	-0.3	1.5	44.6	36.1	33.1	2.9
2006	3.8	2	33.3	37.5	34.1	1.2
2007	1.1	0	30	38.6	36.5	2.7
2008	-0.4	-0.3	29.1	41.1	40.1	4.1
2009	-3.1	-6.9	32.2	32.7	36.1	3.5
2010	-1.4	-5.1	31.8	34.8	35.5	2.1
2011	-1.4	-2.3	33	38.7	38.4	2.9
2012	-3	-3.7	33	36.6	38.1	2.4
2013	-4	-4.1	33.9	36.1	39.1	3.1
2014	-4	-4	34.8	35.2	38.3	2.9

Source: IMF World Economic Outlook (WEO) Database October 2013.

As presented in Table 4.1, the overall current account balance has steadily risen from -1.6 percent in 2004 to -4 percent in 2014. Not only have African countries been running current account deficits, they have also been running fiscal deficits (the twin deficit). The fiscal balance worsened from -0.9 percent in 2004 to -4 percent in 2014. Government debt has also risen in the same period from -0.9 percent to -4 percent. This suggests that a number of African countries have incurred debt to finance the high current and fiscal account deficits. In terms of the specific components of the current account, imports exceeded exports in the period 2009-2014 except for 2011. The trade deficit is a major driver of the current account imbalance as shown in Table 4.1. On the other hand, the UNDP (2011), reports that total remitted profits and dividends from FDI in the developing

world increased by about 736 percent from $33 billion in 1995 to $276 billion in 2008. The report also observes that profit remittances are increasing at a faster pace than FDI inflows, for instance, while profit remittances constituted about 29 percent of FDI inflows in 1995, by 2008 the figure had risen to 36 percent.

The current account deficit can also often viewed in terms of the gap between savings and investment. If savings are less than investment (a savings gap), this indicates that an economy needs to import financial resources to finance investment beyond the level of capital accumulation in the domestic economy. As shown in Table 4.2, investment (gross capital formation) in SSA countries has exceeded the level of domestic savings for the greater part of the period 1980-2012. This has resulted in a huge financing gap that has to be filled with foreign capital inflows such as FDI and external borrowings.

Table 4.2: Savings and Investments (% of GDP) for SSA.

Year	Savings	Investment	Year	Savings	Investment
1980	23.61	25.47	1997	14.96	17.75
1981	19.96	27.60	1998	14.77	18.83
1982	16.55	22.69	1999	14.34	17.69
1983	18.58	21.35	2000	16.15	17.38
1984	17.97	20.85	2001	15.14	17.50
1985	19.25	18.85	2002	16.74	17.60
1986	18.41	18.23	2003	16.35	18.41
1987	17.26	16.53	2004	16.87	19.31
1988	17.71	18.50	2005	16.38	19.15
1989	17.22	18.51	2006	16.38	19.98
1990	15.90	17.77	2007	16.43	21.10
1991	14.45	17.30	2008	16.23	22.12
1992	12.27	15.57	2009	14.07	20.96
1993	13.71	16.01	2010	17.03	20.92
1994	15.66	18.25	2011	16.96	21.22
1995	15.87	18.33	2012	17.04	21.46
1996	18.23	18.37			

Source: World Development Indicators (WDI) database.

4.3 Literature Review

Most of the previous studies only examine the relationship between FDI and the current account through exports and imports separately while neglecting the potential role of profit repatriations. Yalta (2012) observes that FDI can have a negative effect on the current account through repatriations of profit and dividends by the foreign investors. The UNCTAD (1999) estimates that for every $1 transferred to developing countries though FDI, around $0.30 leaves in the form of repatriated income. Doraisami (2007) notes that foreign investors tend to repatriate income to the home country even during times of crisis and thereby exacerbate the external imbalances. Once these profit remittances are taken as an indicator for the 'price' of FDI then FDI becomes an unsustainable form of financing current account deficits (Mold, 2008).

FDI inflows into Africa have been concentrated mostly in the extractive sectors. This has a negative effect on the balance of payments because the resultant profit remittances have surpassed any new FDI inflows (Nunnenkamp, 2004; UNCTAD, 2005). UNCTAD (2007) observes that in Chile while the boom in commodity prices led to a rise in the share of FDI through reinvested earnings, it unfortunately also resulted in an increase in profit remittances. Kumar (2007) argues that FDI inflows are a risky form of financing in many developing countries. This is because they are often associated with increasing incidence of capital flight during the times of financial crisis. Moreover, the income earned through the investment is repatriated to the home country or some other tax havens.

Campbell (2001) investigates the impact of FDI on the current account in Barbados from 1970-1999. The study applies cointegration regression analysis and finds that FDI inflows leads to deterioration in the current account balance both in the short run and in the long run. Lehman (2002) argues that FDI inflows result in a structural change in the external account of a country. The study uses data covering the period 1996-2000 for Brazil and Argentina and finds that FDI was responsible for causing huge income and profit repatriations that caused current account deficits in both countries. Furthermore, Woodward (2003) finds that FDI is one of the main factors driving current account deficits in the six countries in his sample. The study equates profit repatriations from FDI to loan repayments on external debt.

Similarly, Seabra and Flach (2005) investigate the causal relationship between FDI and profit remittances for Brazil using the Granger causality test procedure. Their findings indicate that FDI causes profit remittances. They emphasise the significant adverse long run effects of FDI attraction policies for the Brazilian economy. Yalta (2012) studies the effect of FDI on the current account in Turkey using a vector autoregressive (VAR) model. The results provide evidence that FDI negatively affects the current account because it is associated with a decrease in exports and an increase in both imports and profit remittances. The magnitude of the change in profit remittances in response to a change in FDI flows is greater than that of exports and imports. Likewise, Hossain (2007) examines the impact of FDI on Bangladesh's balance of payments over the period 1998 to 2007. The results show that FDI has an initial positive impact on the balance of payments. However, the medium term effect is negative because the foreign investors increase their imports of intermediate goods and services, and begin to repatriate profit and income. Liuyong and Yanping (2007) analyse the dynamic relationship between FDI and the balance of payments for China from 1983 to 2005 using the Granger causality test and impulse response function. The results confirm that FDI has a negative effect on the current account.

Meanwhile, Salman and Feng (2009) estimate the long run relationship between Pakistan's FDI and the current account balance using co-integration and error correction techniques. They find that Pakistan's FDI has long been the main factor in creating the current account deficit in the country. A one percent increase in the foreign direct investment is associated with a two percent increase in the current account deficit. Jaffri et al (2012) in an analysis of the impact of FDI inflows on the current account in Pakistan find that an increase in FDI is associated with an increase in income outflows and the worsening of the current account in the long run. Siddiqui et al (2013) examine the relationship between FDI and the current account in Pakistan. They use the Johansen-Juselius cointegration technique and the Granger causality test and their results show that FDI inflows lead to a deterioration of the balance of payments in the long run. There are however few papers that deal with panel data analysis of the relationship between FDI and the current account. One such study is Mencinger (2008), who analyses the relationship between FDI and the current account balance using panel data of eight EU new member states over the period 1996-2006. The study finds that FDI worsens the current account balance in all the EU new member states.

Interestingly, Athukorala and Menon (1996) in their study of the Malaysian economy find that export oriented FDI brought significant returns to Malaysia due to its favourable economic climate for internationalisation of production. Fry et al (1995) observe that if a country has a liberal foreign exchange rate regime more FDI is likely to be independent of the current account and other capital flows. Similarly, a study by Mucchielli and Soubaya (2000) on the determinants of the volume of trade of the French multinational corporations shows that inward FDI has a positive influence on foreign trade (including exports and imports), and this positive impact is stronger for exports as compared to imports.

Most of the literature on the relationship between FDI and the different components of the current account is time series and does not cover African economies. Strauss (2015) highlights that net income payments made to foreign investors accounted for about 37 percent of South Africa's current account deficit over the period 2004-2013. In addition, the study also finds that net investment income in South Africa has overtaken the trade balance in driving current account deficits. These findings however cannot be generalised for other African countries. Hence, there is need for a study to determine the impact of FDI on exports, imports and profit repatriations in Africa as a whole. This is very important because the current account deficit is an issue of great concern to policymakers in Africa.

4.4 Empirical Methodology

We use panel cointegration analysis in this study. Firstly, we test for a panel unit root. We employ three statistics proposed by Levine et al (2002), Im et al. (2003), and Breitung (2000). Secondly, we test for cointegration using the heterogeneous panel cointegration test developed by Pedroni (1999). This test allows different individual effects' cross-sectional interdependency. We also use the Kao panel co-integration test, which was developed by Kao (1999). We then estimate the long run relationship using both the dynamic ordinary least square (DOLS) and the fully modified ordinary least square (FMOLS) techniques for heterogeneous cointegrated panels (Pedroni, 2000). We establish a panel error correction model to examine short run and long run causalities between FDI, exports, imports and profit outflows. We also test the long relationship between FDI, exports,

imports and profit outflows using the autoregressive distributed lag (ARDL) for robustness checks. The bounds test for cointegration involves the comparison of the F-statistics against the critical values which are extracted from Pesaran and Pesaran (1997).

Panel cointegration tests enable us to determine the long-run structure of FDI, exports, imports and profit outflows in a dynamic setting. This helps to avoid some of the problems that are associated with using static cointegration tests. They also help to mitigate the problems relating to the sensitivity of cointegration tests to low-powered stationarity tests often associated with time series analysis (Eregha, 2012). Apergis et al, (2006) highlight that the use of these innovative panel data techniques allows for heterogeneity in coefficients and dynamics across countries, and also allows a researcher to test directly for the existence of long-run equilibrium relations among the variables. The basic model to be estimated can be specified as follows:

$$logFDI_{it} = \alpha + \beta_1 logExports_{it} + \beta_2 logImports_{it} + \beta_3 logProfit_{it} + \varepsilon_{it} \quad (4.1)$$

where (α) denotes the intercept term, $\beta_1, \beta_2, and\ \beta_3$ are the coefficients to be estimated. And (ε_{it}) is the error term, and the subscripts (t) are for the dating of variables in time periods. To conduct the cointegration test the following model is estimated:

$$X_{it} = \alpha_0 + \sum_{j=1}^{\rho} \beta_i Y_{it-j} + \varepsilon_{it} \quad (4.2)$$

where X_{it} = (FDI, Exports, Imports, Profit) is a 4 X 1 vector of the variables. α_0 is a 4 X 1 vector of the constants, ρ is the number of lags, β_i is a 3 X 3 matrix of parameters to be estimated and ε_{it} is a 3 X 1 vector of independent and identically distributed innovations. If the variables are cointegrated, we estimate the following Vector Error Correction Model (VECM):

$$\Delta X_{it} = \alpha_0 + \sum_{j=1}^{\rho-1} \Gamma_j \Delta X_{it-j} + \Pi X_{it-1} + \varepsilon_{it} \quad (4.3)$$

where $\boldsymbol{\Gamma_j} = \sum_{\boldsymbol{i=j+1}}^{\boldsymbol{\rho}} \boldsymbol{\alpha_i}$ and $\Pi = \sum_{j=1}^{\rho} \alpha_j - I$. Δ is the difference operator and I is an n X n identity matrix.

4.4.1 Data Description

We use annual data for the period 1980-2012 for 47 African economies chosen according to availability of data. The data on FDI, exports, imports and profit remittances is derived from World Development Indicators (WDI) database. Logarithms of the variables are used so that the estimated coefficients can be interpreted as percentages or elasticities (Narayan and Narayan, 2004). The variables, variable symbols and source of data are presented in Table 4.3.

Table 4.3: Variables used in the econometric analysis.

Variables Symbols	Variables	Source
FDI	Foreign Direct Investment inflows (% of GDP)	UNCTAD
Exports	Exports of goods and services (% of GDP)	World Bank
Imports	Imports of goods and services (% of GDP)	World Bank
Profit	Profit remittances (% of GDP)	World Bank

The list of the 47 countries included in the analysis is shown in Table 4.4.

Table 4.4: List of Countries.

Algeria	Congo	Liberia	Seychelles
Angola	Djibouti	Madagascar	Sierra Leone
Benin	DRC	Malawi	South Africa
Botswana	Egypt	Mali	Sudan
Burkina Faso	Ethiopia	Mauritania	Swaziland
Burundi	Gabon	Mauritius	Tanzania
Cameroon	Gambia	Morocco	Togo
Cape Verde	Ghana	Mozambique	Tunisia
Central Africa Republic	Guinea	Niger	Uganda
Chad	Guinea-Bissau	Nigeria	Zambia
Cote d'Ivore	Kenya	Rwanda	Zimbabwe
Comoros	Lesotho	Senegal	

4.5 Estimation and Results

4.5.1 Panel Unit Root Test

Panel data methodology uses both time and cross sectional data. It is therefore important that the variables be stationary in order to avoid possible spurious relationships among the variables (Bayar, 2014). We therefore investigate common unit root processes with panel unit root tests by Breitung (2000), Levin et al. (2002) and the individual unit root process by Im et al. (2003). The results of the stationarity tests are presented Table 4.5 in both levels and in first differences. FDI and exports are stationary at levels while imports and profit have a unit root. However, after first differencing all the variables become integrated of order 1.

Granger (1981) shows that when the series becomes stationary only after being differenced once (integrated of order one), they might have linear combinations that are stationary without differencing. In the literature, such series are called 'cointegrated'. Since all the variables are integrated of order one, then the next step is to apply panel cointegration test to determine whether a long run relationship exists (Mahadevan and Asafu-Adjaye, 2006).

Table 4.5: Panel Unit Root Test Results.

Variable	Panel Specifications	Unit Root Tests	Levels	First Differences
FDI	Individual Effects	LLC	-16.36***	-34.37***
		IPS	-10.14***	-41.18***
	Individual Effects and Trends	LLC	-12.78***	-26.33***
		IPS	-15.52***	-37.08***
		Breitung	-7.61***	-24.20***
Exports	Individual Effects	LLC	-1.98**	-34.00***
		IPS	-1.85**	-33.80***
	Individual Effects and Trends	LLC	-4.63***	-30.29***
		IPS	-4.55***	-31.12***
		Breitung	-4.06***	-22.07***
Imports	Individual Effects	LLC	-5.07***	-34.50***
		IPS	-4.64***	-34.65***
	Individual Effects and Trends	LLC	-4.92***	-31.81***
		IPS	-4.13***	-33.71***
		Breitung	-0.49	-23.08***
Profit	Individual Effects	LLC	-1.31	-29.18***
		IPS	-0.36	-35.79***
	Individual Effects and Trends	LLC	-3.27***	-25.28***
		IPS	-8.07***	-33.10***
		Breitung	-2.34***	-4.71***

Selection of lags based on Modified Akaike Information Criterion; Newey-West bandwidth selection using Bartlett kernel; Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality; H_0: Unit root (assumes individual unit root process). * Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

4.5.2 Panel Cointegration Analysis

The selection of the correct lag length is very crucial in carrying out any further tests as this has implications for cointegration, VECM and Granger causality tests. We use the VAR lag order selection criteria to obtain the ideal lag for the model used in our study. According to the lag length selection criteria, the optimal lag length which minimises both the Akaike information criterion (AIC) and the Schwarz Bayesian Criterion (SBC) is 1.

We use the Pedroni (1999) and Kao (1999) cointegration tests to determine whether there is a long run relationship between FDI, exports, imports and profit outflows. The Pedroni (1999) approach is robust to potential endogeneity problems and allows for both heterogeneous cointegrating

vectors and short run dynamics across countries. The first of the panel cointegration statistics is a non-parametric variance ration test. The second and the third are panel versions of the Phillips and Perron (PP) rho and t-statistic, respectively. The fourth statistic is a panel ADF statistic similar to the Levin et al. (2002) panel unit root test. The first two of the group mean panel cointegration statistics are panel versions of the Phillips and Perron rho and t-statistic respectively. The third is a group mean ADF test similar to the Im et al (2003) panel unit root test.

The panel cointegration statistics and the group mean panel cointegration statistics test the null hypothesis H_0: 'all the individual variables are not cointegrated.' For the panel statistics, the alternative hypothesis is H_1: 'all of the individual variables are cointegrated,' while for the group mean panel statistics, the alternative is H_1: 'a significant portion of the panel members are cointegrated' (Pedroni, 2004). The results of the panel cointegration tests are presented in Table 4.6(a) and Table 4.6(b). Seven co-integration tests are presented to cover 'within' and 'between' effects in the panel and these tests were separated as two different categories (Asteriou and Hall, 2007). The first category includes 4 tests which are pooled at 'within' dimension. The second category includes the remaining 3 tests pooled at 'between' dimension. We conducted three models of the Pedroni cointegration tests namely: no deterministic trend; deterministic intercept and trend; and no deterministic intercept and trend. We also applied the Kao test. The results from both the Pedroni and Kao cointegration tests show that there is a long run equilibrium relationship among the variables (FDI, exports, imports and profit outflows) except under the panel v-Statistic (Weighted t-Statistic). This suggests that there is cointegration and hence we reject the null hypothesis of 'no cointegration.'

Table 4.6(a): Results of Panel Cointegration Tests.

Pedroni Panel Cointegration Test (No Deterministic Trend)				
	(Within-Dimension)			
	t-Statistic	Prob.	Weighted t-Statistic	Prob.
Panel v-Statistic	2.58	0.00	-2.39	0.99
Panel rho-Statistic	-6.90	0.00	-7.30	0.00
Panel PP-Statistic	-14.08	0.00	-14.36	0.00
Panel ADF-Statistic	-10.73	0.00	-13.78	0.00
	(Between-Dimension)			
	t-Statistic	Prob.		
Group rho-Statistic	-5.44	0.00		
Group PP-Statistic	-16.49	0.00		
Group ADF-Statistic	-15.53	0.00		
Pedroni Panel Cointegration Test (Deterministic Intercept and Trend)				
	(Within-Dimension)			
	t-Statistic	Prob.	Weighted t-Statistic	Prob.
Panel v-Statistic	0.14	0.44	-5.86	1.00
Panel rho-Statistic	-6.13	0.00	-5.22	0.00
Panel PP-Statistic	-19.72	0.00	-17.25	0.00
Panel ADF-Statistic	-17.24	0.00	-16.06	0.00
	(Between-Dimension)			
	t-Statistic	Prob.		
Group rho-Statistic	-3.37	0.00		
Group PP-Statistic	-19.98	0.00		
Group ADF-Statistic	-16.80	0.00		

* Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

Table 4.6(b): Results of Panel Cointegration Tests.

Pedroni Panel Cointegration Test (No Deterministic Intercept or Trend)				
	(Within-Dimension)			
	t-Statistic	Prob.	Weighted t-Statistic	Prob.
Panel v-Statistic	3.02	0.00	-1.31	0.90
Panel rho-Statistic	-6.52	0.00	-6.32	0.00
Panel PP-Statistic	-10.55	0.00	-10.59	0.00
Panel ADF-Statistic	-8.75	0.00	-9.97	0.00
	(Between-Dimension)			
	t-Statistic	Prob.		
Group rho-Statistic	-6.03	0.00		
Group PP-Statistic	-14.85	0.00		
Group ADF-Statistic	-13.35	0.00		

Kao Panel Cointegration Test		
	t-Statistic	Prob.
ADF	-3.50	0.00***
Residual Variance	3.13	
HAC Variance	0.89	

* Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

To confirm our results, the Johansen trace test for cointegration is regressed to find out whether there is a long run association amongst the variables of the study. Table 4.7 shows results from the Johansen Trace test for cointegration and they confirm the presence of cointegration for the variables used in this study. This implies that there is a long run relationship amongst the variables. Accordingly, the variables involved in the regression equation will move together (Engle and Granger, 1987).

Table 4.7: Johansen Test Result for Cointegration.

Hypothesised No of CE(s)	Trace Statistic	Prob.	Max-Eigen Statistic	Prob.
None	483.9***	0.00	368.7***	0.00
At most 1	212.8***	0.00	176***	0.00
At most 2	107.7	0.16	99.99	0.32
At most 3	100.5	0.30	100.5	0.30

* Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

4.5.3 Estimating the long run relationship

Having established that there is a long run relationship between FDI, exports, imports and profit outflows, the next step in our analysis is to estimate the long run coefficients (β). To achieve this objective we use the fully modified ordinary least squares (FMOLS) method developed by Pedroni (2000) and the dynamic ordinary least squares (DOLS) method developed by Kao and Chiang (2000). The DOLS method uses the parametric approach which adjusts for autocorrelation by including the lagged first differences into the model while the FMOLS method adopts a nonparametric approach dealing with autocorrelation and yields biased results in small estimators (Breitung, 2005). The DOLS method allows for greater flexibility in the presence of heterogeneous cointegrating vectors whereas under the FMOLS the cointegrating vectors are constrained to be the same for each country. We used both FMOLS and DOLS methods in estimation of final unbiased coefficients of the cointegration relationship (Bayar, 2014).

The results of DOLS and FMOLS estimation methods are presented in Table 4.8. The results show that an increase in FDI inflows results in an increase in both imports and profit outflows and in a decrease in exports. According to the DOLS there is a negative relationship between FDI and exports. A one percent increase in FDI reduces exports by 1.11 percent. There is however a positive relationship between FDI and both imports and profits. An increase in FDI is associated with an increase in both imports and profit outflows of 2.32 percent and 0.35 percent respectively.

Results from the FMOLS show that the relationship between FDI and exports is not significant. However, there is a positive and significant relationship between FDI and both imports and profit.

This means an increase in FDI results in an increase in both imports and profit outflows. In particular, as presented in Table 4.8, an increase in FDI of one percent is associated with an increase in imports by 1.10 percent and a rise in profits outflows of 0.35 percent.

Table 4.8: Estimation Results of DOLS and FMOLS.

		DOLS		FMOLS	
		Coefficient	t-Statistics	Coefficient	t-statistic
Panel	Exports	-1.11**	-2.13	0.22	0.93
	Imports	2.32***	4.18	1.10***	3.90
	Profit	0.35***	3.53	0.35***	7.59

* Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

We also test the long relationship among FDI, exports, imports and profit using the ARDL approach to check the robustness of our cointegration test results. The bounds test for cointegration involves the comparison of the F-statistics against the critical values which are extracted from Pesaran and Pesaran (1997). The calculated F-statistic is presented in Table 4.9. The calculated F-statistic when FDI is the dependent variable is = 32.58 which is higher than the upper bound critical value of 3.63 at the 5 percent level of significance (see Table 4.10). This means that we can reject the null hypothesis of no cointegration confirming that indeed there is a long run association among the variables.

Table 4.9: Wald Test.

Test Statistic	Value	d.f.	Probability
F-Statistic	32.58	-41,397	0.00
Chi-Square	130.32	4	0.00

Table 4.10: Critical Value Bounds of the F-statistic.

Critical Value Bounds of the F-statistic								
	90%		95%		97%		99%	
k	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
3	2.01	3.1	2.45	3.63	2.87	4.16	3.42	4.84

Source: The critical value bounds are from Pesaran et al (1999). Note: k is the number of regressors.

The main advantage for using the bounds test approach is that it is applicable irrespective of whether the underlying regressors are purely I (0), purely I (1), or mutually cointegrated. Thus,

because the bounds test does not depend on pretesting the order of integration of the variables, it eliminates the uncertainty associated with pretesting the order of integration (Narayan and Narayan, 2004). Table 4.11 shows the long run coefficients (β) from the ARDL test. The results show that FDI inflows are associated with a decrease in exports and in an increase both imports and profit outflows. This confirms the results from DOLS and FMOLS reported in Table 4.8.

Table 4.11: ARDL Test Results.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-17.83***	1.88	-9.46	0.00
Exports	-0.84***	0.40	-2.08	0.04
Imports	5.07***	0.48	10.55	0.00
Profit	0.31***	0.08	3.74	0.00
R-squared	0.60			
Adj. R-squared	0.60			
F-statistic	57.12			
Prob. (F-statistic)	0.00			
Durbin-Watson Sta.	0.93			

* Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

4.5.4 Testing for long run causality

The fact that there is a long run relationship among the variables implies that there is at least a unidirectional causality among the variables. Therefore, we test long-run causality among the variables by searching the significance of test statistics of error correction coefficient. Table 4.12 shows the results from the long run panel causality analysis. The results confirm that there is uni-directional running from FDI to exports, imports and profit remittances. The error correction term (ECT) is statistically significant at the 1 percent level of significance suggesting a moderate speed of convergence to equilibrium.

Table 4.12: Results of Long Run Panel Causality Analysis.

ΔFDI		f(ΔExports, Δ Imports, ΔProfit)
	ECT	-0.34
	t-statistics	15.56***
ΔExports		f (ΔFDI, ΔImports, ΔProfit)
	ECT	0.01
	t-statistics	3.49
ΔImports		f(ΔFDI, ΔExports, ΔProfit)
	ECT	0.01
	t-statistics	2.59
ΔProfit		f(ΔFDI, ΔExports, Δ Imports)
	ECT	0.03
	t-statistics	2.18

* Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

The results from the short run causality analysis though not reported show that there is no short run causality among the variables.

4.5.5 Impulse Response

The impulse response function traces out the responsiveness of the dependent variables to shocks to each of the other variables (Pesaran and Shin, 1998). Impulse response functions are an additional check of the findings from our panel cointegration tests. They show how an anticipated change in one variable affects the other variables over time. The results of the impulse response functions are presented in Tables 4.13-4.16. Ten years horizon is employed in order to allow the dynamic of the system to work out. We use all the 47 African economies as one regional bloc. A shock to FDI has a positive effect on imports and profit. The effect on exports is only significant in a few periods as shown in Table 4.13. As presented in Table 4.13 in response to a one standard deviation disturbance in current FDI future FDI increases by 147 percent in the first period, 46 percent in the fifth period and down to 26 percent in the 10th period. A one standard deviation originating from FDI results in a 13 percent increase in exports and a 10 percent increase in imports and a 4 percent increase in profit repatriations in the 2nd period. The increase in exports however becomes insignificant in subsequent periods. This confirms the results from the FMOLS presented

in Table 4.8. The increase in imports continually increases reaching 19 percent in the 10th period. This probably explains the problem of persistent current account deficits in Africa.

As shown in Table 4.14 a one standard deviation disturbance originating from exports results in an increase in FDI by only 1 percent in the first period with exports in the first period increasing by 19 percent with however no corresponding increase in both imports and profit. Over time however, the changes in both imports and profit become negative though not very significant. Table 4.15 shows that the impact of profit is not very significant. The impact of imports on FDI rises by 2 percent in the 1st period to 5 percent in the 10th period and exports rises by 7 percent in the 1st period before declining slightly to 6 percent in the 10th period. A one standard deviation originating from imports results in imports rising by 16 percent in the first period and before declining to 12 percent in the 10th period. As shown in Table 4.16 the impact of profit on FDI increases by 4 percent in the 1st period and rises to 12 percent in the 10th period. While on the other hand a one standard deviation disturbance originating from profit causes profit to increase by 83 percent in the first period. The increase though still very large declines to 55 percent in the 10th period.

Table 4.13: Response of FDI.

Period	FDI	Exports	Imports	Profit
1	1.47**	0.00***	0.00***	0.00***
2	0.67**	0.13**	0.10**	0.04**
3	0.46**	0.11	0.19**	0.00**
4	0.57**	0.09	0.13	0.04**
5	0.46**	0.12	0.15	0.05**
6	0.38**	0.13	0.17	0.05**
7	0.35**	0.19*	0.17	0.06**
8	0.32**	0.14	0.17**	0.06**
9	0.28**	0.14*	0.18**	0.07**
10	0.26**	0.14*	0.19**	0.07**

* Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

Table 4.14: Response of Exports.

Period	FDI	Exports	Imports	Profit
1	0.01***	0.19***	0.00***	0.00***
2	0.02**	0.16***	-0.01***	-0.0004***
3	0.02***	0.14***	0.01***	-0.00005**
4	0.03***	0.14***	0.00***	-0.002**
5	0.03***	0.15***	-0.003***	-0.003***
6	0.04***	0.14***	-0.002***	-0.003***
7	0.04***	0.14***	-0.002***	-0.003***
8	0.04***	0.14***	-0.003***	-0.004***
9	0.05***	0.14***	-0.004***	-0.004**
10	0.05**	0.14***	-0.004***	-0.004***

* Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

Table 4.15: Response of Imports.

Period	FDI	Exports	Imports	Profit
1	0.02***	0.07***	0.16***	0.00***
2	0.02***	0.07***	0.12***	-0.003***
3	0.02***	0.06***	0.12***	-0.006***
4	0.03***	0.06***	0.12***	-0.005***
5	0.04***	0.06***	0.12***	-0.005***
6	0.04***	0.06***	0.12***	-0.006***
7	0.04***	0.06***	0.12***	-0.006***
8	0.05***	0.06***	0.12***	-0.007***
9	0.05***	0.06***	0.12***	-0.007***
10	0.05***	0.06***	0.12***	-0.007***

* Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

Table 4.16: Response of Profit.

Period	FDI	Exports	Imports	Profit
1	0.04**	0.02**	-0.02**	0.83**
2	0.04**	0.05**	-0.002**	0.56**
3	0.06**	0.05**	-0.02**	0.53**
4	0.08**	0.03	-0.02**	0.57**
5	0.09**	0.03	-0.02**	0.56**
6	0.10**	0.03**	-0.02**	0.55**
7	0.11**	0.03**	-0.02**	0.57**
8	0.11**	0.03**	-0.02**	0.56**
9	0.12**	0.03**	-0.03**	0.55**
10	0.12**	0.03**	-0.03**	0.55**

* Significant at 10% level. ** Significant at 5% level. *** Significant at 1% level.

4.5.6 Variance Decomposition

Variance decomposition is regressed to measure the contribution of each type of shocks to the forecast error variance (Campbell, 1991). With respect of FDI inflows, the result obtained are shown in Table 4.17. Table 4.17 shows that 100 percent of FDI inflows variance is accounted for by current FDI in the first period, and the percentages are still significant over the forecasted 10 year period. Profit has the least contribution and show a slight gradual increase in its contribution compared to imports. Export variance increased from 0.59 percent in the second period reaching 4.59 percent in the tenth year. Profit variance increased from 0.18 percent in the second period to 1.73 in the tenth period.

In Table 4.18, 99.52 percent of the exports variance is accounted for by exports in the first period with FDI contributing only 0.48 percent. This implies that the shock to exports is largely related to its own shock in the first period. The shocks from FDI however increase from 0.48 percent in the first period to 4.48 percent in the tenth period. As shown in Table 4.19, 80.25 percent of imports variance can be explained by the current imports in the first period and the percentage remains significant at the end of the tenth period reaching 74.91 percent. At the end of the 10 years period exports contribute 20.82 percent and profits a negligible 0.01. According to Table 4.20 the forecast error variance of profits is significantly linked to its own shock. The contribution of FDI increases

from 0.31 in the first period to 2.28 in the tenth period. Exports' contribution rises from 0.02 in the first period to 0.17 in the tenth period while imports' contribution declines from 0.06 in the first period to 0.04 in the tenth period.

Table 4.17: Variance Decomposition of FDI.

Period	SE	FDI	Exports	Imports	Profit
1	1.50	100.00	0.00	0.00	0.00
2	1.67	99.00	0.59	0.22	0.18
3	1.80	98.39	0.89	0.47	0.28
4	1.87	97.40	1.34	0.81	0.45
5	1.91	96.30	1.83	1.23	0.63
6	1.95	95.08	2.36	1.72	0.84
7	1.98	93.80	2.91	2.24	1.06
8	2.00	92.47	3.47	2.78	1.28
9	2.03	91.12	4.03	3.34	1.51
10	2.05	89.78	4.59	3.90	1.73

Table 4.18: Variance Decomposition of Exports.

Period	SE	FDI	Exports	Imports	Profit
1	0.19	0.48	99.52	0.00	0.00
2	0.26	1.17	98.63	0.20	0.00
3	0.31	1.75	98.02	0.23	0.00
4	0.35	2.31	97.42	0.27	0.01
5	0.40	2.80	96.90	0.29	0.01
6	0.43	3.24	96.44	0.32	0.01
7	0.46	3.62	96.04	0.34	0.01
8	0.49	3.95	95.69	0.35	0.01
9	0.52	4.23	95.39	0.37	0.01
10	0.55	4.48	95.13	0.38	0.01

Table 4.19: Variance Decomposition of Imports

Period	SE	FDI	Exports	Imports	Profit
1	0.18	0.87	18.88	80.25	0.00
2	0.23	1.42	20.49	78.08	0.00
3	0.27	1.94	20.71	77.34	0.00
4	0.31	2.42	20.84	76.74	0.00
5	0.35	2.84	20.87	76.28	0.01
6	0.38	3.21	20.88	75.90	0.01
7	0.41	3.53	20.87	75.59	0.01
8	0.43	3.80	20.86	75.33	0.01
9	0.46	4.04	20.84	75.10	0.01
10	0.48	4.25	20.82	74.91	0.01

Table 4.20: Variance Decomposition of Profit

Period	SE	FDI	Exports	Imports	Profit
1	0.83	0.31	0.02	0.06	99.61
2	1.03	0.46	0.18	0.04	99.33
3	1.22	0.78	0.17	0.04	99.01
4	1.38	1.06	0.18	0.04	98.73
5	1.53	1.33	0.18	0.04	98.46
6	1.67	1.57	0.17	0.04	98.22
7	1.79	1.78	0.17	0.04	98.01
8	1.91	1.97	0.17	0.04	97.82
9	2.02	2.13	0.17	0.04	97.66
10	2.12	2.28	0.17	0.04	97.51

4.6 Conclusion and Policy Recommendations

This chapter investigates the long run dynamic relationship between FDI inflows, exports, imports and profit outflows for a panel of 47 selected African countries by means of panel cointegration techniques. We use both the vector error correction model (VECM) and the ARDL model. This chapter fills a gap in the literature by providing empirical evidence on the long run dynamic relationship between FDI, exports, imports and profit repatriations in Africa. Given that we include 47 countries over the period 1980-2012 our sample includes more countries over a longer time

period than the samples used in previous studies in this area. Moreover, by including lagged explanatory variables panel procedures we control for potential endogeneity problems.

The results from the cointegration tests show that a long run relationship exists between our variables. Our findings provide evidence that FDI has a negative effect on the current account. In particular, an increase in FDI inflows is associated with an increase in both imports and profit remittances while an increase in FDI results in a decrease in exports. Our results are in line with the findings from: Lehman (2002); Seabra and Flach (2005); Yalta (2012); Hossain (2007). The findings confirm that profit outflows by multinational companies are one of the major factors driving current account deficits in African countries. Our findings have several policy implications. Firstly, African governments should diversify their economies away from the traditional agricultural and extractives sector to manufacturing. This may entail providing incentives for investors (both local and foreign) in the agricultural and extractives sectors to move up the value chain. Habiyaremye and Ziesemer (2006) find that FDI has not significantly enhanced growth in SSA because most of the investment has been concentrated in the primary sector. African governments should therefore provide incentives for FDI into diversified and higher value-added activities.

African governments need to improve their host country factors and overall policy environment in order to enhance the absorptive capacity and to maximise the possible spillovers from FDI. This involves scaling up investment in human capital, infrastructure and strengthening institutions. It has been shown that spillovers from FDI can be fully maximised when the FDI improves the capacity of local businesses and citizens (Carkovic and Levine, 2005; De Mello, 1999; Ndikumana and Verick, 2008). Moreover, as noted by Ali and Walters (2011), a poor local investment environment alters the relative risk and returns profile of locally held assets in a way that generates incentives for capital flight. This implies that African governments need to implement policies that promote domestic investment and also to adopt a targeted approach to attracting FDI inflows. Keshava (2008) has shown that the effectiveness of FDI is enhanced when the host economy has a strong local investment environment. In particular, incentives should be provided to foreign investment with greater scope and potential for linkages with domestic investment.

CHAPTER 5: CONCLUSION AND POLICY IMPLICATIONS

5.1 Key Issues

The thesis focuses on the impact of FDI on economic performance in selected African countries over the period 1980-2012. Firstly, we examine the link between FDI and domestic investment and the role of host country factors such as financial development, institutional development and trade openness. We use the dynamic ordinary least squares, random effects, fixed effects and the system GMM methodologies on a panel of 48 African countries for the period 1980 to 2012.

Secondly, we investigate the impact of FDI on total factor productivity (TFP) and the role of relative backwardness (the technology gap) on a panel of 45 African countries over the period 1980-2012. We use two measures of relative backwardness namely: the distance from technological frontier and the income gap. We apply the fixed effects, random effects and the system GMM method to account for the issues of endogeneity. Thirdly, we analyse the long run dynamic relationship between FDI, exports, imports and profit outflows in 47 African countries over the period 1980-2012 by means of panel cointegration techniques.

Overall, the analysis in Chapter 2 shows that there is a negative relationship between FDI and domestic investment. While the negative correlation may suggest that FDI has a crowding-out effect it could also equally imply that countries with lower private investment attract FDI because there are more domestically unsatisfied opportunities for foreign investors (e.g. because of resource endowments requiring foreign expertise). More importantly this negative relationship between FDI and domestic investment does not necessarily imply that FDI has no positive effects on growth or that FDI is not needed. It may as well be that the positive benefits from FDI in African economies may be as a result of an increase in total factor productivity (TFP) which more than compensates for the decline in domestic investment (Ndikumana and Verick, 2008).

Moreover, FDI's growth-enhancing impact can only be realised when it stimulates the absorptive capacity of the host country (Carkovic and Levine, 2002; Makki and Somwaru, 2004). The study also finds that improved institutions do mitigate the negative effects of FDI while financial market development exacerbates the negative effects of FDI on private domestic investment. This implies

that there is a need to develop policies to strengthen institutions. The review of the literature also suggests that African countries will benefit from measures aimed at promoting private domestic investment.

Our results in Chapter 3 show a general positive but insignificant effect of FDI on productivity growth in African countries under the sample. This suggests that FDI has a limited effect on productivity in African countries. The chapter supports previous studies that have questioned the widespread enthusiasm associated with FDI (e.g. Carkovic and Levine, 2005; Aitken and Harrison, 1999). The failure by many African countries to fully adopt foreign technologies may be because of the limited absorptive capacity. Blomstorm and Kokko (2003) observe that spillovers from FDI are not automatic and that they depend on local conditions. In particular, Borensztein et. al. (1998) and Xu (2000) show that FDI is more productive than domestic investment only when the host economy has sufficient human capital development.

The analyses in Chapter 4 on the impact of FDI on exports, imports and profit outflows in 47 African countries over the period 1980-2012 show that a long run relationship exists between the variables. Our findings provide evidence on the adverse long run effects of FDI on the current account in African economies. In particular, the results show that, FDI inflows lead to a decrease in exports and an increase in both imports and profit remittances. These findings confirm that indeed profit outflows by multinational companies are one of the main factors driving current account deficits in African countries.

5.2 Policy Recommendations

The results do confirm that FDI's growth-enhancing impact can only be realised when it stimulates the absorptive capacity of the host country (Carkovic and Levine, 2002; Makki and Somwaru, 2004). African countries should therefore develop policies to improve local conditions, strengthen institutional quality and enhance trade openness. African governments should focus more on improving the education and skills level of the labor force through human capital investments. Nelson and Phelps (1966) argue that human capital investments play a major role in growth via two channels namely: increasing a country's ability to undertake innovation and through

enhancing the absorption and adoption of technology. Hence, as argued by (Ashraf et al, 2014), finite domestic government resources could probably be better utilised in human capital investments as opposed to offering tax and other non-tax incentives to multinational companies. Empirical evidence shows that institutions help in the diffusion of technology and countries with better institutions tend to experience better technology diffusion and that those countries lacking basic institutions experience difficulties in absorbing foreign technology (Manca, 2009). African governments should strengthen their institutions so as to improve their absorptive capacity and thereby close the technology gap.

Policy efforts aimed at attracting FDI should be balanced with the imperative of strengthening domestic firms, entrepreneurship and local innovation. Keshava (2008) has demonstrated that even in those countries where FDI has been more productive and beneficial, domestic investment is more effective than FDI in promoting growth. Investment incentives should not discriminate against domestic investment. Policymakers should therefore implement policies that strengthen the linkages between FDI and the local industry. Importantly, the objectives of multinational corporations need to be synchronised with the development imperatives and goals of African countries. Regional integration in the region needs to be expedited in line with the recommendations from UNCTAD (2005), which notes that African countries need to think regionally. Market and competition regulations to dismantle the monopolistic tendencies of some foreign investors should be strengthened in many African countries.

The continent should also adopt a targeted approach to FDI. As Alfaro and Charlton (2007) argue, some types of FDI may be more beneficial and productive than others. Agosin and Mayer (2000) note that the reason why FDI has been more productive in Asia than in other developing countries is because of the cautious and targeted approach. In addition, Adams (2009) observes that this approach should involve careful screening of investment projects and granting differential incentives to investments in different sectors. While FDI inflows in African countries have mainly been concentrated in the extractive sector, in most Asian countries FDI has largely been focused towards the secondary sector, thereby contributing to the diversification of the export base (UNCTAD, 2007). African policy makers should therefore seriously consider the prioritisation of FDI to sectors such as manufacturing so as to diversify growth and the export base.

5.3 Suggested Areas for Further Research

Future research however needs to be undertaken to investigate the impact of the different forms of FDI on domestic investment and productivity growth. FDI comes in two basic forms namely: greenfield investments which involve the creation of new production processes and mergers and acquisitions (M&As) which involve the purchase of assets of existing local companies. FDI can also be classified according to its purpose namely: natural resource seeking, market seeking, efficiency seeking and strategic asset seeking (Dunning, 1993). It is possible that these two forms of investment have different effects on domestic investment. This therefore calls for empirical analysis that investigates the different effects of the different forms of FDI on domestic investment and productivity growth in African economies.

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