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Title

Impact of FDI on income inequality in Africa

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Summary

FDI is considered as a channel of growth and economic development for the country therefore, many developing countries have gone through economic reforms adopting liberalisation policies towards FDI for achieving higher economic development. There have been contradicting views about the impact of FDI on the economies of recipient countries. Also, there are contradictory evidences in the literature explaining the relationship between FDI and income inequality therefore, present research aims to explain the relationship between FDI and income inequality using dependency theory. It also attempts to identify the factors which determine this relationship in African countries.

The study confirms the argument of dependency theory that the relationship between FDI and income inequality is not direct rather it is determined by local factors such as absorptive capacity, human capital, technology and innovation and institutional environment. It is found that all these factors influence the impact of total and sectoral FDI on income inequality(Li and Liu 2005) but absorptive capacity is the most important factor that positively determine the relationship between FDI and income inequality(Wu and Hsu 2012). In general, a higher absorptive capacity in the country is associated with lower income inequality that is countries with higher absorptive capacity have lower income inequality.

Further the present study found that role of FDI is also sector specific where FDI in hi-tech and manufacturing sector reduces income inequality in African countries while inward FDI in other sectors does not make a significant impact in the host countries. At regional level, there is no significant relationship between FDI and income inequality because of lack of heterogeneity in the sample of countries.

Keywords

Income inequality, Greenfield Foreign Direct Investment, hi-tech sector, manufacturing sector, service sector, resource absorptive capacity, technology diffusion, human capital, quality of institutions

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Dedication

I dedicate this thesis to my parents Dalbir Kaur and Baljit Singh.

Foreword

This thesis is part of one year MSc. in Urban Management and Development at Institute for Housing and Urban Development (IHS), Erasmus University Rotterdam, Netherlands. The purpose of this study to analyse the relationship between FDI and income inequality and to identify the factors which determine this relationship in the context of African countries.

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Abbreviations

HIS	Institute for Housing and Urban Development
FDI	Foreign Direct Investment
MNC	Multinational Corporations
GCI	Global Competitiveness Index
MNEs	Multinational Enterprises
GDP	Gross Domestic Product
USD	United States Dollars
WB	World Bank
OECD	Organisation for Economic Co-operation and Development
Min.	Minimum
Max.	Maximum
SD	Standard Deviation
HIS	Institute for Housing and Urban Development
FDI	Foreign Direct Investment
MNC	Multinational Corporations
MNEs	Multinational Enterprises
GDP	Gross Domestic Product
USD	United States Dollars

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Chapter 1: Introduction

1.1. Background

Globalisation is one of the most important processes which are shaping the world through increasing economic integration across the world. Foreign Direct Investment (FDI) and liberalisation are two major components of economic globalisation (Mah, 2003). Economic growth has been considered as a prime solution for reducing poverty, therefore, many developing countries have gone through economic reforms adopting liberalisation policies towards FDI for achieving higher economic development.

There have been contradicting views about the impact of FDI on the economies of recipient countries. According to proponents of neoclassical theory, FDI fosters economic growth and productivity in host countries. It is a common belief among most of the development economists and international institutions that apart from filling the resource gap FDI can lead to higher economic growth and development in host country through technical diffusion, development of human capital and management skills and access to the export market (Tsai, 1995, Li and Liu, 2004).

However, literature presents conflicting evidence on the long- term and transnational impact of Multi-National Companies and FDI. According to Nair and Weinhold, the causal relationship between FDI and economic growth is heterogeneous across countries (Nair-Reichert and Weinhold, 2001). In addition to this, a persistent poverty in developing countries accompanied by high economic growth raises a question on the effectiveness of growth as a solution for poverty reduction. For instance, despite economic growth, Asian countries have been experiencing increasing relative poverty that is income inequality (Perera and Lee, 2013).

Contrary to neoclassical approach is dependency theory, which states that economic dependency on developed countries has a negative social and economic impact on developing countries, particularly in the long run. Supporters of dependency theory claim that FDI has a negative impact on the economic growth of developing countries and results into disparities and fragmentation in the economy (Firebaugh and Beck, 1994). Multi-National Companies (MNCs) leads to the process of fragmentation of production, it is expected that inflow of FDI causes an increase in inequality between highly skilled workers and low-skilled workers. This increased income disparity results into a higher level of inequality in society as a whole. Tsai also supported dependency theory by concluding that FDI has led to uneven income distribution in east and south East Asian countries (Tsai, 1995). A recent literature on dependency theory suggests that the impact of FDI on income inequality is determined by local conditions in the host countries particularly absorptive capacity, technology diffusion and government ideology (Wu and Hsu 2012; Schneider and Soskice 2009).

A vast literature is available on economic growth, distribution of income which has shown mix results about the impact of growth on the reduction of poverty and inequality. Mundell

argued that an increased inflow of FDI in developing countries reduces inequality in income distribution (Mundell, 1957). Another longitudinal study on South Korea using data from 1975 to 1995 showed that inflow of FDI did not affect income distribution in Korea (Mah, 2003). A study based on a number of less developed countries found a positive association between FDI and economic growth but also concluded that it does not influence income distribution (Sylwester, 2005).

On the contrary, a number of studies confirm that FDI is positively associated with income inequality. For instance, Ranci stated that rising global markets and introduction of IC technology has increased the economic growth in cities but it has also resulted in widening the gap in income and working conditions and social segmentation of society (Ranci, 2011). A study by Kucera and Leanne showed that trade liberalisation had a greater positive impact on the income of higher income group households as compared to those in lower income quartile in South African cities whereas India experienced a negative impact across all income quintiles of households (Kucera and Roncolato, 2011). Choi in his study of 119 countries concluded that increase in FDI leads to higher income inequality measured as Gini coefficient (Choi, 2006). Wu and Hsu argued that effect of FDI on inequality is determined by host country's capacity to adopt new technology and concluded that inflow of FDI leads to higher income inequality in countries with lower absorptive capacity while it has a little impact on inequality in country which have better absorptive capacity (Wu and Hsu, 2012).

The growing income inequality, particularly in developing countries during last two decades has stimulated a debate on the efficacy of FDI in reducing poverty and inequality in host countries. A need has been felt to explore the driving forces which cause a change in income distribution within the country. At the same time, there are limited studies that examine the relationship between FDI and inequality. In addition to this, there are conflicting evidence in the literature about the impact of FDI on income inequality.

1.2. Statement of Problem:

Foreign Direct Investment (FDI) has been seen as an instrument for economic growth and development of the host countries but its impact on income inequality has generally been neglected by literature as well as policy makers. Inequality has deep roots which can be observed at all levels, across regions, countries, cities and neighbourhoods within a city. The most common measures of economic inequality are income inequality and wage inequality.

Basu and Guariglia conducted research on 119 developing countries and concluded that inflow of FDI leads to growth as well as income inequality (Basu and Guariglia, 2007). Another study analysed the influence of inward and outward FDI on income inequality in European countries and concluded that in long run FDI reduces inequality whereas in short term FDI has a positive relation with inequality (Herzer and Nunnenkamp, 2013). In Addition to this, there were large differences across countries where some countries showed a positive relation between inward and outward FDI on income inequality in the long run. Mahutga and Bandelj found a strong positive relation between FDI and income inequality in Central and East European countries (CEE) and concluded that FDI increased inequality in CEE by

increasing dualism between foreign and domestic sector and within foreign sector by creating inequality between skilled managerial staff and labour since foreign firms pay higher wages as compared to domestic firms (Mahutga and Bandelj, 2008).

Sylwester showed a positive relationship between FDI and growth in developing countries but found no relationship between FDI and income inequality (Sylwester, 2005). Bhandari in his study on countries of East Europe and Central Asia showed that FDI did not affect income inequality but it increased wage inequality in these countries (Bhandari, 2007). Wu and Hsu analysed the effect of FDI on income inequality for 54 countries based on their absorptive capacity and concluded that FDI leads to higher inequality in countries with lower absorptive capacity while it reduces inequality in countries with higher absorptive capacity (Wu and Hsu, 2012).

There a number of theories which explains the reasons why globalisation necessary for development or beneficial for reducing income inequality but empirical research shows contradictory results, therefore, the relationship between growth and inequality has still remained a mystery (Dreher and Gaston, 2008)

Since 1990s many developing countries including African countries have adopted liberal policies in order to attract more FDI. Beside variation across countries, Africa has experienced a significant increase in FDI relative to its GDP and attracted higher FDI inflows compared to other developing countries. Africa has experienced an overall increase in income equality between 1988 and 1993 whereas inequality across African countries has increased sharply while intra-country inequality has slightly reduced but still it is higher than rest of the world. Further, the causality between growth and inequality is not clear for Africa and it appears that inequality hinders growth because it is linked to the factors that affect growth like social and political conditions, the level of school education etc. Globalisation has been a gradual process in Africa and it has been accompanied by persistent high poverty in the continent and slow economic growth (Nissanke and Thorbecke, 2010).

There is a vast literature which confirms positives effects of FDI on economic growth but there have been limited studies which try to link FDI with inequality particularly in Africa mainly due to the lack of data. Studies have shown mix results which further vary between developed and developing countries. There is a need for a better understanding of the factors that lead to heterogeneity of the relationship between FDI and income inequality across regions, counties and cities. Existing studies illustrate the complexity of this relationship and lay the foundation for an intensive research for a deeper understanding of how the nature of FDI affects the inequality and what are the factors which determine and explain the heterogeneity of this relationship across continents, countries and cities. In this context, this research attempts to get a deeper understanding of the relationship between FDI and income inequality in African countries. Such analysis determines whether the relationship between FDI and inequality varies with absorptive capacity of the countries. The study would attempt to fill the gap in the literature on FDI and inequality by decomposing FDI into sectors and identifying the impact of different types of FDI on the level of inequality in African countries.

1.3. Research Objectives:

The research aims to explain the relationship between FDI and income inequality using dependency theory. It also attempts to identify the factors which determine this relationship in African countries and cities. Consequently, this study sought to make policy recommendations for promoting the type of FDI that reduces income inequality in African countries.

1.4. Research Question:

Main research question:

What are the factors that determine the relationship between FDI and income inequality in countries and cities of Africa from 2003 to 2015?

Research sub-questions:

1. What is the impact of inward sectoral FDI on income inequality in African countries and cities?
2. Does impact of FDI on income inequality vary across regions, countries and cities and time?
3. To what extent dependency theory explains the influence of FDI on income inequality?

1.5 Significance of the Study

There is a vast literature which focuses on benefits of FDI in host countries and from policy point of view, it is seen as a major instrument of economic growth and development by many developing countries but at the same time the relation between FDI and income inequality has largely been ignored in policy as well as literature, as a result there are limited number of studies which link these two variables particularly in case of Africa. In addition to this, studies have shown mixed results which further vary with between developed and developing countries. The present research is a longitudinal study which attempts to fill the gap in the literature by explaining the relationship between FDI and income inequality using four main perspectives of dependency theory. The major contribution of this research is that it identifies the most important factors which determine the relationship between FDI and income inequality particularly in the context of African countries for the period between 2006 and 2014 since most of African countries experience the highest level of income inequality in the world despite increasing inflow of FDI and opening up of economies.

This research also contributes to the existing knowledge by looking at the impact of sectoral inward FDI on income inequality in African countries which is missing in the existing literature. Because FDI in different sectors may have different impact of income inequality. For this purpose, the inward FDI into hi-tech, manufacturing, resource and service sector is analysed separately. Here it is assumed that FDI into knowledge intensive sectors brings technology and may lead to technology diffusion which in turn boosts local economy and

reduce income inequality while FDI into labour intensive sectors may replace labour and increase income inequality in the society.

Therefore, this study identifies the sectors where inward FDI reduces income inequality in the country. The findings of the study are also significant from a policy perspective since it identifies the sectors of the economy where the inflow of FDI is able to reduce income inequality.

1.6 Scope and Limitations

The present study focused primarily on the relationship between FDI and income inequality in African continent for the period between 2006 and 2014. In order to have a better understanding of the heterogeneity of this relationship, the study is conducted at two levels. Firstly, the relationship between FDI and income inequality is examined at country level and across geographical regions. Further, in order to see the impact of sectoral FDI on income inequality, total inward FDI is decomposed into four major sectors of economy namely hi-tech, manufacturing, resource and services. In terms of geographical scope, this study covers 35 major African countries. A country level map of Africa is given below in figure 1. Due to the unavailability of the data for several countries are excluded from the analysis.

Figure 1: Study Area

Source: Author, 2016. Map prepared in Arc GIS

A major limitation of the study is that the data used for this research contains several missing values which resulted into lower number of observations in regression models despite the panel data of nine years. In addition, human capital is one of the important indicator in the present research. While previous cross sectional studies have used average years of secondary education as an indicator of human capital but that data is not available for panel data therefore this research uses enrolment in tertiary education as proxy for human capital. The study uses Gini coefficient as dependent variable in the main regression models but this measure as some limitations. Therefore, in order to make the analysis more robust, two additional regression models have been used taking alternative measures of income inequality. These regression models use growth of average income in top income decile and lowest income deciles. But the data on income deciles is available only for eight countries therefore panel regressions which uses growth of average income in top income decile and lowest income deciles is based on the data for eight countries. These countries are Algeria, Cameroon, Egypt, Kenya, Morocco, Nigeria, South Africa, Tunisia.

Chapter 2: Literature Review / Theory

2.1. Literature review

2.1.1. Foreign Direct Investment (FDI):

Globalisation is a significant process responsible for the increasing global integration, particularly economic globalisation has been a major force in shaping today's world. The major components of economic globalisation are liberalisation, FDI and international trade. Globalisation is defined as a process wherein national economies integrate into the world economy through trade, FDI and flows technology, workers, humanity and capital flows (Bhagwati, J. 2004). FDI is a major component of economic globalisation and is considered as an engine for growth in the recipient country (Bhandari 2007). In literature, it is often used as a proxy for globalisation or global integration.

Due to the importance of FDI as a measure of global integration, countries compete with each other to receive more FDI in order to achieve more integration into the global economic network, since the economic achievement of countries is considered to be determined by their position in global trade and investment flows (Dicken 2011). It is expected that current global crisis would adversely affect dependent countries of the global south but few countries in the south have shown an improvement in their position in global economy along with the rise in their level of socio-economic development. There is limited, partial and based on empirical analysis only as it fails to consider the role of economic power in determining the relation between countries (Wall 2016). FDI is a measure of country's integration into the global economy and it is expected to have positive effects on the recipient country. The inflow of FDI leads to higher economic growth and development in the country and increases the capital flow for the domestic development investments(Asiedu 2002). But at the same time there is a lack of studies on determinants of FDI attraction for countries with different levels of integration into the global economy and therefore it is not appropriate to expect that FDI has same effects on them (Blonigen and Wang 2004).

About two-thirds of the world exports are controlled by Multinational Enterprises (MNEs), and 1/3 share of it is accounted for FDI. Due to the competitive global market, more than 80 % of FDI is received by 20 countries (Mukim and Nunnenkamp 2012). FDI is defined as an investment by an MNE based in one country, in order to control unit in a foreign country. The power of MNE grows in the global economy with the growth in FDI. Due to the higher growth of FDI as compared to trade growth, now FDI has become a primary channel of global economic integration (Dicken 2011). In other words, FDI originates when an MNE decides to relocate some of its activities in a foreign country. Hence, MNE allocates its resources world over and extend the power to control the new location in a foreign country (Athukorala 2009). The significance of FDI in the world has increased and it is growing faster than world GDP making up 46.6 % share of global GDP (Dunning, Lundan cited in Wall and Wall 2016).

FDI plays a crucial role in the development of international trade and establishing long-term economic relations between countries (Groh and Wich 2012). It is also a major channel of increasing international economic integration (OECD 2008a). The geographical distribution of FDI is determined by the value added activities of MNEs because of location advantage of

different places influences the location decisions of MNEs, therefore, MNEs prefer to locate in places which enhance their main competencies (Dunning 1998).

In addition, state policy is also influenced MNE's locational decisions as MNEs prefer to locate their operational activities in countries with the supportive institutional environment (Wallerstein and Wallerstein 1998). Country level institutions in developing countries, along with legal and regulatory structure also affects investment strategies of foreign firms (Meyer and Estrin 2001). Government policies also influence the construction of local assets which make the location unique and hard to transfer or locate elsewhere (Dunning 1998).

The major location factors which determine MNE's investments strategy include demand for their product, supply, availability of inputs, infrastructure, factor cost, institutional environment (Wall 2016) As countries move towards knowledge intensive industries, to types of factor become more crucial for location decisions of MNEs. First is, property rights which an intangible asset and second are locational factors such as physical infrastructure, government policies, clusters and connectivity with global networks (Dunning 1998).

Firm's strategies to invest in foreign countries are divided into four types. First is market-seeking investment which aims to serve new markets, resource seeking FDI is investment in extraction and processing of natural resources for exporting or for selling in local market, efficiency seeking FDI is an investment in production of goods and services for the global market, and lastly, the asset seeking investment is the FDI which aims to acquire new assets and partnerships with local firms for protecting or enhancing MNE's advantages (Dunning 1998). Market seeking and asset seeking MNE's prefer to locate in semi-peripheral areas and they both are interested in horizontal FDI which aims to imitate production of their parent company or having access to new markets. On the other hand, resource seeking and efficiency seeking MNE's choose to locate in peripheries where they can increase their profits by establishing manufacturing units and extracting natural resources, this type of investment is called vertical FDI (Mukim and Nunnenkamp 2012). From the sectoral point of view, sectors with relatively more comparative advantage attract more inward FDI compared to sectors which have the comparative disadvantage (Qiu 2003).

Therefore the location decisions of MNE's are influenced by a combination of tangible and intangible assets offered by host countries because MNE's tend to locate in locations where local conditions match their requirements. In turn, activities of MNEs and property right conditions in host countries determine the effects it has on host country's human resource development, employment situation, technological advancement and structure of trade (Dunning, Lundan cited in Wall 2016).

2.1.2. FDI and Economic Development

In today’s globalising world FDI is considered as a channel of growth since financial capital is moving across countries in the world and integrating world economies through FDI. As a result, host countries and many developing countries around the world are adopting liberalisation policies for attracting more FDI in order to increase their economic development. Beside the role of FDI in the integration of world economies, there has been contradicting views about effects of FDI on long-term growth particularly in the case of developing countries (Nair-Reichert and Weinhold 2001). From neo-classical theory perspective, FDI increases economic growth and productivity in recipient countries. It is a common belief among most of the development economists and international institutions that

apart from filling the resource gap FDI can lead to higher economic growth and development in host country through development of human capital and management skills and access to the export market (Tsai 1995; Li and Liu 2005). Contrary to neoclassical approach is dependency theory, which states that economic dependence on developed countries is harmful to developing countries, particularly in the long run. Therefore supports of this theory argue that FDI has negative effects on the economic growth of developing countries and it results in disparities and fragmentation in developing economies (Firebaugh and Beck 1994). Multi-National Companies (MNCs) leads to the process of fragmentation of production, it is expected that inflow of FDI causes an increase in inequality between highly skilled workers and low-skilled workers. This increased income disparity results into a higher level of inequality in society as a whole. Tsai also supported dependency theory by concluding that FDI has led to uneven income distribution in east and south East Asian countries (Tsai 1995).

However, literature presents conflicting evidence on the long-term and transnational impact of Multi-National Companies and FDI. The causal relationship between FDI and economic growth is heterogeneous across countries(Nair-Reichert and Weinhold 2001). Beugelsdijk et.al in their empirical study on developed countries showed that FDI leads to higher economic growth (Beugelsdijk et al. 2008). A number of studies have shown that FDI has a direct and indirect effect on economic growth. FDI increases economic growth in developing countries, by employing local workers in their foreign firms whereas if the technology gap between the host country and foreign firms is wider then FDI has a negative impact (Li and Liu 2005). Adams in his study on Africa concluded that FDI is crucial for the growth and but at the same time it is not a sufficient condition for economic growth in Africa (Adams 2009).

2.1.3 Inequality:

Persistent poverty and inequality are the rising concerns in developing counters and reducing poverty and inequality are top priorities as well challenge for developing countries. Although reducing poverty is the first target in United Nation's Millennium Development Goals, unfortunately, inequality has not received same attention but at the same time, it is one of the major social concern across the world (Facundo Alvaredo 2015). Inequality manifests itself in several forms. It is broadly divided into two types: economic inequality (e.g. income and wage) and cultural inequality (e.g. class, gender, race etc.). Most of the literature in economics has primarily focused on different dimension and measures of economic inequality. Economic inequality is measured in several ways. Wage, income and consumption are the three major types of economic inequality. The present study also concerns with economic inequality, specifically income inequality. There are a number of methods to measure income inequality such as Lorenz curve, the Gini coefficient, percentile ratios, Atkinson Index and the Palma Index. But Gini coefficient is most commonly used measure (Morelli et al. 2015; Gilbert 2000)**.** Most of the earlier studies have measured income inequality by analysing income distribution within countries. But Gini coefficient is the most common measure of income inequality. Simond Kuznets in his pioneer work established the relationship between inequality in terms of distribution of income and economic growth of the country. He argued that as the country moves from agriculture to industrial economy, the level of inequality increases because of increased income gap between skilled and unskilled workforce. But after reaching a certain level of development, inequality starts to decline since

growth penetrates into the larger section of society. He explained that due to the rural-urban migration, the increasing weight of urban population leads to more inequality. During the process of economic growth, the rural-urban gap in per capita income tends to increase because per capita productivity in urban economic activities tends to increase faster than agriculture. Therefore, overall income inequality increases with the increase in economic growth. During the initial stages of industrialisation, income inequality widens particularly in old countries where the emergence of industrialisation has destroying effects on previous economic and social institutions. Once the initial phase of industrialisation and urbanisation passes, a number of forces come into play which leads to the penetration of growth into the lower income group and lower inequality. This relation between economic growth and income inequality was expressed as inverted U-shaped curve (Kuznets 1955).

According to a neo-liberal argument due to the increasing economic integration among countries, the world income inequality and poverty has declined in last two decades for the first time in last century and a half. The prime solution for lagging countries, particularly Africa is more open financial markets and free trade policies for a deeper integration into the global economy. This argument is supported by the most powerful institutions like World Bank, IMF, WTO and Treasuries of US and UK along with international media including The Financial Times and The Economist. On the hand, according to dependency theory argument, the world income inequality and poverty is rising due to the unchecked forces of globalisation. This approach suggests control of public policies on the operation of market forces. In addition, this anti-neoliberal group offers a larger number of solutions for reducing inequality as compared to the neo-liberal group (Wade 2004).

Most of the previous studies on international inequality used GDP per capita which measured inequality across countries. Another type of studies tried to incorporate income distribution in the country. Due to non-availability of survey data, these studies use Gini coefficients or other measures for estimating income distribution using a single statistic. Milanovic argued that both of these approaches are not satisfactory because firstly, a single statistic of inequality cannot represent the income distribution and secondly, assumption that all countries have the same distribution of income is not acceptable. Since the 1980s more accurate studies used survey data but household surveys were used to get income shares, not the actual incomes. During 1990s studies started to use household surveys but their focus was a measurement of poverty rather than inequality. Milanovic's study on international inequality was the first study that was entirely based on household survey data and it derived world income distribution in a similar way as it is aggregated for a country from regional income distribution. The study shows that world inequality is very high and it further increased between countries as well as within countries during 1988 and 1993. But between countries inequality was relatively higher and caused an increase in overall inequality(Milanovic 2002). Whereas Melchior argued that inequality between countries has declined since the late 1960s. Here international inequality is measured as Gini coefficient of per capita income that is weighted by population. The major reason is that some developing countries, particularly in Asia, have grown faster than many developed countries. Despite the heterogeneity of economic growth across developing countries, the Gini coefficient shows convergence because per capita income is measured by the population of the country. He suggested that while measuring global inequality it should be clear that whether we want to measure inequality between countries or persons. For instance, when inequality is measured

using average per capita income than it only measures inequality between countries. Therefore, world inequality based on country comparison is lower than intercountry comparison. Paper further suggests that increased inequality within countries leads to divergence or higher inter-country inequality (Melchior 2001).

Wade tested the empirical basis of neo-liberalisation argument and argued that found that neoliberal argument is supported when inequality is measured as population-weighted PPP-adjusted per capita income of countries. Whereas, the polarisation of income distribution has increased. Inequality has increased since the 1980s when it is measured for whole distribution or cross-sectional data based on household survey or measures of combine inequality within and across countries. The pay inequality within countries was either declining or stagnate between1960s to 1980s and since the 1980s it has been continuously increasing. Pay inequality is much greater in manufacturing industry across the world. At the same time, the absolute income gaps are also increasing fast. On the whole, he argued that due to the large regional variation in economic growth, a different way of measurement produces different outcome, therefore, the trend of global income distribution depends on the selection of countries and the technique of measurement as there is no single best method to measure global income inequality. Several methods have been used to measure inequality which includes per capita GDP in UD dollars or adjusted to Purchasing Power Parity (PPP), Countries considered as one unit or weighted by population. There are measures of income distribution viz. Gini, some average coefficients, ratios of income of 1st and 10th deciles of world population and ratio of average incomes of rich and poor countries. Measurement also varies with sources of data on income for example National Accounts data and Household Survey data, selection of sample countries as well as the time period (Wade 2004).

A considerable number of studies have shown the association between inequality and growth. There is some contradiction about whether inequality across countries has increased or decreased during last few decades but a longer trend of the ratio between rich and poor countries shows an increase in inequality (Basu 2006). It is evident from the literature that income inequality is a major social issue, particularly in developing countries. Studies have shown that most of the African countries have highest income inequality in the world. The overall income inequality in Africa increased between 1988 and 1993 whereas there has been a sharp increase in inequality across African countries while intra-country inequality has slightly reduced but still it is higher than rest of the world (Nissanke and Thorbecke 2006). In addition to this, Sub-Saharan Africa has reported highest consumption inequality (Alvaredo and Gasparini 2015).

2.1.4. FDI and Income inequality: Neo-Classical Perspective

There is a complex relationship between FDI and income inequality. A limited systematic empirical literature has established the link between FDI and inequality(Basu and Guariglia 2007; Tsai 1995; Wu and Hsu 2012). The view regarding this relationship is divided between neo-classical and dependency theories. The neo-classical theory has an optimistic view about effects of FDI on income inequality and argues that inward FDI leads to higher economic growth and lower inequality. For instance, Mundell theorised that inflow of FDI in developing countries leads to lower inequality (Mundell 1957). A common view among supporters of neo-classical perspective is that FDI can lead to higher economic growth and

development in host country through technical diffusion, development of human capital and management skills and access to the export market (Tsai 1995; Li and Liu 2005). On the other hand, few empirical studies have shown that FDI has no influence on income distribution of country (Mah 2003; Sylwester 2005).

2.1.5. FDI and Dependency Theory Perspective

Dependency theory explains the under development of countries by analysing their interaction with developed countries and states that inequality among countries is associated with these interactions. It states that poor countries may not necessarily benefit from the economic growth in developed countries rather economic activities of advanced countries may cause serious problems in underdeveloped countries. Whereas neoclassical theory did not predict such possibility. Dependency theory explains that inequality in developing countries in relation to their interaction with developed economies and argues that inequality is the outcome of these interactions. A number of studies have shown that FDI has a negative impact on developing countries' economic growth and results in disparities and higher income inequality measured as Gini coefficient (Firebaugh and Beck 1994; Choi 2006; Ha 2012). Multi-National Companies (MNCs) leads to the process of fragmentation of production. This increased income disparity results into a higher level of inequality in society as a whole. FDI has led to uneven income distribution in east and south East Asian countries (Tsai 1995). Rising global markets and introduction of IC technology has increased the economic growth in cities but it has also resulted in widening the gap in income and working conditions and social segmentation of society (Ranci 2011). It has been argued in few studies that impact of FDI mainly depends on the local conditions of host countries, though there are only a few studies which have analysed the relationship between FDI and economic growth as well as the influence of local conditions in determining this relationship (Hermes and Lensink 2003).

Recent research has claimed that the impact of FDI on income inequality in host country depends on several other factors viz. absorptive capacity, human capital and technology diffusion and institutional environment. These are discussed below:

2.1.5.1. Absorptive Capacity

Absorptive capacity is the ability of a firm to recognise the available foreign knowledge, integrate it into local knowledge and use it for enhancing it productive capacity (Cohen and Levinthal 1990). It has significant implications for increasing innovative capabilities of local firms in host countries. The concept of absorptive capacity was introduced by Cohen and Levinthal in their seminal work in 1990 which provided the basis for subsequent studies for analysing impact of FDI on the local economy of host countries. They argued that absorptive capacity of firms which in turn leads to advancement in local innovation is path dependent which implies that if a firm does not invest in its areas of expertise during initial stages it will hampers the technological development in future. Therefore, R&D investment by firms improves their absorptive capacity. Based on this theoretical framework, subsequent studies have used several indicators to measure the impact of absorptive capacity at firm, industry and national level. The significant indicators which have been used to measure absorptive capacity are related to infrastructure and human capital (Wu and Hsu 2012).

Criscuolo and Narula contribute to the literature by aggregating absorptive capacity from firm level and empirically applying it to the national level. They argued that absorptive capacity of a country and accumulation of knowledge are co-determined wherein absorptive capacity supports technological development and technological advance leads to higher absorptive capacity and vice versa. At the same time, they also claimed a non-linear relationship between absorptive capacity and level of technological development. During initial stages of industrial development, the knowledge accumulation takes place mainly through technology diffusion due to R&D activities related to inward FDI. As the country approaches a higher level of development, absorptive capacity tends to decrease and acquiring new knowledge become difficult because the quantity of new knowledge become lesser and available knowledge is more complex. At this stage, knowledge creation within host country plays a significant role in knowledge accumulation accompanied with R&D activities related to outward FDI and joint ventures and strategic alliance. Therefore absorptive capacity is not constant because it tend to decrease as the country develops (Criscuolo and Narula 2008).

Wu and Hsu analysed the effects of FDI on income inequality for 54 countries using absorptive capacity as a threshold variable and applying endogenous threshold model. They observed a clear divide between the sample countries and concluded that FDI leads to higher inequality in countries with lower absorptive capacity because it increases income gap between skilled and unskilled workers whereas it has little effects on inequality in countries with better absorptive capacity. The study claims a non-linear relation between FDI and income inequality. In addition, unlike previous studies it distinguished different groups of countries based on their absorptive capacity to examine its role in determining the effect of FDI on income inequality because absorptive capacity is a significant factor for inward FDI and countries at different stages of absorptive capacity tend to attract different types of FDI (Wu and Hsu 2012). An empirical study by Tsai also observed a positive association between FDI and income inequality in Asian and East/South East Asian countries and concluded that inward FDI in less developed countries have negative effect on the income distribution of country and in turn increases inequality (Tsai 1995). An emerging view in the literature is that the role of FDI in the development of host country is determined by the type and behaviour of FDI as well as capabilities of local economy or firms in host countries (Lall and Narula 2004)

2.1.5.2. Human capital

Human capital is another significant factor that contributes to the development of the country and it is generally measured as the level of education. Cohen and Levinthal linked absorptive capacity of a firm with human cognitive capabilities and stated that as the human ability to identify and exploit foreign knowledge depends on the level of previous knowledge, the similarly absorptive capacity of a firm depends on its previous related knowledge (Cohen and Levinthal 1990)

It is observed that countries with higher level of education tend to attract technology intensive FDI which further improves their human capital. Whereas less technology intensive FDI tends to flow toward countries with the lower level of education and this FDI has marginal effects on the development of host countries (Wang and Blomstrom 1992). Another empirical study concluded that FDI leads to growth as well as inequality in human capital. It implies

that FDI leads to higher inequality in societies where poor do not have access to modern FDI based technology due to their lower level of prior human capital (Basu and Guariglia 2007).

Some studies have emphasised on the role of human capital in determining technology diffusion since the implementation of new technology and managerial skills take place through the workforce. It is important that labour should have required skills to understand and use new technology. Therefore host country should have the minimum required human capital in order to have spillover effect (E Borensztein et al. 1998). Similarly, Hermes and Lensink argued that FDI and human capital complement each other and their interaction leads to the process of technology diffusion.

2.1.5.3. Technology Diffusion

The influence of FDI on economic growth of host countries has been a topic of debate in the literature, particularly as channel of economic growth in the recipient country. Technology diffusion has been considered as one of the major channels for economic growth of host countries. It is defined as the extent to which FDI may increase "technological change through spillover effects of knowledge and new capital goods" (Hermes and Lensink 2003). Technology transfer and spillovers have also become one of the major themes in the literature on the impact of economic globalisation and FDI on host countries. Increasing technological advancement and knowledge in developed countries tend to move across borders and contribute to technological improvement in developing countries domestic technological progress is not purely dependent on local innovation rather FDI and international trade are considered to be the main instruments for indirect technology transfer through various activities of foreign firms in host country (Liu and Wang 2003; Wei and Liu 2006; Liu and Zou 2008).

The growth rate of developing countries depends on their ability to assimilate and implement new technology developed by advanced countries. In this way, they can catch up with technology levels of developed countries. FDI is an important channel through which less developed countries access and adopt foreign technologies. Technology introduced by FDI is transferred from multinational firms to domestic firms through spillover effect. Implementation of new technology increases labour and capital productivity of domestic firms. The spillover of technology may take place in several ways such as imitation of technology of foreign firms by local firms, competition created by entry of foreign firms for local firms to improve their technology, interaction between foreign firms and local firms and training of employees by local firms for improving their skills for using new technologies(Kinoshita 2000a; Sjöholm 1999).

The earlier theoretical literature on technology transfer through global movement of capital was mainly limited to ad hoc models of externalities where host country's production capacity increases with an inflow of FDI. These theories assume that foreign firms have greater technological knowledge and nature of technology transfer is a 'public good'. These models ignored the elements of the cost involved in technology transfer and characteristics of technology transfer. In the model developed by Wang and Blomstrom, technology transfer from a foreign country via FDI is described as endogenized equilibrium phenomenon, which is an outcome of the strategic interaction of local firms with the foreign firms. Their model

identifies two types of cost involved in technology transfer. Firstly, the cost to MNEs for transferring technology to their subsidiaries and secondly, the cost of learning for local firms. The rate of technology transfer greatly depends on the learning efforts of domestic firms (Wang and Blomstrom 1992).

The relationship between FDI and economic development is controversial. There is common belief that in order to develop, poor countries require foreign investment, innovation, employment generation and increase in export but due to lack of capabilities in local economy, inflow of FDI in a certain sector results in enclave formation which creates direct employment in host country but causes little spill-over effects on local firms for long-term positive and sustainable development. This process of development of local capabilities and control over the export base which was initially established by outer factors and forces is called endogenisation. The study by Melese and Helmsing analysed the process of endogenisation in Ethiopia in the case of FDI in flower cut industry and showed that endogenisation is taking place in this industry but it is still in the initial stage. They argued that endogenisation is determined by the interest of FDI in engaging with local firms, establishing relationships, sharing technology and capacity of local firms to take advantage of this opportunity and supportive institutional environment and availability of infrastructure to make it possible (Melese and Helmsing 2010)

The empirical studies have shown a mixed result regarding effects of endogenous and foreign innovations on technological change (Fu et al. 2011; Liu and Wang 2003). Studies have been failed to show convincing evidence for strong positive technology diffusion and spillover effects of FDI on host countries (Fu et al. 2011). These contradictory results indicate that there are certain characteristics of host country which are collectively called absorptive capacity help FDI to contribute in the economic growth of recipient country through technology spillover (Hermes and Lensink 2003). However, spillover effect depends on the certain characteristics local conditions of host countries which determine country's absorptive capacity to adopt new technology. Therefore FDI can only lead to higher economic growth through spillover effects if host country has sufficient absorptive capacity. Hermes and Lensink have argued that technology diffusion and absorptive capacity are linked since spillover effects of technology depend on the absorptive capacity of the host country. According to Kokko the impact of technology diffusion on economic growth depends on the local firm's initial level of technology in comparison to foreign firms. The higher technology gap between foreign firm and local firm leads to lower technology diffusion (Kokko 1994).

Wang and Blomstrom argued that technology transfer and diffusion by foreign sources can only be effectively delivered if it is accompanied by endogenous efforts for innovation. In addition, supportive government policies and modern institutions also play a significant role in using and exploiting foreign technology. Adopting and diffusing foreign technology involves cost and certain conditions. Firstly, the absorption capacity of local firms is a significant factor in determining the technology transfer. Second, the local innovative capacity of host country encourages MNEs to establish links with the local economy and adopt innovative practices which create more opportunities for technology transfer. Third, the larger dependency on foreign technology is associated with a decrease in local R&D efforts. There is a lack of evidences in support of technology spillovers from MNEs innovation practices on technological change in local firms due to deterrents on local firms and a decline in local R&D. Fourth, Inappropriateness of foreign technology to local socio-economic

conditions may often result in negative spillover effects. It is argued that local innovation and capabilities become significant as the country moves up on the development ladder to benefit from the globalisation and available foreign technology. A dependence on foreign innovation and technology is not ideal for host countries to catch up and improve their local technology. Once a local firm adapted or modified foreign technology according to domestic socio-economic conditions, it is easier and low-cost for other firms to do practice the same. Therefore in order to increase technology transfer from MNEs, host countries should support the efforts of local firms in learning foreign technology (Wang and Blomstrom 1992).

On the other hand, a study by Liu and Wang indicated that FDI, the level of R&D and size of firm are the most significant factors for increasing productivity in Chinese industries. The positive effect of FDI on factor productivity indicated that FDI is not merely an inflow of capital from a foreign country but also a channel for technology transfer. Another important finding was that human capital contributes to increasing TFP only when it is accompanied by FDI and R&D which indicates that greater FDI and a higher level of R&D leads to increasing the productivity of human capital. Therefore government should adopt a strategy to enhance technology transfer through FDI as well as support domestic innovation for improving local technological capabilities because technological advancement is the main driving force for sustained growth in the long term (Liu and Wang 2003).

Liu and Zou analysed the impact of greenfield FDI, mergers and acquisitions and trade on knowledge transfer and spillover in Chinese high-tech industry from resource-based view (EBV) which is based on the notion that valuable, rare and inimitable assets (tangible and intangible) are significant for achieving sustainable competitive advantage. Their study considered FDI as an intangible asset of foreign firms and analysed its spillover effect on local firms with limited absorptive capacity. On one hand, MNCs have a risk of losing their intangible valuable resource; on the other hand, FDI and trade are opportunities for local firms to catch up with technologically advanced countries. The study concluded that Greenfield FDI positively affect the innovation in intra-industry and interindustry firms. This technology spillover is a result of R&D investment of MNEs in host country instead of competition affect due to their productivity. Therefore access to foreign technology through FDI and local investment in innovation both increases the domestic innovation in the host country (Liu and Zou 2008).

A limited number of studies have analysed the impact of both inward and outward FDI on technology transfer. In the case of inward FDI, the presence of foreign-owned affiliates in many developing countries contributes to the technological progress of host country through their substantial share in production as well as R&D activities. Whereas, outward FDI related to R&D activities such as technology sourcing leads to higher productivity in home country (Criscuolo and Narula 2008).

Kinoshita argued that accumulation of knowledge is one of the determining factors of economic growth of a country. The stock of knowledge in a country is enhanced by its investments in R&D sector and diffusion of existing technology as they both increase the productivity of firms. R&D involves innovation as well as an absorptive. Absorptive capacity is particularly important since technology diffusion is not an automatic process but it requires the ability of firms to absorb and exploit existing knowledge and R&D activities support technology spillover by increasing firm's absorptive capacity. Kinoshita analysed the

effects investments in R&D and technology spillover from FDI on the productivity of manufacturing sector at the firm level and found that absorptive capacity was more important than innovation efforts in explaining the productivity growth of firms. In addition, the joint venture and partnership with foreign firms did not produce spillover effects of technology (Kinoshita 2000a). FDI is a major channel of technology diffusion and absorptive capacity mediates the technology transfer from foreign firms to local firms (Kinoshita 2000a; Wang and Blomstrom 1992).

2.1.5.4. Institutional environment:

Institutions are defined as set of beliefs, practices, actions and perceptions which are used for resolving the problems and conflicts in a particular context (Morgan 2016). These practices have been change during the curse of period as a result of changing socio-economic dynamic. For example, the expansion of markets during 19th and 20th century created conflicts and inequalities in society. Therefore, institutions were built by involving different actors to set the limits of the market processes and to determine the level of inequality that is acceptable in particular society. Morgan in his paper examines how the relationship between institutions, inequality and different actors has evolved over time. He points out that old actors have been transformed and replaced by new actors their powers have also transformed. Table 1 presents the change in the actors and their strength after second world war.

Table 1: Change in actors and their role

Actors	In the post-war settlement	From the 1980s
Finance	Weak: controlled by the state and the rules of the Bretton Woods system	Increasingly powerful and dominant over policy making
Firms	Mainly national, dependent on export trade: Chandlerian managerial capitalism supported by oligopolistic position and passive shareholders	Multinationals—present in many locations for purposes of production and tax. Engaged in global competition through efficiencies and innovation. Driven by shareholder value.
State	Dominant actor mediating between classes, managing the economy and the welfare system	Weakened because of globalization and competition for MNC investment. Reducing tax base to attract inward FDI leading to increased borrowing on financial markets: rise of the debtor state dependent on finance
Trade unions and social democratic parties	Key actors forging post-war settlement based on welfare state, full employment and labour market regulation	Increasingly weakened by globalization and attacks on labour market regulations from employers and state

Source: Morgan, G 2016

In this process, two main groups of actors with their conflicting interests and institutions have emerged. One is finance and related institutions and second is MNCs and global networks of innovations and value chains. These relatively new actors are not national actors rather they operate at different scales from local, regional, national to transnational level. The second group of actors, instead of regulating the market processes these institutions create social environment so that various market processes can operate with ease. The institutions and actors that emerged after second world war were formed to reduce the power of capital and improve the condition of labour for reducing income inequality. Since 1980s new actors such as finance and MNCs emerged which shaped the institutional environment in the counties (Morgan 2016). The table below shows the change in actors and their power since second world war.

The finance and firms were the weaker actors in post war period but since 1980s, finance became and MNCs became powerful. State which was the major actor for coordination between classes and managing economy and welfare, became weaker because of globalization and competition to attract more FDI. Earlier the trade unions and pro-poor political parties particularly with left ideology were important actors for their efforts toward full employment and market regulation. They also became weaker because of globalization and attacks from employers and state.

So the focus shifted from creating a more equal society to generating more wealth. MNCs have played an important role in this process. During multilateral and bilateral trade, MNCs want their governments to consider their interests. MNCs located in the foreign countries employ their own nationals in top roles and their main innovative activities are based in their home countries while locate secondary activities in foreign countries for using their resources.

In the context of growth and competitiveness, according to Malecki public institutions are one of the main components of growth competitiveness which include sub components of contracts, laws and corruption. He explained that the sustained economic competitiveness not only depend on the stable economic conditions and capabilities of firm, also called absorptive capacity but they also depend on other specialised and sector specific institutions as well as governance that resolve the problems and conflicts between government and other social actors. The countries to become competitive economies in terms of absorptive capacity, trust and flexible institution are the most important factors along with R &D and only small number of countries can achieve these conditions (Malecki 2004).

There is consensus among the researchers about the importance of institutions because they determine the activities of MNCs in foreign country and the spillover of technology through them (Ines 2013). Ines in his paper analyses direct effects of FDI on growth and its indirect effects through institutions. Local institutions such as private property protection, legal framework can affect various effects of FDI on the economy of host country (Ines 2013). For instance, more developed institutional framework leads to higher competition between foreign firms and local firms which may harm the local economy and lead to higher income inequality. Hence, the type and strength of institutions plays an important role not only in achieving growth and competitiveness but they also influence of the effects of grown on the society.

2.2. Lessons learnt from literature review:

The above literature review discusses the key concepts used in the present study and their related arguments. It suggests that FDI is a significant component of economic globalisation.
Due to the importance of FDI as a measure of global integration, the present study aims to examine a causal relationship between Greenfield FDI and income inequality. Greenfield FDI is defined as a fresh investment which involves new establishment such as factories, plants, offices and buildings along with flows of intangible assets particularly in services (Liu and Zou 2008). Henceforth, in rest of the thesis, term FDI stands for Greenfield FDI. Since FDI is considered as a major channel for growth, developing countries are adopting liberal policies for attracting more FDI to become integral part of the world economy for economic gains. At the same time, despite increasing flows of FDI many countries particularly developing countries are experiencing increasing inequality which raises the concerns among policy makers as well as economists.
The association between FDI and income inequality is explained by two main theories. One is neo-classical perspective which states that income inequality in host country reduces through increased capital flow in the form of FDI, and through the introduction of new technology, skill improvement and access to international market. Contrary to this, dependency theory argues that FDI not necessarily reduces the income inequality rather its impact on inequality is determined by several factors associated with local conditions of the recipient country.
There are four main perspectives within dependency theory which explain the relationship between FDI and income inequality. These are absorptive capacity, human capital, technology diffusion and institutional environment. The higher absorptive capacity of recipient country leads to positive effects on local economy which reduces income inequality. The higher absorptive capacity also leads to technology diffusion from FDI in the host country which in turn increases the absorptive capacity. These two concepts are interdependent and simultaneously determined. These two factors strengthen the local economy and leads to lower income inequality. Human capital is often considered as part of absorptive capacity as educated and skilled workers are a channel of absorbing and assimilating foreign technology as well as contribute to innovation in the country and in turn improve the local economy which reduces income inequality. While public institutions are important as they regulate and control the market processes. The type of institutions and their strength reflects the ideology of government and they determine whether growth will concentrate in few hand or it will benefit whole society
There is a gap in the literature for studies which analyse the impact of sectoral FDI on income inequality in host countries. In addition, there are only a few empirical studies on Africa which focused on income inequality and its relation with FDI. To fill the gap in the literature, the present study aims to explain the effects of sectoral FDI on income inequality in African countries through above mentioned perspectives of dependency theory.

2.3. Conceptual Framework:

Based on the literature review few crucial concepts have been identified for the further analysis in order to answer the proposed research question. These are described below:

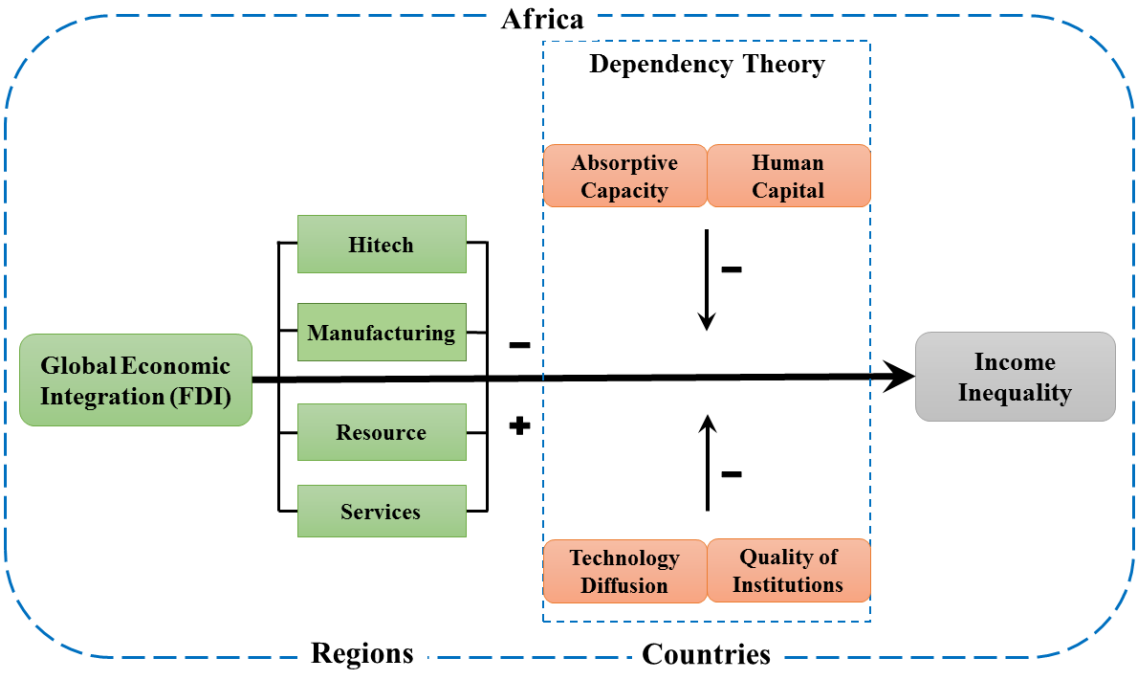
Income inequality measures as Gini coefficient is the dependent variable while global integration measured as FDI is an independent variable. Absorptive capacity, human capital, technology diffusion and quality of institutions are moderator variables (based on

dependency theory) which determine the effects of FDI on income inequality. Income inequality is a form of economic inequality and it is defined as the uneven or disproportional distribution of income in the society (Faustino and Vali 2011; OECD 2015, Firebaugh, G. 2003). FDI is a significant component and a measure of global economic integration (OECD 2008; Wall 2015). Wall defined FDI as an investment by a firm based in one country giving it control over a unit in in another country (Wall 2016)

There are two contradictory theories in literature which explain the relationship between FDI and income inequality. First is a neo-classical theory which states that inflow FDI reduces income inequality in the recipient country. While according to dependency theory the positive or negative impact of FDI on income inequality depends on the local conditions of the host country. Four main concepts of dependency theory which have been used in literature to explain the effects of FDI on income inequality particularly in developing country context are absorptive capacity, human capital, technology diffusion and quality of institutions.

Conceptual framework in Figure 2, presents the relationship between above explained concepts and shows that the impact of FDI on income inequality is determined by absorptive capacity, human capital, technology diffusion and quality of institutions.

Figure 2: Conceptual Framework



Source: Author, 2016. Based on literature review

Most of the previous studies have focused on one of these concepts in their analysis but recent studies have shown that absorptive capacity and technology diffusion are interrelated concepts as they are simultaneously determined and reinforce each other. “Absorptive capacity is defined as a host country's ability to absorb and adopt new incoming technology from a foreign country” (Wu and Hsu 2012).

Human capital is defined as educated and skilled workers. An individual acquires human capital by investing and attaining education (Stokey 1990). Human capital is the most valuables resource for the firms as it increases the competitive advantage of the firms. It is also a channel through which technology transfer take place foreign firms to local firms (Hatch and Dyer 2004; Lin et al. 2013).

Technology diffusion takes place through the direct transfer of technology from the foreign firm and through competition induced by the presence of foreign firm (Wang and Blomstrom 1992). Technology diffusion leads to higher absorptive capacity and more absorptive capacity further reinforces technology diffusion in the host country. Whereas, Institutions are the set of beliefs and practices and rules which are used to resolve the conflicts and problems in a particular context and public institutions mediate between market forces and social actors (Morgan 2016)

Chapter 3: Research Design and Methods

3.1. Revised Research Question(s)

Main research question:

What are the factors that determine the relationship between FDI and income inequality across regions and countries of Africa from 2003 to 2015?

Research sub-questions:

1. What is the impact of inward sectoral FDI on income inequality in Africa?
2. Does impact of FDI on income inequality vary across geographical regions, countries and over time?
3. To what extent does dependency theory explain the influence of FDI on income inequality?

3.2. Operationalization: Variables, Indicators

3.2.1. Definitions of concepts:

The most significant concepts used in the present research has been presented in the table below which presents their definitions based on literature and operational definition formulated for the purpose of the present study.

Table 3: Definitions of concepts

Concept	Definition	Operational Definition
Global economic integration	1.Gradual integration of nations within our globalising world is strongly related to economic networks formed by multinational headquarters and their subsidiaries located across the globe" (Wall et al. 2011). 2."Selection effects as the result of global integration are now central to the trade and FDI literature…" (Kanbur 2015).	Global integration is defined as increasing interaction of cross boarder economies through flows of FDI.
Income inequality	1."Average disproportionality of income…" "Income inequality refers to the relative magnitude of incomes" (Firebaugh 2003). 2."Income inequality is defined as the extent of unequal distribution of income" (Faustino and Vali 2011; OECD 2015).	Income inequality is defined as relative marginalisation of countries and cities due to the disproportional incomes in the world.
Absorptive capacity	1. "The ability of a firm to recognize the value of new, external information, assimilate it, and apply it to commercial ends" (Cohen and Levinthal 1990) 2. "Absorptive capacity is defined as a host country's ability to absorb and adopt new incoming technology from a foreign country" (Wu and Hsu 2012).	Absorptive capacity is the capability of countries to adopt and assimilate external information and technology and apply it according to their local conditions for increasing productivity.

Technology diffusion	1."International technology transfer through multinational firms emerges as an endogenised equilibrium phenomenon, resulting from the strategic interaction between foreign subsidiaries of MNCs and host country firms" (Wang and Blomstrom 1992). 2.There are two different types of technology diffusion in our analysis: costless technology spillovers and costly transfer induced by market competitions (Wang and Blomstrom 1992) . 3."…there exists 'learning by doing' in international technology transfers, that is, the transfer cost decreases with the frequency of transfers" (Wang and Blomstrom 1992). 4."The process of technological diffusion is defined as the extent to which FDI may enhance technological change through spill over effects of knowledge and new capital goods" (Hermes and Lensink 2003).	Technology diffusion is a process of technology transfer and spill over through interaction of foreign technology with local technology of host country.
Quality of Institutions	" Institutions are the set of beliefs and practices and rules which are used to resolve the conflicts and problems in a particular context and public institutions mediate between market forces and social actors" (Morgan 2016) "Institutional capabilities that lend credibility and effectiveness to government policy play particularly important roles in the development process through infrastructure growth. The gains from improving investment and performance in infrastructure sectors depend on the institutional and organizational reforms..." (Esfahani and Ramírez 2003) " strong institutions that ensure the ability to adapt, the availability of talent, and a high capacity to innovate" (Schwab 2013)	The quality of institutions represents the efficiency and interaction of public, market forces and private stakeholders which affects the productivity as well as distribution of benefits in the society.
Human Capital	"Individuals acquire human capital by investing in education attainment" (Stokey 1990) " a significant threshold level of human capital, below which FDI exerts a disproportionately positive (negative) impact on the relatively poor (rich) and hence improves income distribution" (Lin et al. 2013)	Human capital is defined as level of education which helps in assimilation of new knowledge and technology in the host country through educated and skilled workers.

Source: Author, 2016. Based on literature

3.2.2. Operationalisation of concepts

The concepts mentioned in the conceptual framework have been unbundled into variables and indicators in this section. The variables have been categorised based on their use in the regression model namely dependent variable, independent variables and moderator variables. First table describes the indicators associated with dependent variable that is income inequality. Second table pertains to the indicators associated with variables absorptive capacity, technology diffusion and quality of institutions which are assumed to influence the relationship between FDI and income inequality. Third table presents the indicators which are used to measure independent variables that is FDI. Several control variables have been selected which influence income inequality and their associated indicators are presented in a separate table.

Table 4: Dependent Variable

Concept	Variable	Indicator	Scale of measurement	Source	Value
Income Inequality	Income distribution	Growth of Gini coefficient of per capita income	Ratio scale	Oxford Economics	Higher the growth of Gini coefficient, more the inequality within country
		Growth of average household income of 1st decile	Interval scale	Euro Monitor Passport survey	Higher growth of income in 1th decile indicates reduction in income inequality in society
		Growth of average household income of 10th decile	Interval scale	Euro Monitor Passport survey	Relatively higher growth of income in 10th decile indicates increasing income inequality in the society

Table 5: Moderator variables:

Concept	Variable	Indicator	Scale of measurement	Source	Value
Absorptive capacity	Infrastructure	The volume of freight, express mail, and diplomatic bags carried by air carriers registered in the country on each flight stage measured in Metric ton-kilometres (Millions)	Interval scale	World Development Indicators, World Bank	The large the volume of freight, better the air infrastructure
		The production of power plants and combined heat and power plants less transmission, distribution, and transformation losses and own use by the heat and power plants consumption	Interval scale	World Development Indicators, World Bank	More the electricity production, better the infrastructure
		Quality of Electricity supply	Ratio scale	World Economic Forum	Quality of electricity indicates better infrastructure
		Mobile phone subscription (%)	Ratio scale	World Economic Forum	More mobile subscription indicates better communication infrastructure and access to information
		International internet bandwidth (Bits per second per person)	Ratio scale	World Bank	More bandwidth indicates better communication infrastructure
Human Capital	Level of education	Enrolment in tertiary education (%)	Interval scale	World Economic Forum	Higher the percentage of tertiary enrolment more the human capital

		Percentage of internet users (%)	Ratio scale	World Bank	Higher the % of internet users, more the educated people
Level of Technology	Local innovation	R&D expenditure as % of GDP	Ratio scale	World Bank	More expenditure in R&D increases capacity to learn new technology
		Number of patents applications	Ratio scale	World Economic Forum	Higher the number of patents higher the level of technology
		Number of scientific and technical journal articles	Ratio scale	World Economic Forum	Higher the number of publications higher the level of technology
	Level of local technology	Availability of latest technology (1 to 7 weighted average)	Interval scale	World Economic Forum	More the availability of technology, more the diffusion of technology
		FDI technology transfer (1 to 7 weighted average)	Interval scale	World Economic Forum	Technology transfer leads to improvement of local technology

Quality of Institutions	Trust and transparency of Government institutions	Public trust in politicians (1 = extremely low; 7 = extremely high) weighted average	Interval scale	World Economic Forum	Higher public trust in politicians indicates a pro poor political system hence lesser inequality
		Judicial independence (1= not independent at all; 7=entirely independent) weighted average	Interval scale	World Economic Forum	Judicial Independence ensures fair judgement without external influence and promotes equality
		Transparency of government in policymaking (1=extremely difficult; 7=extremely easy) weighted average	Interval scale	World Economic Forum	Transparent policy making indicates lesser corruption in the government thus policies are effectively implemented and reduces inequality in the society.
	Firm level institutions	Intellectual property protection (1 = not at all; 7 = to a great extent) weighted average	Interval scale	World Economic Forum	Strong laws related to intellectual property protection attracts higher FDI in the cost country which increased growth and productivity and in turn reduces income inequality.

		Ethical behaviour of firms (1=extremely poor among the worst in the world; 7 = excellent among the best in the world) weighted average	Interval scale	World Economic Forum	A better ethical behaviour of firms creates a better working conditions and wages for the workers which reduces income inequality
		strength of auditing and reporting standards (1 = extremely weak; 7 = extremely strong) weighted average	Interval scale	World Economic Forum	Strong auditing and reporting helps public sector entities to fulfil their duties and to be accountable and transparent to citizens while achieving their objectives.
		strength of investor protection (Index on a 0–10 (best) scale	Interval scale	World Economic Forum	Strong investor protection attracts more investment and leads to higher economic growth which can be distributed in the society to reduce inequality.

Table 6: Independent Variable

Concept	**Variable**	**Indicator**	**Scale of measurement**	**Source**	**Value**
Global economic integration	Foreign Direct Investment	Total and sectoral Greenfield FDI inflows as a % of GDP	Ratio scale	FDI Markets	More FDI may leads to higher economic growth and lower income inequality.

Table 7: **Control variables:**

Variable	**Indicator**	**Scale of measurement**	**Source**
Trade	The share of imports plus exports as % of GDP	Interval	Oxford Economics

Initial per capita GDP growth	Annual growth rate of per capita GDP for year 2006	Ratio	Euro Monitor Passport
Initial Gini coefficient	Value of Gini coefficient for year 2006	Interval	Oxford Economics
Population	Total population (millions)	Interval	Euro Monitor Passport
Size of the country	Land area (Square Kilometres)	Interval	Food and Agriculture Organisation, UN
The distance of the country from equator	Latitudes (in degrees)	Interval	CIA World Factbook website

3.2. Research strategy

Based on the nature of research question, present research employs secondary data analysis a research strategy using quantitative methods and statistical techniques. There are several reasons for selecting secondary data analysis as research strategy.

First, present study is a deductive research based on theory and aims to explain the causal relationship between dependent variable (income inequality) and independent variable (FDI) using dependency theory in the context of African countries. It has been assumed that FDI inflow into different sectors of economy may have different impact on the income inequality in the country therefore effect of total FDI as well as sectoral FDI (hi-tech, manufacturing, resource and service sector) has been analysed separately. In addition, an attempt has been made to find the regional variation in the impact of FDI on income inequality because Africa is a large continent and there are socio economic variations within this continent which may result into the regional variation in the effects of FDI on income inequality.

In doing so it also aims to identify factors that determine this relationship. The main research question of this research is explanatory in nature while first sub question is a testing research question which can best be answered through secondary data analysis. Second, as the study area comprises majority of African countries, the geographical scope of the present research is wide. In addition, the study covers the time period of 9 years from 2006 to 2014. Present study is based on large number of research units which include all countries of Africa and involves several moderating variables beside dependent and independent variables. Due to the scope of the study, it focuses on the broad understanding of the relationships rather than the depth of processes therefore secondary data analysis is the most appropriate strategy for obtaining the answers for the proposed research questions (Theil 2015). Third, all the variables required (e.g. FDI, GDP and trade etc.) for present study cannot be collected through primary survey and they can be obtained through reliable secondary data sources.

The research strategy employs two types of regression analysis. First, panel regression is used to test the relationship between FDI (independent variable) and income inequality (dependent variable). This analysis has been done for total greenfield FDI as well as sectoral FDI.

Second, to increase the robustness of analysis, a panel regression with interaction terms is employed to identify the factors which determine this relationship between FDI and income inequality. Based on theory, four moderator variables discussed in the operationalization, are

included in the regression model to create interaction with FDI which are assumed to determine the impact of FDI on income inequality. In addition, control variables are included in the model which influence income inequality and three instrumental variables are included (population, distance from equator and size of the country) to deal with the issue of endogeneity. All the variable are based on theory and are widely used in existing empirical literature, particularly those studies which have used moderator variable to explain the effects of FDI in income inequality such as Wu and Hsu (2012) Ha (2012) and (Lin et al. 2013).

3.3. Reliability and Validity

A major challenge related to reliability of present research is lack of availability of data. Some of the indicators related to infrastructure and technology and education contain several missing values. Since the data on secondary education attainment used in several cross sectional studies was not available for several years therefore enrollment in tertiary education has been used as proxy for human capital in this research.

The results of the present study may not be generalized to other continents and countries particularly developed countries for there are significant differences in their economic, social and political environment.

The research has a strong measurement validity since secondary data is obtained from most authentic data sources such as World Bank, Oxford Economic, Euro Monitor Passport and FDI Markets. In order to increase the validity of research, panel data is analysed for the period of 9 years (2006 to 2014) for which required indicators are available. The indicators used in this research are derived from the theory and existing scientific literature which enhances the validity of the present research. Further, to enhance the validity of statistical analysis, the panel data is tested on several assumptions before applying the panel regression. To increase the robustness of analysis two types of regressions have been employed namely panel regression as well as panel regression with interaction terms. In both the regression models four different dependent variables which measure income inequality have been used in regression analysis. These variables are Gini coefficient, growth of Gini coefficient, growth of average income in lowest income decile and growth of average income in highest income decile. Similar results from different regression models further confirm the validity of the present research.

3.4. Different aspects of data:

3.4.1. Data Collection Methods

Based on the research questions and operationalisation, the present research employs secondary data analysis as a research strategy and uses quantitative data from authentic secondary online data sources. Due to the wide scope of the study secondary data is the best to obtain the answers of the proposed research questions. All African countries and cities have been selected as research units for this research because despite increasing economic integration with the global economy and high inflow of FDI they have been experiencing highest income inequality in the world, hence Africa presents a good study area for this study. Therefore, the study area comprises all 35 major African countries for which data is available. Apart from the geographical scope, the study aims to analyse the trend over 9 years between 2006 and 2014, therefore, data can only be obtained from secondary sources.

Data collection: The required data for present research data is collected from the secondary data sources given below:

- **Oxford Economics:** the data on Gini Coefficient that is dependent variable has been obtained from Oxford Economics. It is a global advisory firm which provides reports, forecasts of market trends and their socio-economic and business impact for 200 countries across the world, 100 industrial sectors and more than 300 cities all over the world.
- **FDI Market Survey:** The main independent variable that is inward Greenfield FDI is derived from FDI Markets which is a service from Financial Times. It provides data on cross border Greenfield investments across all countries and sectors world over.

- **Euro Monitor Passport survey:** few indicators for descriptive analysis are collected from Euro Monitor Passport Survey. It is a global market research database that provides statistics, and other types of data on industries, countries and consumers worldwide.

- **World Development Indicators, World Bank:** Several indicators which are used to create indices of absorptive capacity and level of technology are collected from the World Bank website.

- **Global Competitiveness Index:** For the construction of composite index of absorptive capacity and level of technology, few indicators related to infrastructure and technology have been obtained from sub pillars of Global Competitiveness Index provided by World Economic Forum.
- **Food and Agriculture Organization of the United Nations (FAO UN):** The data for the land area of the countries has been obtained from Food and Agriculture Organization of the United Nations. FAO plays an important role in compiling, processing and dissemination of statistics related to food and agriculture. It also plays a vital part in the global compilation, processing and dissemination of food and agriculture statistics, and provides essential statistical capacity development to member countries. It provides statistics in the areas of agriculture, forestry and fisheries, land and water resources and use, climate, environment, population, gender, nutrition, poverty, rural development, education and health as well as many others.

3.4.2. Data Analysis Methods:

The present study is a deductive research as it attempts to explain the impact of FDI on income inequality based on existing theories. Due to the contrasting theories which explain the relationship between these two variables as well as contradictory evidences, the present study attempts to identify the factors which determine the impact of FDI on income inequality. For answering each sub research question, the data analysis has been done in two stages viz. descriptive statistics and inferential statistics comprising different methods. Following research methods have been used under these two stages of data analysis:

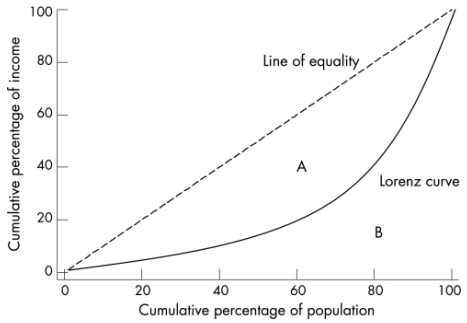
3.4.2.1. Descriptive statistics:

In order to describe the data, measures of central tendency and dispersion have been used. Graphs and trend lines have been prepared to understand the nature of indicators.

1) **Gini coefficient:** "Gini coefficient is an aggregate measure of income inequality. It represent the deviation of the income distribution from the state of perfect quality. (UN, 2015).

It is expressed as ratio with values ranging between 0 and 1. The 0 value of Gini coefficient represents every person in the country earns the same income whereas 1 represents that all the income of country is earned by one person that is compete inequality. Gini coefficient is calculated from Lorenz curve because it is the area between the Lorenz curve and the line of equality.

Figure 2: Lorenz Curve and Gini coefficient



Source: Mario, 2007

As shown in the above Lorenz curve, cumulative income share is presented on the vertical axis while horizontal axis shows the distribution of income. The Gini coefficient is calculated as area A divided by total area of A and B. In case of perfect equality or when income is equally distributed in the society, the Lorenze curve merges with line of total equality representing the value of Gini coefficient as zero. In contrast, if all the income is received by one individual then the area of A and B would be the same representing the value of Gini coefficient as one.

Advantages of Gini coefficient as measure of income inequality:

- The main advantage of Gini coefficient is that unlike per capita income or GDP, it is representative of whole population because it measures income inequality by means of ratio analysis.
- Gini coefficient is adequately simple and easy to interpret. It shows the change in income for poor and rich whereas measures such as per capita GDP do not reflect the changes for whole population.
- Gin coefficient indicates the change in income distribution of the country over a period of time, therefore it is used to see whether income inequality has increased or decreased over time.
- The Gini coefficient is comparable across countries and sectors such as rural and urban since inequality tend to vary between rural and urban areas in most of the countries.
- The present study uses Gini coefficient as a measure of income inequality since it has been widely used in official reports that are based on primary income data. In

addition, the studies which compared several measures of income inequality (Anand and Kanbur (1993) found similar kind of aggregate results across various measures of income inequality.

Gini coefficient has for important characteristics which makes it a reliable measure of income inequality:

- Anonymity: Its maintains the anonymity. It does not consider who are in high and low income groups.
- Scale of independence: In the measurement of Gini coefficient, the size of country and economy are not considered.
- Population independence: the size of population is not considered in the calculation of Gini coefficient.
- Principle of transfer: the transfer of income from rich people to poor people results into more equal distribution of income.

Disadvantages of Gini coefficient as measure of income inequality:

- A large size economically diverse country tends to have higher Gini coefficient as compared to its individual regions. Therefore, Gini scores of individual European countries are difficult to compare with US as a whole.
- The comparison of income distribution across countries may become difficult because the benefit system may vary. For instance, in some countries poor receive benefits in the form of money whereas in other countries they receive food stamps which are not counted as income in the calculation of Gini coefficient.
- Gini coefficient gives different results when calculated for individuals instead of households. The comparison is only meaningful if Gini is measured with consistent definition across different populations.
- The amount of inequality may be understated in Lorenz curve if richer income group uses their income more efficiently as compared to lower income group.
- The reliability of Gini coefficient decreases if data is less accurate. In addition, different countries use different methods for collecting data which makes the statistical comparison difficult across countries.
- The countries with similar income and Gini coefficient may have very different income distribution.
- Since Gini coefficient is an aggregated measure of income inequality it does not capture the specific changes in underlying income distribution. For instance, the redistribution of income from top to middle income group may cause the same change in the Gini coefficient as the redistribution of income from middle income group to bottom quintile (Deininger and Squire 1996). In other words, total Gini of a society is not same as sum of the Gini coefficient for sub groups or sub regions.

2) **Income distribution according to deciles**: To uncover the changes in income distribution across individual groups of society over time which may be obscured by aggregate measure Gini coefficient, the share of income by deciles has been used as an alternative measure of income inequality. For instance, the proportion of income earned by poorest 10 percent population is an intuitive measure of inequality.

3) **Decile ratio**: The decile ratio is a simple and effective measure of income inequality. It is calculated by dividing the income of 10 percent richest households by the income of 10 percent poorest households. The ratio indicates the gap between the income of richest and poorest people in the country.

Following two methods have been used for the visual representation of the indicators:

4) **Network analysis:** To analyse the spatial pattern of distribution of FDI, a network analysis has been performed using Gephi software. Network analysis is done for total FDI as well as FDI in four major sectors (hi-tech, manufacturing, resource and services) of economy to see the relative position of countries in terms of total inward FDI across different sectors of economy.
5) **Thematic maps**: Thematic maps are prepared in Arc GIS to show the spatial pattern of income inequality and FDI across African countries.
6) **P2 Distance:** The moderator indicators absorptive capacity, human capital, quality of institutions and technology and innovation in host country are four indices calculated using P2 distance index in R software. P2 distance combines group of indicators into a single index.
7) This approach has also been used to create synthetic indicators in subjects like well-being and other social indicators (Bonet-García 2015). It is an efficient measure to combine several indicators into one index because it does not reduce the information. In addition, it can be used for comparison across spatial units such as regions and comparison over time.
8) All the information contained in indicators is used in the construction of index therefore large number of indicators can be combined without losing information, and it also removed the redundant variance and multicollinearity from the data (Montero 2010; Bonet-García 2015).

To calculate the P2 distance, we use the data matrix X of order (m, n) where m represents the number of countries and n, is the number of indicators. Each element of this matrix, xri, is the value of the indicator i in the country r. The P2 distance indicator calculates the distance of each spatial unit from the theoretically defined spatial unit of reference. For comparison across spatial units, a reference value is defined foe each indicator (Bonet-García 2015).
The calculation of distance matrix D is given below:

$$dri=|Xri-X^*i|$$

where $x'i$ is the r-th element of the reference base vector
$X' = (x'1, x'2, \ldots, x'n)$.

3.4.2.2. Inferential statistics

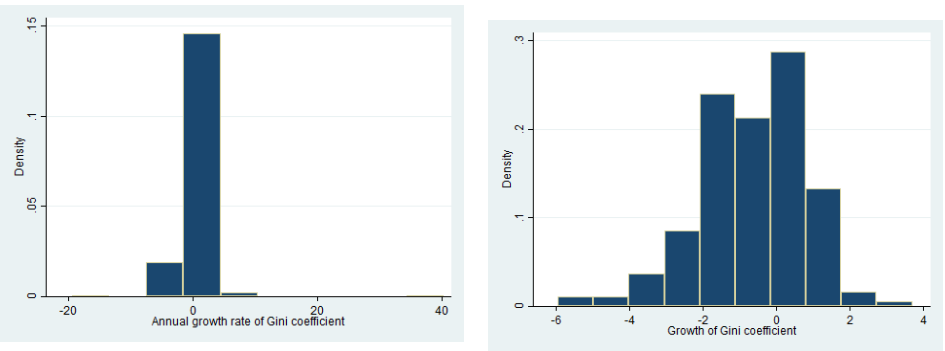
For the purpose of present research, the inferential statistics has been done in two stages. First, panel regression has been used to answer the first and second research question that is to test the impact of FDI on income inequality and its variation across geographical region. Second, panel regression with interaction terms has been employed to find out the factors which determine effect of FDI on income inequality in African countries. To increase the robustness of analysis the regressions have been done using four different dependent

variables which represent income inequality. These are Gini coefficient, growth of Gini coefficient, growth of average income in lowest income decile and growth of income in highest income decile. Similarly, panel regression with interaction terms has been done using two dependent variables namely, Gini coefficient and growth of Gini coefficient.

To enhance the validity of the statistical analysis the data is tested on following assumptions before applying panel regression.

1. **Check for unusual and influential observations:** Influential observations are those observations whose removal significantly change the estimation of coefficient. Cooks'Distance, is used to measure the influence in data. It is a measure of overall influence which combines the information of outliers and leverages. Based on this test the influential observations are excluded from the regression analysis.
2. **Test for normality:** The check for non-normal errors in panel regression is important for both methodological and conceptual reasons. The assumption for normality states that residuals behave normal. This assumption is tested through graphical and non-graphical methods. Kernel density produces a graph of residuals while Shapiro wilk test is a non-graphical test for normality where significant value of W in the output rejects the hypothesis which states that residuals are normally distributed. Both the test show that data used in panel regression is normal.
3. **Test for homoscedasticity:** Test for homoscedasticity tests the assumption that variance in the residuals are constant or homoscedastic. A graphical way to test homoscedasticity is to generate scatterplot between residuals and predicted values. Breusch Pagan test is a non-geographical way to test this hypothesis. A significant result rejects the null hypothesis that means residuals are heteroscedastic. To analyse the heteroscedastic data, robust command is used in regression. The scatterplot as well as Breusch Pagan test confirm that data is heteroscedastic therefore robust command is used in both types of panel regression.
4. **Test for multicollinearity**: Variance inflation factor (VIF) tests the null hypothesis that independent variables are not perfectly correlated. The indicators with VIF values >10 should be excluded from the regression model. According to VIF test, there is no multicollinearity in the data used for the panel regression.
5. **Test for linearity:** A two-way scatterplot is generated for each independent variable and dependent variable to find out if the relationship between dependent and independent variable is linear.
6.

Figure 3: Histogram of growth of Gini coefficient and log of growth of Gini coefficient



Source: Author, 2016, Based on Oxford Economics

And histograms are generated for dependent and independent to check for skewness in the data and skewed variables are transformed taking natural log or square root of variable. The dependent variable, growth of Gini coefficient is found to be a skewed variable therefore it is transformed into log variable for using in panel regression.

7. **Test for model specification:** Model specification error occurs when one or more relevant indicators are excluded from the regression model of irrelevant indicator are included in the regression model. Link test is used to test the assumption that error term and independent variables in the model are not correlated. A significant value of F statistics indicates that model is incorrect. The insignificant p value in the link test confirms that the model specification is correct.
8. **Test for independence:** Test for independence tests the hypothesis that there is no first order autocorrelation. A significant result of F statistics rejects the null hypothesis. The insignificant p value confirms that there is not autocorrelation in the data.
9. **Hausman test for selection of fixed and random effects model:** There are two types of computational techniques to analyse the panel data and Hausman test is a statistical method to decide which technique is appropriate for the present research. The two types of techniques and their use are discussed below:

Fixed Effects (FE): Fixed Effects model explores the relationship between dependent and independent variable within entity that is country in the present analysis. Each entity or country has its own specific characteristics which may not necessarily influence independent variables. Under the fixed effects model it is assumed that some characteristic of entity may influence or bias dependent or independent variable which needs to be controlled. Therefore, fixed effects model removes the influence of those time invariant characteristics for measuring the net effect of independent variables on the dependent variable. FE model also assumes that no correlation should be found between time invariant characteristics of different entities. Similarly, entity's error term and constant should not be correlated with other entities. If the error terms of entities are correlated, then FE is not an appropriate model since it may not give the correct inferences. FE model can only support the inference about the group of entities analysed in the panel and inferences cannot be generalized to other entities because these models aim to analyse the differences within an entity.
FE model is a suitable model under two conditions. First, when it is believed that all entities/countries included in the analysis are functionally identical. Second, when the aim is to compute the common effect size for the sample that is analysed, and not to generalise to other populations.

Random Effects (RE): Unlike FE model, RE model assumes that the variation across entities/countries is random and does not correlate with the independent variables. If the researcher believes that dependent variable is influenced by variation across spatial units or entities, then RE is an appropriate model. An advantage of RE model is that it allows the researchers to make inferences about the population from which the sample is derived. In RE model it is important to identify the specific characteristics which are assumed to influence the independent variables. But the constraint is that some of the variables are not be available so researcher has to omit that variable.

If the effect size in each entity/country relative to variance between the subjects is large enough (given a large sample size), it indicates that population exhibits that effect. Another advantage of RE model is that time invariant variables (size of the country) can be included. Random Effects model is expressed as follows:

$Yit = \beta Xit + \alpha + uit + \varepsilon it$

where
uit= withing entiry error
εit=between entity error

Selection of Fixed/Random Effects: The selection of the method of analysis is primarily based on the researcher's expectation about the whether or not the entities or countries share a common effects and the aim of the analysis. FE models tests the null hypothesis that there is zero effect in every entity. On the other hand, the hypothesis being test in RE model states that the mean effect is zero.
The statistical method to test the if entities share a common effect is Hausman test. The test is used to decide the type of model, wherein the null hypothesis states that RE is appropriate model while alternative hypothesis assumes that FE is preferred model.

In other word, the null hypothesis means that the unique errors (ui) are not correlated with the regressors. The test compares an estimator that is known to be consistent (fixed) with an estimator that is efficient under the assumption being tested (random) (Hausman, 1978). A significant result of the chi2 rejects the null hypothesis meaning the estimates are fixed and not random. Based on the Hausman test Random Effects model of panel regression has been used in the present research.

3.4.3.1.Panel Regression

To answer the first and second research question that is, to explain the relationship between FDI and income inequality, Random Effects panel regression is performed for the panel of 35 African countries using statistical package STATA. The selection of Random Effects model is based on the Hausman test. Two panel regressions are done using two dependent variables but same control variables. First, panel regression is done using value if Gini coefficient as dependent variable. Since the panel of data is only for nine years which is a short period of time to reflect the change in the value of Gini coefficient. Second, panel regression is done using annual growth of Gini coefficient. Due to the very little variation in the value of Gini coefficient across countries and time, it is converted into annual growth rate. Since growth rate of Gini coefficient is a skewed variable, its logged value is used as dependent variable in the panel regression.
As a measure of global economic integration, the share of Total Greenfield FDI as percentage of GDP as well as FDI in four sectors namely hi-tech, manufacturing, resource and services are used as main independent variables in different regression models. In addition, a set of control variables are included in the model viz initial Gini coefficient, trade as share of GDP and initial per capita GDP growth, total population, size of country and distance from equator. To tackle the problem of endogeneity, instrumental variable like size of the county,

total population and distance from equator are used as control variable (Caner and Hansen 2004; Wu and Hsu 2012; Lin et al. 2013).

3.6.2.2. Panel Regression with interaction terms

Since few recent studies (Wu and Hsu 2012; Lin et al. 2013) have claimed that the relationship between FDI and income in inequality is not a direct relationship rather it is determined by other factors such as absorptive capacity and human capital. In order to find out the factors which determine the impact of FDI on income inequality, panel regression with interaction terms is employed. According to a popular school of thought, the interaction effect is conceptualised in terms of moderated relationships. This perspective explains the interaction in three variables system wherein one variable is defined as outcome variable (dependent variable), second variable is focal independent variable and a third variable is construed as moderator variable.

The effect of focal independent on dependent variable is considered to vary as function of moderator variable. In other words, the effect of focal independent variable on the outcome variable varies depending on the level of the moderator variable.

In a moderated causal relationship, a third variable i.e. Z moderates the relationship between dependent(Y) and independent(X) variables. That means the value of Z variables determined the nature of relationship between X and Y.

Figure 4: Causal and moderated causal relationship

Direct causal relationship **Moderated causal relationship**

Source: Jaccard & Robert Turrisi (2003)

Since there are contradictory evidences in literature on the effects of FDI on income inequality, particularly between developed and developing countries. Few recent studies have claimed that FDI may have a positive or a negative impact on income inequality but its effect depends on the factors such as absorptive capacity, human capital, quality of institutions and technology diffusion by the FDI (Melese and Helmsing 2010; Wu and Hsu 2012; Lin et al. 2013). Therefore, panel regression with interaction terms is used to explain the role of these factors in determining the impact of FDI on income inequality in Africa countries. In the present research, panel regression with interaction terms has been used to explain the role of absorptive capacity, human capital, quality of institutions and technology diffusion in determining the effect of FDI on income inequality and to identify which of these factors is relatively more significant in explaining the relationship between FDI and income inequality.

The following is an example of regression equation with interaction term, which is formed by including moderator variable x.z, that is a product of two independent variables x and z

$$y = a + b_1x + b_2z + b_3x \cdot z + e$$

In the regression model, four interaction terms are used which are absorptive capacity, human capital, quality of institutions and technology and innovation. The interactions are included in the model in steps. First, panel regression is run using single interaction to see the effect of each interaction on the relationship between FDI and income inequality.
Then panel regression is run using four interactions in one model by incorporating them one by one and control variables are included in the next step. The regression equations for these models are given below:

Growth of Gini coefficient= B0 + B1*FDI + B2*Absorptive capacity + B3* FDI*Absorptive capacity
Below is the description of indicators used in the panel regression with interaction terms:

3.6.2.2.1. Dependent variable

In the main models of regression analysis the growth of Gini coefficient has been used as dependent variable. Due to the little variation in the values of Gini coefficient between 2006 and 2014, the growth rate of Gini coefficient is used as dependent variable in the main regression model. Further the growth of Gini coefficient is a skewed variable therefore it is transformed into log variable to correct for skewness and used in panel regression. While the output tables of model which uses value of Gini coefficient as dependent variable are kept in Annex.

3.6.2.2.2. Independent variables

Total and sectoral inward FDI: The main independent variables used in the study are total inward Greenfield FDI and sectoral Greenfield FDI. The data on FDI is provided by FDI Markets from Financial Times (in million $). For the purpose of analysis, the value of total FDI as well as FDI in four major sectors of economy has been is converted into percentage of GDP as used in several studies on FDI and income inequality (Wu and Hsu 2012; Lin et al. 2013; Lall and Narula 2004).

These four major sectors are Hitech, Manufacturing, Resource and Services. The share of total as well as sectoral FDI as percentage to GDP has been used as main independent variables in five separate panel regressions. For resource sector the square root of the percentage of FDI in this sectors is used as independent variable in panel regression due to the skewness of the variable and lesser number of observations. The table below presents the summary statistics of original data used to construct independent variables.

3.6.2.2.3. Moderator variables

The research uses four moderator variables in the panel regression with interaction terms. These are absorptive capacity, human capital and level of technology and quality of institutions. These indicators are indices calculated using P2 distance index in R software.

- **Absorptive capacity:** The index of Absorptive capacity is calculated by combining a group of indicators related to infrastructure, access to information and human capital. The selection of indicators is based on theory (Wu and Hsu 2012; Lin et al. 2013). The indicators used for the compilation of absorptive capacity are air infrastructure, electricity consumption, quality of electricity, international internet bandwidth, internet users, mobile subscription, enrolment rate in tertiary education and collaboration between universities and industry for R&D.
- **Human Capital:** Present study measures the human capital through enrolment rate in tertiary education. Previous studies based on cross sectional data (Wu 2009; Lin et al. 2013) have used average years of secondary education as an indicator of human capital. But this indicator is not available for panel of nine years therefore current research has used enrolment in tertiary education as an indicator of human capital.
- **Level of technology:** Level of technology index is constructed from five indicators related to technology and innovation obtained from World Bank and Global Competitiveness Index of World Economic Forum. The indicators used for the construction of this index are R&D expenditure, number of patents applications, number of scientific and technical journal articles, availability of latest technology, FDI technology transfer.
- **Quality of institutions**: Quality of intuitions is as index constructed through P2 distance. It combines seven indicator related to government intuitions as well as firm level institutions which are obtained from Global Competitiveness Index of World Economic Forum. These indicators are based on Executive opinion survey.

3.6.2.2.4. Control variables: In panel regression as well as in panel regression with interaction terms, six control variables have been included based on the theory. These are trade, initial per capital GDP growth rate, total population of the country, size of the country and distance from the equator.

The trade as percentage of GDI is included as control variable to control the effect of trade openness on income inequality and initial growth rate of per capita GDP is an indicator of initial level of economic development. While initial Gini coefficient is included because present level of income inequality is influenced by previous level of income inequality.

The size of the country and distance from equator (latitudes) are used as instrumental variables. These geographical indicators are used to control the problem of endogeneity (Lin et al. 2013; Wu and Hsu 2012). The size of the country and population are the measures of market size of recipient country and determine the demand for inward FDI as well as potential for the supply of FDI from the source country. Latitudes (distance from equator) of the countries are included as control variable because studies claim that countries located in similar latitudes tend to have similar characteristics such as culture, climate and institutions and MNCs tend to locate in countries with similar cultural, political and legal set up in order to reduce the information gap and transaction costs. (Lin et al. 2013).

Finally, in the third stage, the indices such as absorptive capacity, technology and innovation and quality of institutions are unbundled and separate panel regressions are run for identifying the most important factors within each index which determine the effect of FDI on income inequality

3.5. Overview of study area:

The study aimed to analysed all African countries but due to the unavailability of data, several countries have been eliminated from the analysis and finally the research is based on the analysis of 35 countries. Data for several indicators is obtained from Global Competitiveness Index of World Economic Forum which is available only for 38 African countries. Out of 38 countries the data on dependent variable (Gini coefficient) is not available for Seychelles. Further, during initial analysis, two outliers namely Liberia and Mozambique are excluded from the study because regression line was showing a non-linear relationship between FDI and income inequality due to these two countries which cannot be generalised for whole continent therefore these countries are excluded from the analysis. As a result, the relationship between FDI and income inequality became linear.

Since analysis has been done at two levels, the sample countries are categorised according to geographical regions. The continent of Africa comprises of five geographical regions namely Northern Africa, Central Africa, Eastern Africa, Western Africa and Southern Africa.

The list of countries according to geographical regions is given below:

Table 8: List of Countries by geographical regions in Africa

Northern Africa	Central Africa	Eastern Africa	Western Africa	Southern Africa
Algeria	Burundi	Ethiopia	Benin	Angola
Egypt	Cameroon	Kenya	Burkina Faso	Botswana
Libya	Chad	Madagascar	Cape Verde	Malawi
Mauritania	Gabon	Mauritius	Cote d'Ivoire	Namibia
Morocco		Rwanda	Gambia	South Africa
Tunisia		Tanzania	Ghana	Zambia
		Uganda	Guinea	Zimbabwe
			Mali	
			Nigeria	
			Senegal	
			Sierra Leone	

Source: Author, 2016

In order to make the analysis more robust, two additional regression models have been used taking alternative measures of income inequality. These regression models use growth of average income in top income decile and lowest income deciles. But the data on income deciles is available only for eight countries therefore panel regressions which uses growth of average income in top income decile and lowest income deciles is based on the data for eight countries. These countries are Algeria, Cameroon, Egypt, Kenya, Morocco, Nigeria, South Africa, Tunisia.

Chapter 4: Research Findings

This chapter presents the research findings based on the statistical analysis. Research findings are presented into two broad sections. Section 4.1 discusses the descriptive analysis and its results while section 4.2 deals with inferential analysis and present the results based on the regression analyses. The main tables, graphs, charts and maps are presented in the chapter while most of the tables and graphs are kept in the annexure.

4.1. Descriptive Analysis:

4.1.1. Trend and Pattern of income inequality:

In the present research, Gini coefficient is the main indicator that is used to measure income inequality. In addition, the data on income distribution was available for eight countries which has been analysed to better understand the distribution of income in the society.

4.1.1.1. Income inequality measured as Gini coefficient:

As the world is becoming more integrated, countries around the world are competing for higher growth and competitiveness to gain from the globalisation. Developing economies are the new players in this process and many of them have been able to achieve higher economic growth. But unlike developed economies, the economic growth in developing countries is combined with high levels of income inequality that is concentration of income in the richer section of society. This concentration of income increases the gap between haves and have not and leads to polarisation and segmentation in society which further gives rise to dissatisfaction, conflicts and several other evils in the society which in in turn affect the social and economic health of the country. African countries are the most appropriate example of this phenomena which are trying to integrate in the global economy and at the same time they are experiencing the highest level of income inequality in the world. Therefore, income inequality is gaining attention in research as well as policy making because understanding the nature and cause of income inequality is crucial to the formation and implementation of effective policy to reduce income inequality.

Since this research focuses on African countries, present section deals with the trend and pattern of income inequality in African countries between 2006 and 2014. For the purpose of this research, income inequality is measured by Gini coefficient that is a widely used measure of income inequality. Its value varies between 0 and 1 wherein 0 represents perfect equality that is equal distribution of income in the society whereas 1 represents complete inequality where one person receives all the income. The value of Gini coefficient closer to the 0 indicates a highly unequal society where wealth is concentrated to few people and a large number of people live below poverty line and experiencing lack of minimum basic services while a coefficient value closer to 1 represent a highly equal society with little gap between rich and poor people in the society. The summary of Gini coefficient and its annual growth is given in table 9.

Table 9: Summary of 1st and 10th income deciles (2006-2014)

Indicator	Observations	Mean	Standard Deviation	Minimum	Maximum
10th decile	104	4808.04	3897.3	573.3	13427.3
1st decile	104	77805.09	31500	22365.5	137865.6

Source: Author, 2016. Based on Euro Monitor Passport survey (2006-2014)

The figure 6 presents the trend of income inequality and its growth in Africa measured as Gini coefficient and its annual growth rate for the period between 2006 and 2014.

Figure 5: Trend of Gini coefficient and its annual growth in Africa (2006-2014)

Source: Author, 2016, based on Oxford Economics (2006-2014)

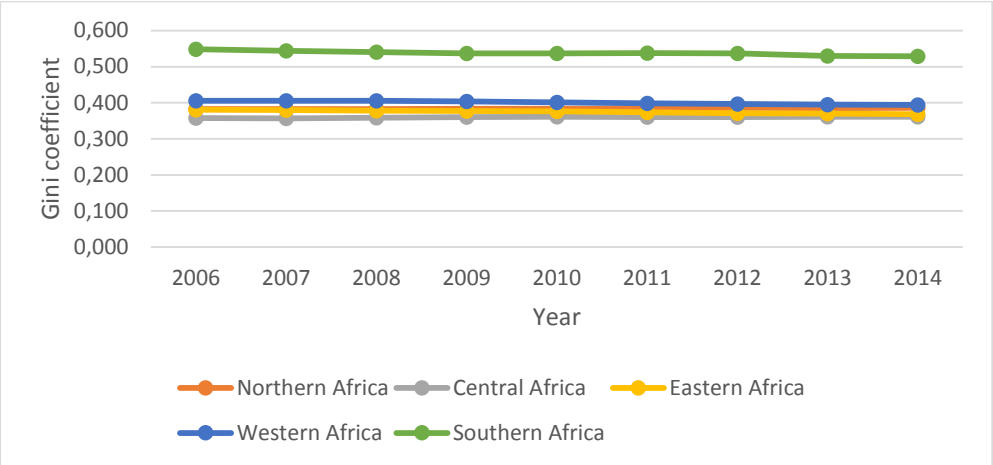
It is clearly visible that the income inequality has remained high and almost unchanged in Africa as a whole during the considered period with the value of Gini coefficient being 0.420 in 2006 and 0.411 in 2014. In terms of growth rate of Gini coefficient there has been little improvement because Gini coefficient has reported a negative growth rate in this period from -0.09 to -0.179. It is inferred that the income inequality has remained high and almost unchanged in Africa as a whole showing a large part of income is concentrated to fewer people while most of the people in Africa are living under poverty. But at the same time the negative and increasing value of growth rate of Gini coefficient indicates a positive sign that growth of income inequality is reducing and this negative growth rate of income inequality may result into decile in income inequality in the long run since the period of current research is only of nine years and it is a short period of time to observe the change in Gini coefficient because it takes long time to reflect change in the value of Gini coefficient.

4.1.1.1a. Income inequality across geographical regions

Looking at the regional pattern of income inequality as shown in figure 7, it clearly comes out that Southern Africa is most unequal region of Africa throughout the study period.

On one hand Southern Africa is one of the most economically developed part of Africa which consist of countries such as South Africa, Angola, Botswana, Malawi, Namibia, Zambia and Zimbabwe. But in terms of social development it represents a highly unequal society with a large part of income in few hands while most of the population struggling with poverty. However, among other regions there is only a slight difference in the level of inequality where Western Africa is followed by Northern Africa, Eastern Africa and Central Africa between 2006 and 2014.

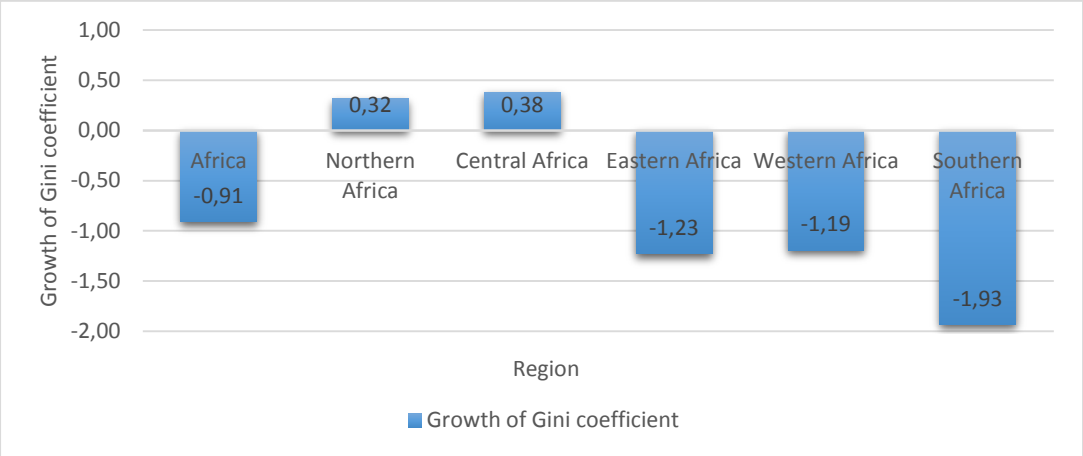
Figure 6: Trend of Gini coefficient by region in Africa (2006-2014)



Source: Author, 2016, based on Oxford Economics (2006-2014)

The growth of Gini coefficient between 2006 and 2014 at regional level in figure 8, shows a quite different picture. It is observed that Southern Africa region which has reported highest level of income inequality has shown a fastest reduction in the growth of income inequality that is about -2 %, it is followed by Eastern Africa (-1.23 %) and Western Africa region (-1.19 %). On the other hand, regions with relatively lower levels of income inequality such as Northern and Central Africa have experience an increase in the growth of income inequality.

Figure 7: Growth of Gini coefficient by region in Africa (2006-2014)

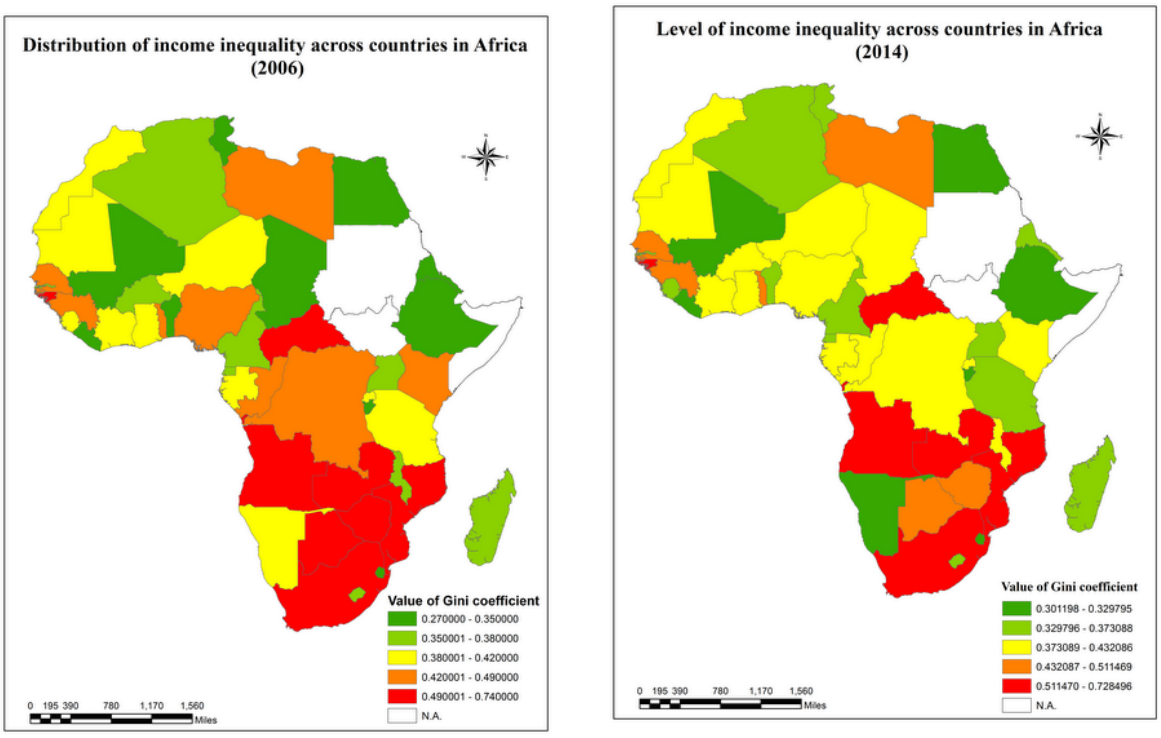


Source: Author, 2016, based on Oxford Economics (2006-2014)

4.1.1.1.b. Income inequality across countries

To see a broad picture of income inequality at country level the values of Gini coefficient for the period between 2006 and 2014 are averaged. It is observed that, the fastest growing economy of Africa that is Ethiopia (0.306) has reported lowest level of income inequality, it is followed by Mali (0.307), Burundi (0.313), Egypt (0.314) and Namibia (0.333) whereas all top five countries with highest average income inequality are from Southern Africa. These countries are Zambia (0.744), South Africa (0.650), Angola (0.583), Zimbabwe (0.559) and Botswana (0.510).

Figure 8: Level of income inequality in African countries (2006 & 2014)



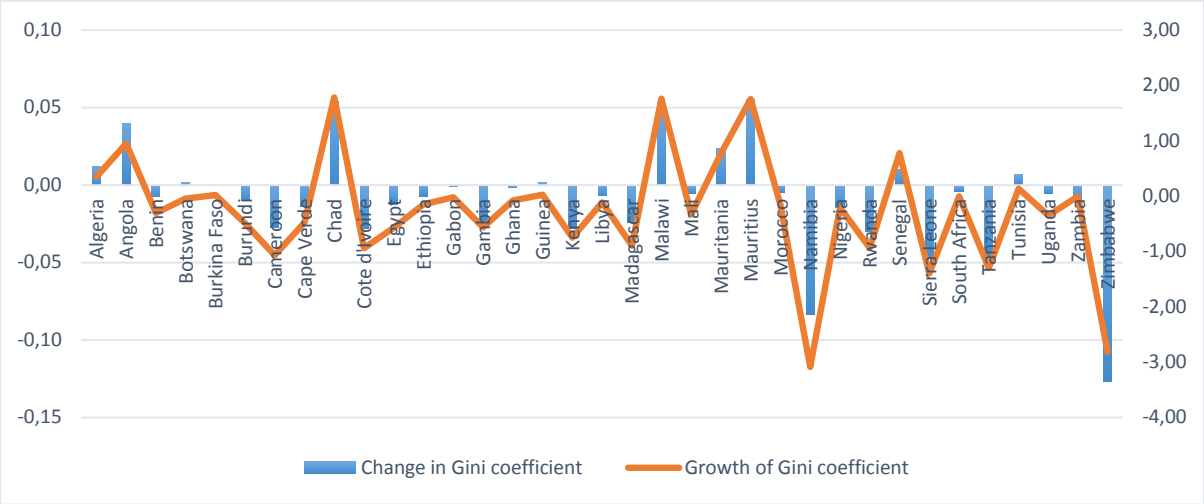
Source: Author, 2016, prepared in Arc map software

The figure 9 and 10 present the change in the level of income inequality between 2006 and 2014 and the thematic maps show the spatial distribution of income inequality in Africa at both points of time. It is observed that there is hardly any change in the values of Gini coefficient indicating that income inequality has remained almost unchanged during this period. Looking at the change in the values of Gini coefficient as shown in the graph below it has been found that although the change in inequality is minimal but out of 35 countries of analysis, 24 countries have experienced a slight decline in their level of income inequality.

Zimbabwe that is one of the most unequal societies in Africa is the leading country with 0.127 point declined in its income inequality from 0.634 in 2006 to 0.507 in 2014. It is followed by Namibia (-0.084), Sierra Leone (-0.047), Tanzania (-0.046) and Rwanda (-0.030). On the other hand, eleven African countries have experienced a further increase in their income inequality. The countries with highest increase in inequality are Mauritius

(0.055), Chad (0.054), Malawi (0.048), Angola (0.040), Mauritania (0.024), Algeria (0.012). These are followed by Senegal, Tunisia, Guinea, Botswana and Burkina Faso.

Figure 9: Change in Gini coefficient and its growth across countries in Africa (2006-2014)



Source: Author, 2016, based on Oxford Economics (2006-2014)

In terms of growth of income inequality (Figure) Namibia which is among the countries with lowest level of income inequality has also reported fastest reduction in its income inequality with negative growth rate of -3.09 % between 2006 and 2014. Namibia is followed by another South African country Zimbabwe and Sierra Leone. Out of 35 African countries nine countries have experienced growth in their income inequality. Chad (1.784%), Malawi (1.758%) and Mauritius (1.752 %) are the countries with highest growth of income inequality followed by Angola, Senegal, Mauritania, Algeria, Tunisia, Guinea and Burkina Faso. Surprisingly income inequality in South Africa has remained almost unchanged during this period being one of the highest in Africa.

4.1.1.2. Income gap between 1st and 10th decile

Although Gini coefficient is a widely used measure of income inequality but the distribution of income in the society provides a deeper understanding of nature of income inequality. Therefore, in addition to Gini coefficient the data on distribution according to deciles have been analysed in this section. Since the data is available only for the 1st and 10th decile of income distribution therefore it has been used to see the gap between richest and poorest section of society in eight African countries. The summary of 1st and 10th income decile is given in the table 10 below:

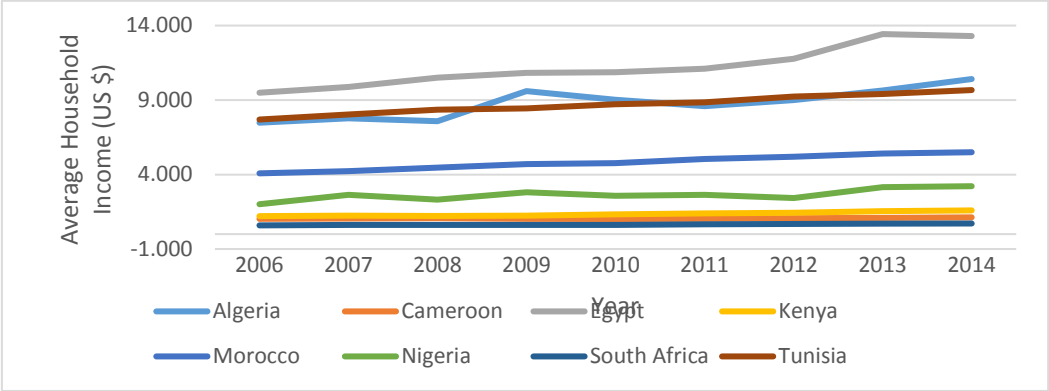
Table 10: Summary of 1st and 10th income deciles (2006-2014)

Indicator	Observations	Mean	Standard Deviation	Minimum	Maximum
10th decile	104	4808.04	3897.26	573.3	13427.3
1st decile	104	77805.09	31499.63	22365.5	137865.6

Source: Author, 2016. Based on Euro Monitor Passport survey (2006-2014)

The income gap between richest and poorest 10 % of households is another important measure of income inequality which has been used in several studies. The figure 11 presents the trend of income in the lowest and highest income deciles. It shows that South Africa being one of the most developed African countries has the lowest average household income among 10 % poorest households as compared to other countries. South Africa is followed by Cameroon, Kenya and Nigeria. These countries not only have lowest income among poor but the income has been almost stagnant in among the poorest 10% households during 2006 to 2014.

Figure 10: Average disposable income of households in lowest income decile in African countries (2006-2014)

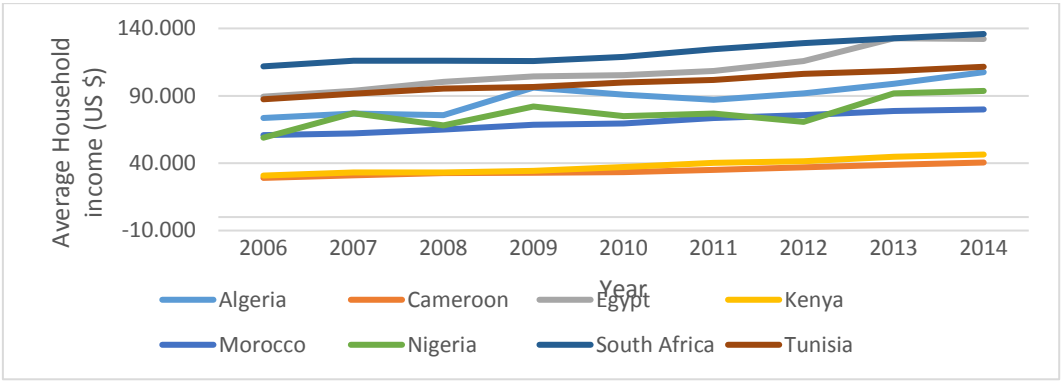


Source: Author, 2016. Based on Euro Monitor Passport survey (2006-2014)

On the other hand, North African countries such as Egypt, Tunisia and Algeria have a much higher average income among the poorest section of society which has been increasing steadily during the same period which indicates better economic and living conditions for the poor and reduction in income inequality in these countries.

Similarly, the trend of average income in the highest income decile for eight African countries is presented in the figure 12 below. Unlike the previous graph it shows a steady increase in the average income of 10% richest households in all eight countries. As expected, South Africa has the highest average income among 10 % richest households as compared to other countries followed by Egypt, Tunisia, Algeria, Nigeria and Morocco whereas Kenya and Cameroon have lowest average income among the richest 10% households.

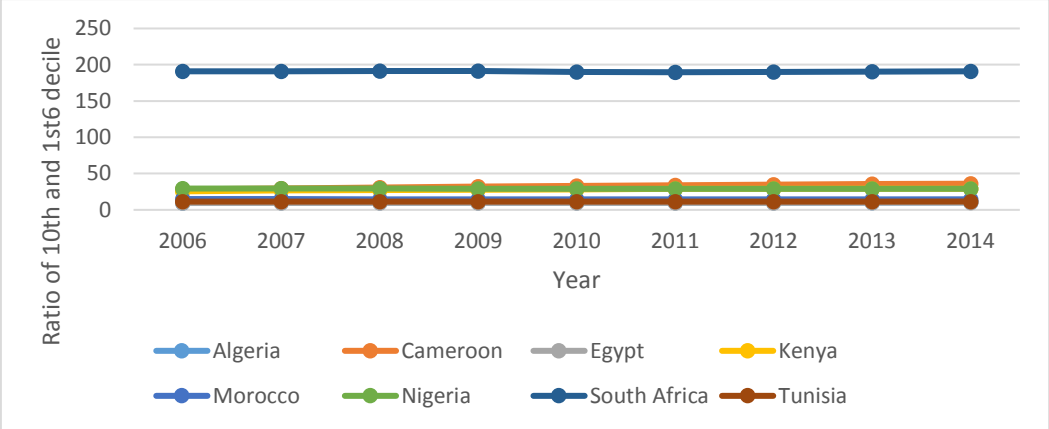
Figure 11: Average disposable income of households in highest income decile in African countries (2006-2014)



Source: Author, 2016. Based on Euro Monitor Passport survey (2006-2014)

The income gap between richest and poorest 10 % households has been measured by ratio of average income in 10th and 1st income decile that is presented in the figure 13. As expected South Africa has the highest income gap between richest and poorest 10 % households throughout the study period and there has been only a negligible decline of 0.27 from the ratio of 191 in 2006 to 190.73 in 2014. South Africa has a long history of oppression and apartheid, despite economic growth South Africa still represent a highly unequal society where poor are living in worse conditions compared to other African countries.

Figure 12: Ratio of Average disposable income of households in 10th and 1st income decile in African countries (2006-2014)



Source: Author, 2016. Based on Euro Monitor Passport survey (2006-2014)

While other seven countries have a much lower gap between rich and poor as compared to South Africa. Among these countries, Egypt, Tunisia, Algeria and Morocco have almost similar gap between 10% richest and poorest households with the value of ratio ranging from 10 to 15 respectively. While Nigeria and Cameroon have a relatively higher gap where the ratio of 10th and 1st income decile in Nigeria is about 30 and it ranges from 30 to 36 in Cameroon in the study period. Out of these eight countries only Morocco, South Africa and Nigeria have experienced a minimal decline in the gap between rich and poor 10% households and the change in the ratio values are -0.37, -0.27 and -0.24 respectively.

4.1.2. The trend and composition of Greenfield FDI in Africa

4.1.2.1 Trend of total and sectoral FDI

The global integration is one of the most important phenomenon which are shaping the world for last few decades. The countries which are deeply integrated into the global economy are the biggest beneficiaries of this process. FDI is one of the major components of global economic integration which integrate the economies through the capital flows across the globe therefore countries, particularly developing countries are competing to attract more FDI to become part of the largest global network for economic gains. A large number of countries including African countries, have opened up their economy and adopted liberal policies for attracting more FDI to achieve growth and higher level of development. Still these countries

are characterised by extreme poverty and income inequality which indicates that economic growth in these countries does not penetrate to the poorer section of society.

Since African countries are attracting large value of FDI for several years, present study seeks to understanding the impact of inward Greenfield FDI on the income inequality in the host countries in the context of Africa. This section describes that magnitude, trend and sectoral composition of FDI in Africa. The summary of total and sectoral FDI in Africa between 2006 and 2014 is given in the table 11. During the considered period the average value of inward FDI in African countries is about 1829 million dollars while the maximum value of FDI is 57557.76 which is received by Egypt in 2014. Looking at the four major sectors of economy it is observed that manufacturing is the largest sector which receives FDI with the average of 766.542 million $. The second largest sector in terms of inward FDI is resource sector (mean=554.695) followed by service sector (mean=368.599) while hi-tech sector receives the smallest amount of FDI (mean=139.186).

The second part of the table shows the summary of FDI as % of FDI which is used as main independent indicator in regression analysis. The mean of 5 of FDI received by Africa between 2006 and 2014 was only 1.63 % but FDI accounted for the maximum share in Zimbabwe in 2011 which was about 22%. At sectoral level FDI in manufacturing and resource sector accounts for 0.53 % and 0.52 % respectively followed by service sector (0.39%) while hi-tech sector has the smallest share in GDP that is only 0.82 %.

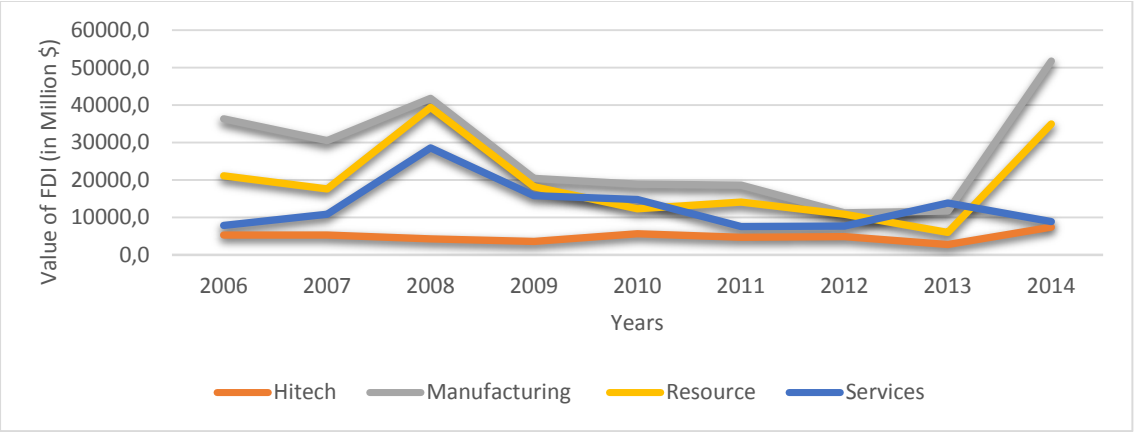
Table 11: Summary of value and share of FDI in Africa (2006-2014)

Indicator	Obs.	Mean	SD	Min.	Max.
Value of FDI (Million US $)					
Total FDI	315	1829.023	4683.428	0	57557.76
Hitech	315	139.186	470.073	0	5530.4
Manufacturing	315	766.542	3147.203	0	43598.76
Resource	315	554.695	1570.915	0	16000
Services	315	368.599	843.053	0	7529.7
FDI as % of GDP					
Total FDI	315	1.630	2.725	0	21.713
Hitech	315	0.082	0.332	0	5.161
Manufacturing	315	0.539	1.671	0	14.564
Resource	315	0.523	1.739	0	20.718
Services	315	0.391	0.777	0	7.047

Source: Author, 2016. Based on FDI Markets (2006-2014)

The figure 14 below presents the trend of total and sectoral FDI (in million$) in Africa between 2006 and 2014. It is observed that there are some fluctuations but total and sectoral FDI exhibit similar trend wherein FDI increased from 2006 to 2008 and year 2008 reported the highest amount of FDI in Africa. Since 2008, the value of FDI gradually declined till the year 2013 and again shown a sharp increase in 2013 in the value of FDI in all sectors of economy except service sector which showed a decline in FDI. Throughout the study period, manufacturing sector is the largest recipient of FDI followed by resource and service sector while hi-tech is the smallest sector in terms of inward FDI.

Figure 13: Trend of inward FDI by sector in Africa (2006-2014)



Source: Author 2016, Based on FDI Markets

The table 12 presents the trend of inward FDI as share of GDP in Africa. In case of total FDI, the percentage of FDI in GDP of Africa has been fluctuating which increased from 1.86 % in 2006 to 4.36 % in 2010 the year which reported highest amount of FDI in Africa. Then share of FDI steadily declined to 1.7 %. All four sectors also follow the similar trend but only manufacturing sector have reported a slight increase of 0.2 % in its FDI as share of GDP.

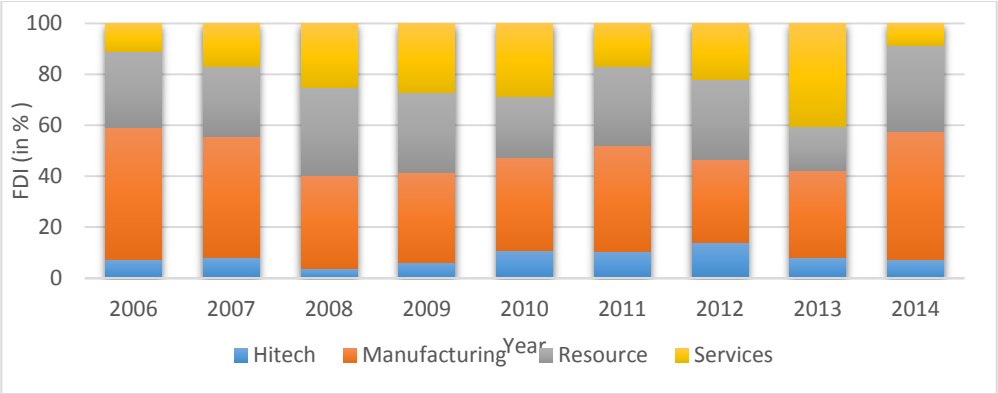
Table 12: Share of FDI as percentage of GDP

Years	Total	Hitech	Manufacturing	Resource	Services
2006	1.86	0.06	0.47	0.50	0.75
2007	1.78	0.04	0.43	0.72	0.46
2008	3.76	0.32	1.27	1.31	0.60
2009	2.89	0.02	0.44	1.09	1.22
2010	4.36	0.16	1.47	2.35	0.35
2011	2.78	0.08	1.21	1.20	0.29
2012	1.16	0.07	0.66	0.14	0.29
2013	1.36	0.03	0.55	0.22	0.56
2014	1.712	0.067	0.693	0.188	0.764

Source: Author, 2016

The sectoral composition of FDI in Africa between 2006 and 2014 has been depicted in the figure 15 below. It is clearly visible in the graph that manufacturing and resource sectors are the major recipients of FDI in Africa throughout the period of consideration. These two sectors are followed by service sector whereas hi-tech sector receives relatively smaller percentage of FDI compared to other sectors that is below 10 % in most of the years except year 2010, 2011 and 2012 (10.95 %, 10.39 % and 14.04 %). While share of FDI in manufacturing sector was lowest in year 2012 that is 32.38 % of total FDI and highest was 50.23% in 2014. The share of FDI in resource sector varies between 16.48 % in 2013 and 34.54 % in 2008. The share of service sector in total FDI increased from 11.18 % in 2006 to 40.38 in 2008 but it declined to 8.64 % in 2014.

Figure 14: Sectoral composition of FDI in Africa (2006-2014)



Source: Author, 2016. Based on FDI Markets (2006-2014)

Table 13 is the correlation matrix of sectoral FDI and Gini coefficient and its growth. Its shows that total inward FDI positively associated with income inequality in Africa (Gini coefficient) but the correlation is weak whereas total FDI has a negative association with growth of income inequality. The possible reason is that the values of Gini coefficient changes over a long period of time, similarly in case of present study the values of Gini coefficient have remained almost unchanged over the period of nine years between 2006 and 2014. Therefore, annual growth of Gini coefficient has been used in panel regression.

At sectoral level FDI in hi-tech manufacturing and resource sector is negatively associated with growth of Gini coefficient which indicates that the countries which receive FDI in these three sectors experience decline in the growth of income inequality which may reduce income inequality over time. The country level analysis is given in the next section.

Table 13: Correlation between Gini coefficient and Sectoral FDI

Inicator	Gini	Growth of Gini coef.	Total FDI	Hitech	Manufacturing	Resource	Services
Gini	1						
Growth of Gini coef.	0.049	1					
Total FDI	0.087	-0.061	1				
Hitech	0.040	-0.001	0.122	1			
Manufacturing	-0.001	-0.034	0.6353	0.003	1		
Resource	0.038	-0.139	0.6442	-0.01	0.015	1	
Services	0.000	0.024	0.342	0.042	0.083	0.0295	1

Source: Author, 2016. Based on FDI Markets and Oxford Economics (2006-2014)

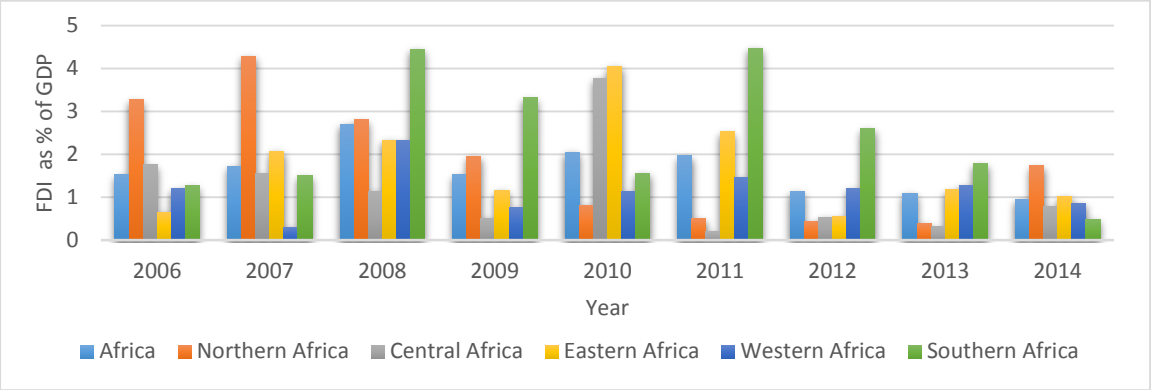
4.1.2.2. Trend and composition of FDI: A regional level analysis

This section discusses the distribution, trend and sectoral composition of FDI across geographical regions in Africa. Since Africa is a large continent, it should not be considered

as one entity as different regions have their own socio-economic characteristic which may respond and interact differently with the inward FDI and may result into different outcomes.

The figure 16 shows FDI as percent of GDP across regions in Africa between 2006 and 2014. It is observed that among five regions of Africa, northern Africa, western Africa experienced increase in share of FDI in their GDP between 2006 and 2008 and since 2008 it has been gradually declining till 2014. While in southern Africa, east Africa and central Africa the share of FDI increased between 20016 and 2011 and then started declining.

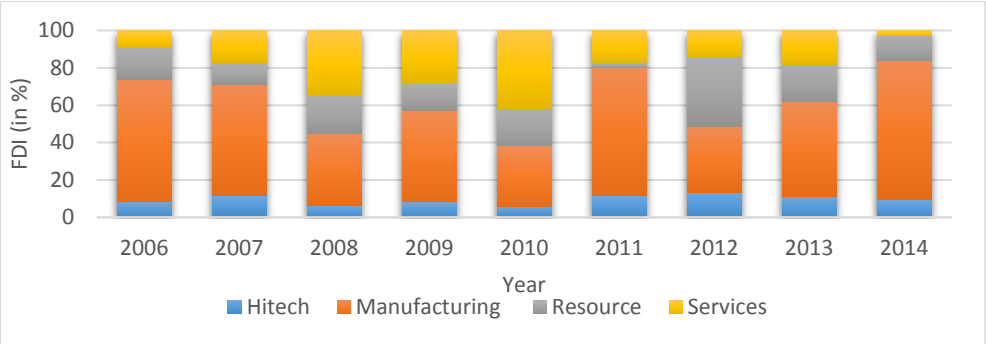
Figure 15: Share of FDI as percentage of GDP by region in Africa (2006-2014)



Source: Author, 2016. Based on FDI Markets (2006-2014)

The regional level analysis reveals variation in the sectoral composition of FDI across regions in Africa (figure 17). For instance, Northern Africa has been receiving the largest share of FDI in manufacturing sector between 2006 and 2014 that is 65.31 and 74.20 % in respective years. Manufacturing is followed by service sector and resource sector. The percentage of service FDI increased from 2006 (9%) to 2010 (42%) but afterwards it gradually declined to 3 % in 2014 while hi-tech sector accounts for the smallest share of FDI that gradually increased from 85.5% in 2006 to 10 % in 2014.

Figure 16: Sectoral composition of FDI in Northern Africa (2006-2014)

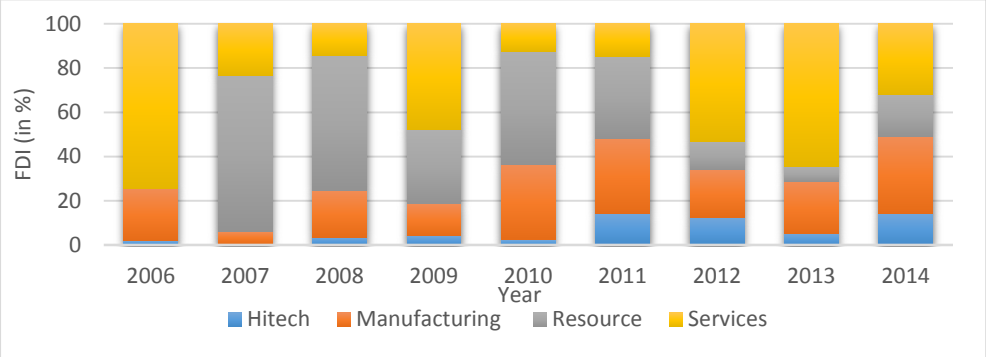


Source: Author, 2016. Based on FDI Markets (2006-2014)

Eastern Africa has observed a change in the sectoral composition of FDI during 2006 to 2014 (figure 18). Particularly percentage of FDI in service sector has been fluctuating during this period, as it was the largest recipient of FDI in year 2006, 2009, 2012 and 2013 whereas in 2007, 2008, 2009, 2010 and 2011 resource sector received highest share of FDI, followed by

manufacturing. In the recent year that is 2014 the largest sector of FDI was manufacturing and service sector (35%). The FDI in Hi-tech sector has gradually increased from 2% to 15 % between 2006 and 2014.

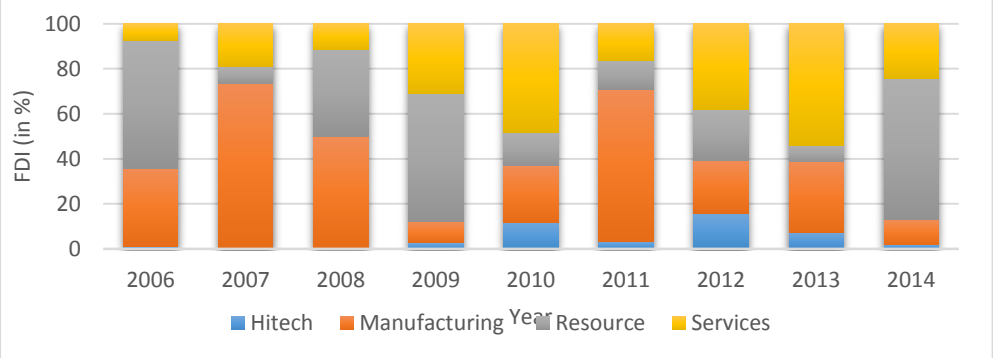
Figure 17: Sectoral composition of FDI in Eastern Africa (2006-2014)



Source: Author, 2016. Based on FDI Markets (2006-2014)

Figure 19 shows that Western Africa also experienced a change in its sectoral composition of FDI wherein manufacturing was the dominant sector in year 2007, 2008 and 2011 (73 %, 49 % and 68 %) but in recent years its share declined to 24 %, 31 % and 11% in year 2012, 2013 and 2014, whereas % of FDI in resource sector has been fluctuating but in 2014 western Africa received highest amount of FDI in resource sector. Service sector is the third largest sector in terms of inward FDI in this region while hi-tech sectors received only a small share of FDI in recent years.

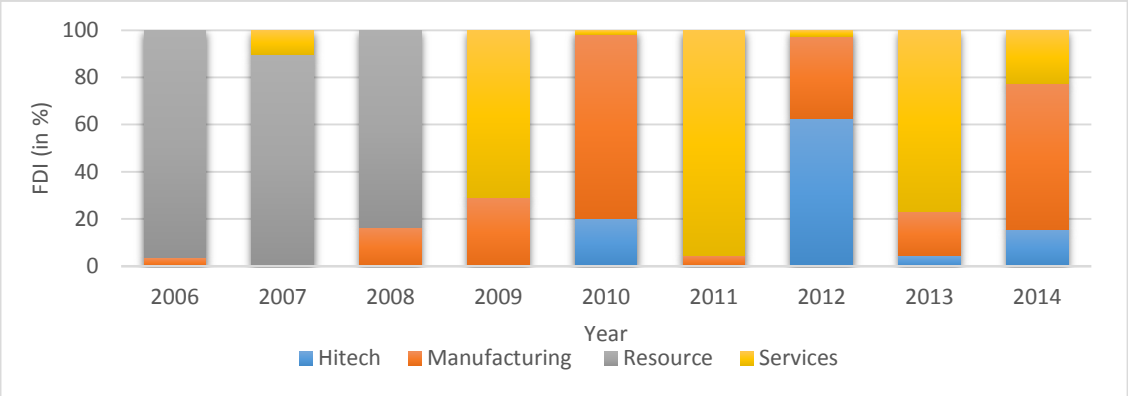
Figure 18: Sectoral composition of FDI in Western Africa (2006-2014)



Source: Author, 2016. Based on FDI Markets (2006-2014)

Central Africa has also gone through major changes in terms of inward FDI where a huge share of inward FDI came into resource sector between 2006 and 2008 which is 96%, 90% and 83 % (figure 12). Then service sector was dominant in 2009, 2011 and 2013 with 71 % 95 % and 77 % share in total FDI. The share of FDI in manufacturing sector has been fluctuation but in 2014 it is the largest sector in terms of inward FDI (62 %). Service sector in central Africa received large share in total FDI in year 2009, 2011 and 2013 which was more than 70 %. Although Central Africa has received FDI in hi-tech sector recently but its share in total FDI is larger as compared to other regions. For instance, the percentage of FDI in hi-tech sector in year 2010, 2012, 2013 and 2014 was 20%, 63%, 4 % and 15 % respectively.

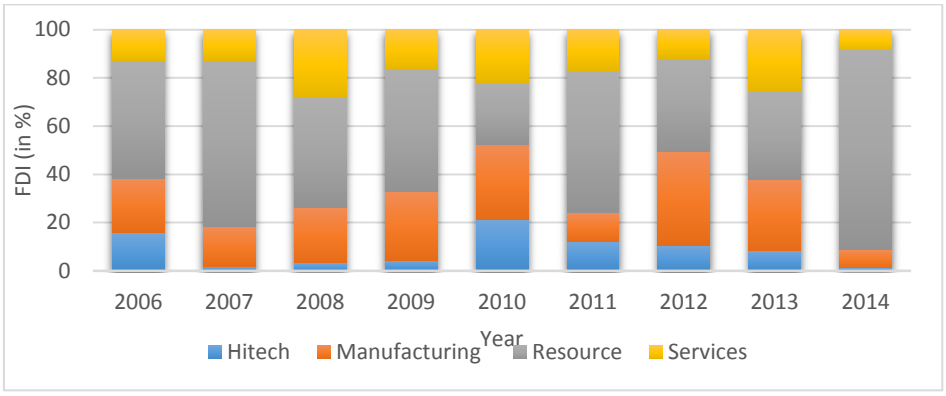
Figure 19: Sectoral composition of FDI in Central Africa (2006-2014)



Source: Author, 2016. Based on FDI Markets (2006-2014)

Southern Africa is a resource rich region and it is also reflected in the composition of inward FDI shown in figure 21, where resource sector makes up the largest share of total inward FDI throughout the period of consideration and in 2014 it accounts for 83.5% of total FDI. Manufacturing sector is the second largest recipient of FDI but its share has gradually declined to 8% in 2014. Although hi-tech is the smallest sector in terms of FDI but it is related to hi-tech sector in Africa because a large part of hi-tech FDI in Africa comes in manufacturing sub-sector of hi-tech sector. This is the reason that manufacturing and hi-tech FDI both followed the same trend in southern Africa as their share increased from 2007 to 2010 and then gradually declined till 2014.

Figure 20: Sectoral composition of FDI in Southern Africa (2006-2014)



Source: Author, 2016. Based on FDI Markets (2006-2014)

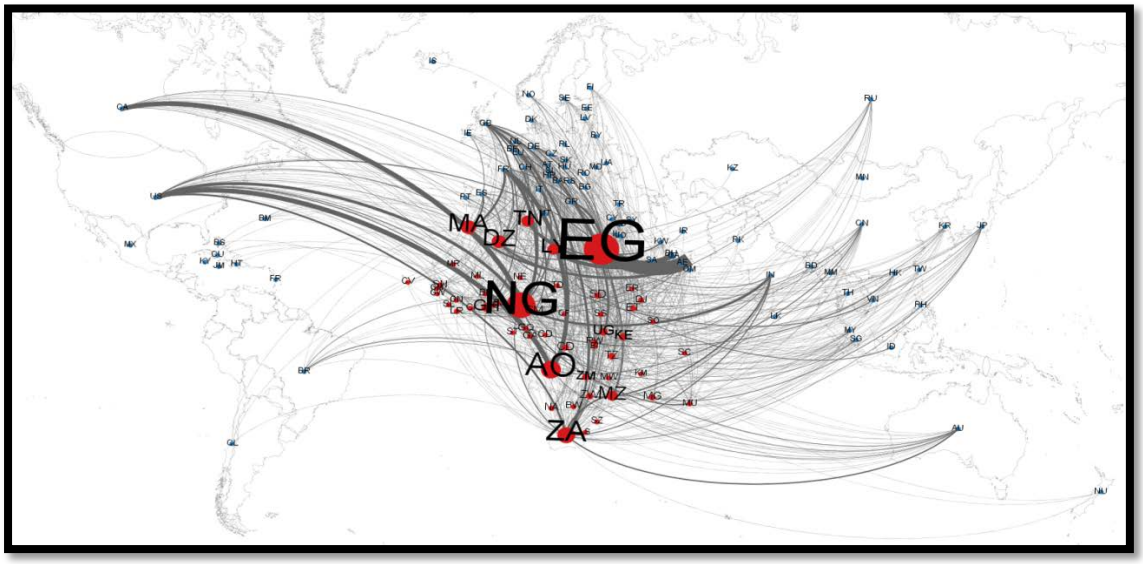
4.1.2.3. Distribution of total and sectoral inward FDI: A country level analysis

Present section discusses the network of total and sectoral FDI between targeted African countries and non-African countries which are source of FDI. For this purpose, network maps are prepared in Gephi software. In these network maps red dots represents the African countries and their size is based on weighted in degree that is the total value of FDI received by the country whereas small blue dots represent the source countries of FDI which have invested in African countries. The curved grey lines in the map represent the flow of FDI from source countries to destination countries and the thickness of these lines is based on the value of investment from source country into the destination country (weighted degree) and

the number of lines depicts the number of investments in a particular country. Instead of names, country codes have been used in the map for the identification of countries which are given in the annex.

The network map of total inward FDI (figure 22) shows the value of total FDI received by African countries between 2006 and 2014. It is clearly visible in the map that the five coastal counties namely Egypt (128591.20 million $), Nigeria, South Africa, Angola and Morocco have received the largest value of FDI during the considered period. These are followed by Algeria, Tunisia, Libya, Ghana and Uganda. These countries are part of larger network of FDI and are deeply integrated into global economy as they receive FDI from a large number of countries around the world. The major investors in African countries are UAE, Qatar, European countries such as Greece, France, Germany and Canada and US. On the other hand, Burundi (56.50 million $), Benin (57.20 million $), Guinea (89.70 million $) are the least integrated into the world economy with a little amount of FDI. Other countries which received lowest foreign investment are Gambia (340.00 million $), Mauritania, (405.90 million $), Cape Verde (446.30 million $) and Mali (592.45 million $).

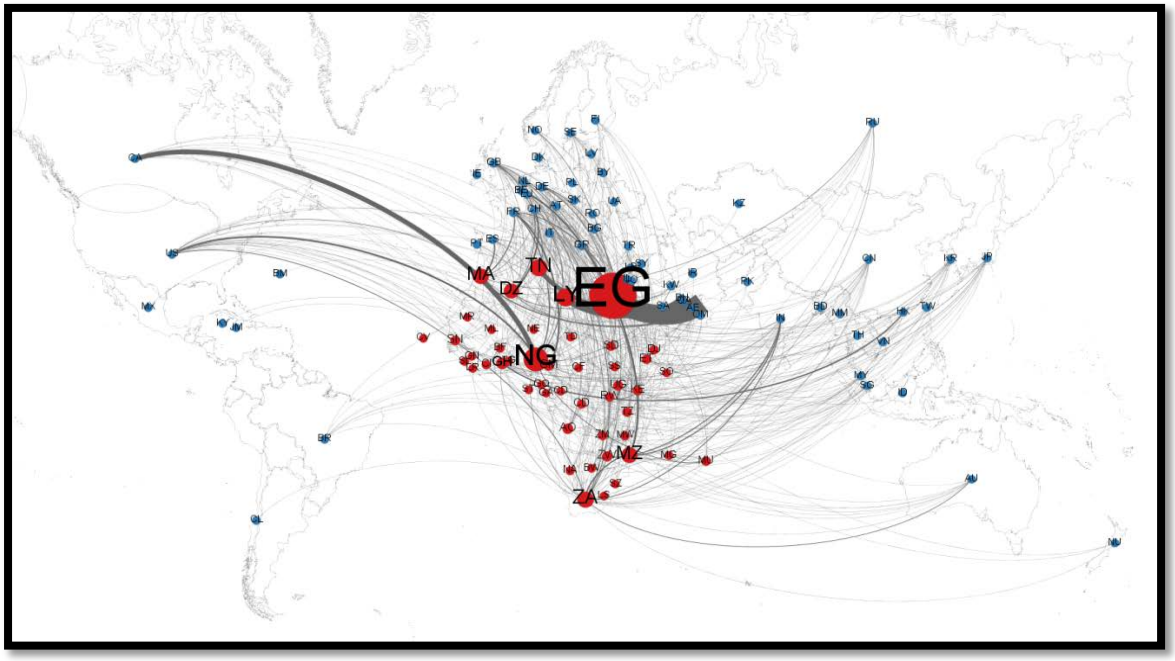
Figure 21: Network of total inward Greenfield FDI in African countries (2006-2014)



Source: Author, 2016. Map prepared in Gephi software

Manufacturing is the largest sector in Africa in terms of inflow of FDI and a large part of FDI in this sector is concentrated in few countries (figure 23). The largest value of FDI in this sector is received by Egypt (82326.63 million $) which is followed by Nigeria (29366.96 million $), Libya (22660.18 million $), Tunisia (19942.41 million $), South Africa (14528.59 million $), Morocco (14350.34 million $), Algeria (13871.23 million $) and Ghana (7707.89 million $). As shown in the map the Middle Eastern countries, Europe, Canada and U.S. are the major investors in the manufacturing sector.

Figure 22: Network of Greenfield FDI in manufacturing sector in African countries (2006-2014)

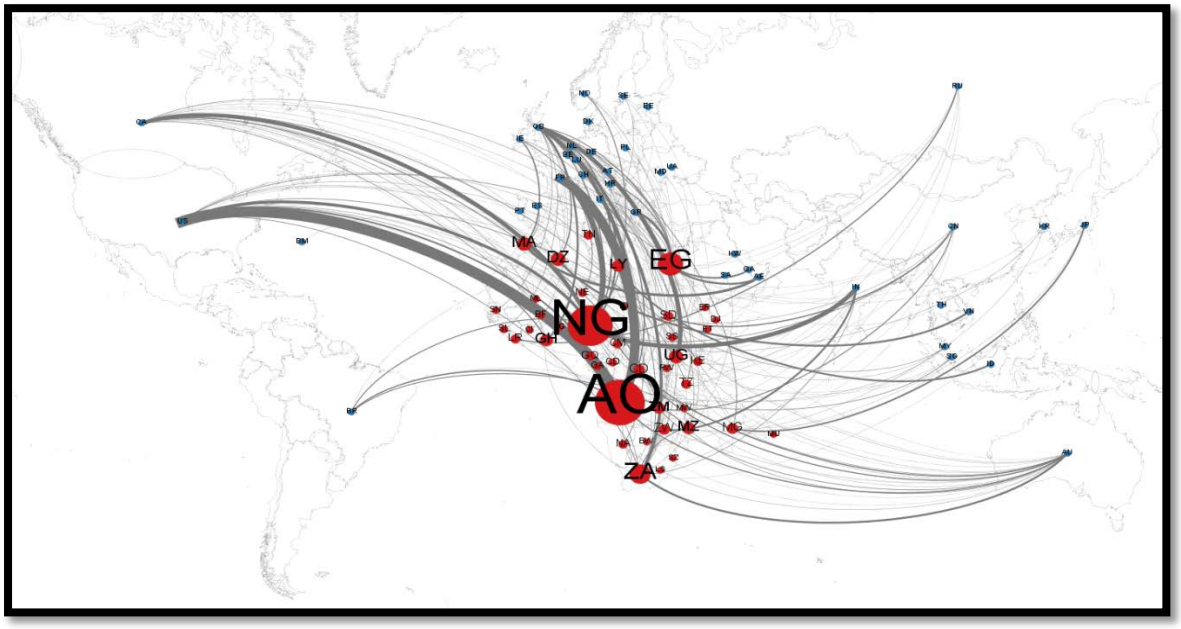


Source: Author, 2016. Map prepared in Gephi software

On the other hand countries such as Benin, Burundi, Gambia have not received FDI in manufacturing sector between 2006 and 2014. Other countries which received a minimal amount of foreign investment are Cape Verde (6.4 million $), Guinea (27.8 million $), Mali (41.45 million $), Mauritania (44.4 million $) and Burkina Faso (50.9 million $).

Resources are the second largest sector of Africa which receives large value of foreign investment. As depicted in the figure 24 below the southern and eastern African countries are the major recipients of FDI in Africa.

Figure 23: Network of Greenfield FDI in resource sector in African countries (2006-2014)

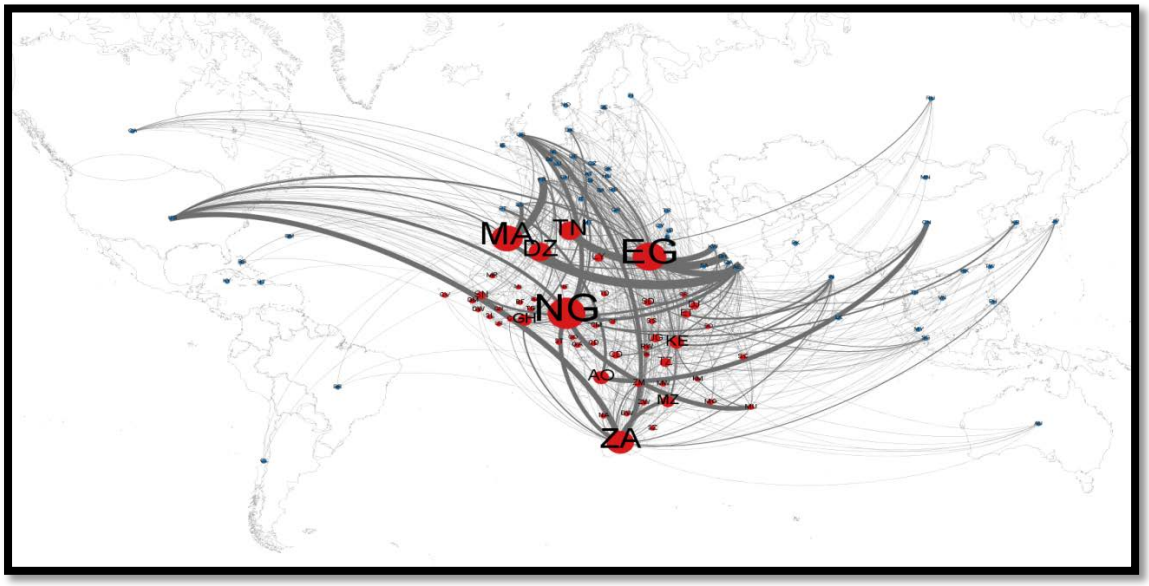


Source: Author, 2016. Map prepared in Gephi software

Specifically, the large share of resource FDI is concentrated in Angola (35954.8 million $), Nigeria (32182.1 million $) Egypt (22127.5 million $), South Africa (16945.3 million $) and Uganda (9874.8 million $). The major investors in these countries are European countries, US and Canada. There are several African countries such as Benin, Burundi, Cape Verde, Gambia, Guinea and Mauritania which have not received FDI during 2006 and 2014. While Mauritius (8.2 million $), Ethiopia (55.6 million $), Botswana (166.8 million $) have received a minimal value of FDI in this period.

Though service sector is the third largest sector in terms of inward FDI in Africa but it receives large number of investments from all over the world as depicted by dense network of lines in the figure 25. The countries which have received largest value of FDI between 2006 and 2014 are Nigeria (18585.13 million $), Morocco (13624.75 million $), Egypt (12721.88 million $), South Africa (12471.64 million $) and Tunisia (10035.41 million $). On the other hand Mali and Benin received the lowest FDI in service sector which is only 11 million $, these are followed by Burundi (38.8 million $), Guinea (55.1 million $), Burkina Faso (224.6 million $), Sierra Leone (295.9 million $) and Gambia (340 million $).

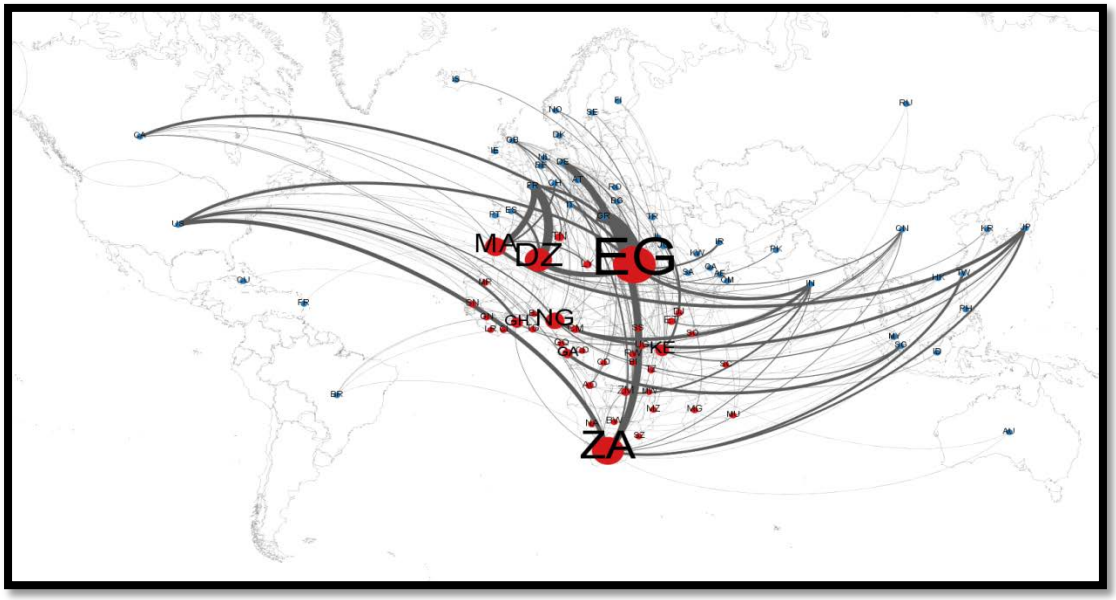
Figure 24: Network of Greenfield FDI in service sector in African countries (2006-2014)



Source: Author, 2016. Map prepared in Gephi software

Hi-tech sector is the smallest sector of African economy in terms of inward foreign investment and as the map shows FDI in this sector is concentrated in few countries. Between 2006 and 2014, Egypt (11415.17 million USD) has received largest value of FDI which is followed by South Africa (7353.98 million USD), Algeria (7095.2 million $), Morocco (4633.04 million $), Nigeria (3724.55 million USD) and Kenya (2131.08 million $). It is important to be noted that these are one of the most developed economies of Africa and also receive large share of FDI in other sectors also. The major source countries of investment in these countries are from Europe, US, Canada, China, India, Japan and Singapore.

Figure 25: Network of Greenfield FDI in hi-tech sector in African countries (2006-2014)



Source: Author, 2016. Map prepared in Gephi software

Not surprisingly several African countries have not received FDI in hi-tech sector during the considered period (figure 26). These countries are Burkina Faso, Cape Verde, Chad, Gambia, Mali, Sierra Leone and Zimbabwe while several other countries have received only a small value of FDI such as Malawi (4.2 million USD), Cote d'Ivoire (6.2 million USD), Guinea (6.8 million $), Mauritania (8.9 million USD), Burundi (17.7 million USD), Mauritius (21.4 million D), Botswana (43.22 million USD) and Benin (46.2 million USD).

4.1.3. Factors influencing the relationship between FDI and income inequality

4.1.3.1. Absorptive Capacity

Absorptive capacity is a theoretical concept which has been mainly used in growth and FDI literature. The concept was coined by Cohen and Leventhal in their firm level study and they defined absorptive capacity as ability of local firms to absorb the new information and technology and apply it for enhancing their productivity. According to them absorptive capacity of firms mainly depends on their previous related knowledge (Cohen and Levinthal 1990). Later on, this concept was adopted and used at firm level and country level in several studies related to growth and FDI (Li and Liu 2005; Meschi and Vivarelli 2009; Kinishita and Lu 2006). Recently in a country level study Wu and Hsu have used absorptive capacity to explain the relationship between FDI and income inequality and claimed that it is non-linear and absorptive capacity of host countries is one of the major factor that determine the effect of FDI on income inequality. They concluded that inflow of FDI reduces income inequality in the countries with better absorptive capacity while it increases income inequality in the countries which have lower absorptive capacity.

Wu and Hsu have measured absorptive capacity by combining three infrastructure related indicators viz. air transport, electricity consumption and telephone main lines through

principal component analysis. Present study also attempts to see that to what extent absorptive capacity explain the relationship between FDI and income inequality in African countries. Herein, absorptive capacity is measured by combining seven indicators into one index through P2 distance. These indicators include two infrastructure related indicators used by Wu and Hsu which are air transport and electricity consumption while mobile subscription has been used instead of telephone main lines. In addition, other indicators used are quality of electricity supply, international internet bandwidth, university industry collaboration in R&D and percentage of internet users.

The index includes three infrastructure related indicators because infrastructure affects the economic development in two ways. First, infrastructure creates positive externalities in the economy. For instance, international internet bandwidth improves the communication efficiency. Second, MNCs tend to locate in the countries with better infrastructure facilities for reducing their cost of production (Kinoshita 2000b).

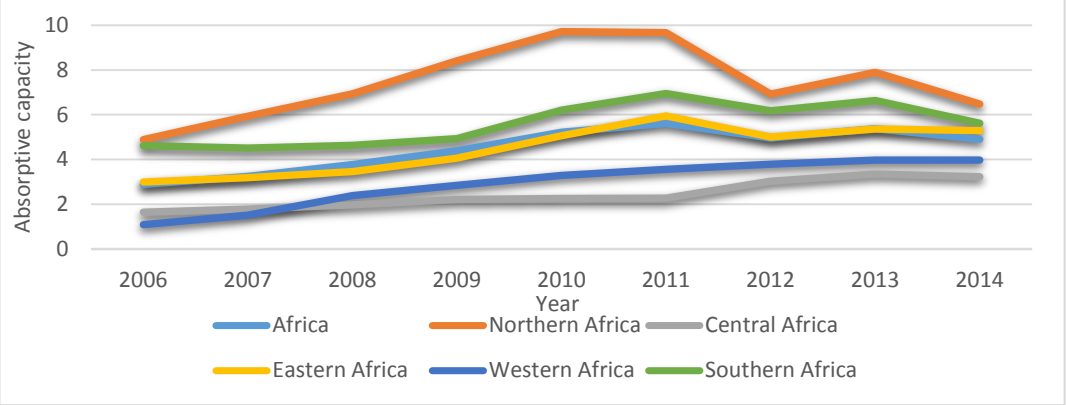
The graph 27 given below shows the trend and level of absorptive capacity in five geographical regions between 2006 and 2014. The declining trend in the graph after 2011 is because of missing data on international internet bandwidth from 2012 to 2014 and the missing data on electricity consumption for year 2014. It is clearly visible in the graph that northern Africa is the leading region with highest level of absorptive capacity throughout the considered period. In addition, as discussed in previous sections, the region is largest recipient of FDI in Africa and four out of 6 countries in this region viz. Egypt Morocco, Tunisia and Algeria have experienced negative growth in their income inequality. Surprisingly Libya which is among the countries with highest absorptive capacity but received lower value of FD, has reported an increase in growth of income inequality. While Mauritania is the only country in this region with low level of absorptive capacity along with low foreign investment and increasing growth rate of income inequality.

Southern and eastern Africa stand at second and third place in terms of absorptive capacity but both of these regions are experiencing highest level of income inequality despite high value of foreign investment in these regions. Among seven southern African countries, four countries which are Malawi, Angola, Zambia and South Africa have experienced increasing growth of income inequality. Increasing income inequality along with economic development is a matter of concern because along with the worsening condition of poor it leads to other social problems, conflict and instability in the society.

On the other hand, two southern African countries Namibia and Zimbabwe have experienced highest decline in the growth of income inequality followed by Botswana. In eastern African Region, Uganda and Rwanda which have a relatively lower absorptive capacity, have reported a declining growth of income inequality. Mauritius and Ethiopia have experienced increasing growth of income inequality despite higher absorptive capacity.

While western Africa had lowest absorptive capacity in 2006 but it improved and surpassed central Africa in 2007 therefore central Africa is the weakest region in terms of absorptive capacity. Among western African countries although there is not much difference in terms of absorptive capacity but the countries which received a minimal value of FDI such as Cote d'Ivoire, Mali, Cape Verde, Sierra Leone and Benin have experienced negative growth in income inequality whereas growth income inequality has increased in Nigeria and Senegal. Central Africa has the lowest absorptive capacity compared to other regions which includes Burundi, Cameroon, Chad and Gabon. Among these countries Burundi and Chad have lowest level of absorptive capacity and also received little foreign investment but they have lowest level income inequality while Gabon and Burundi have relatively higher income inequality.

Figure 26: Trend of absorptive capacity by geographical region in Africa (2006-2014)

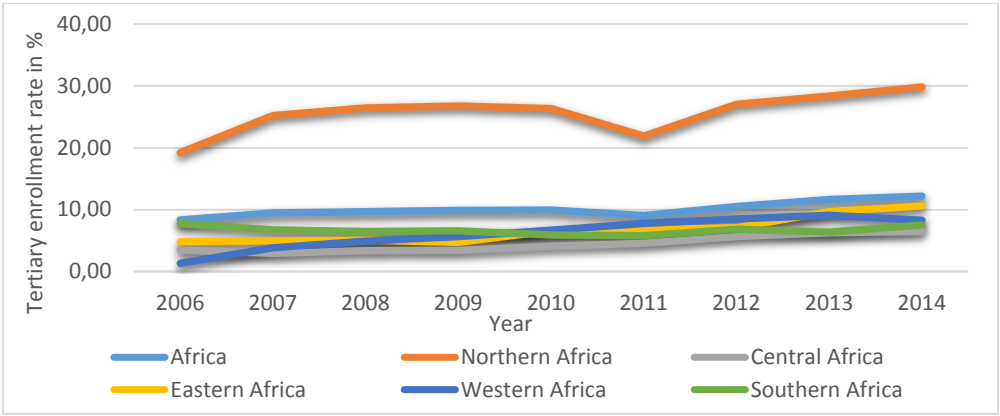


Source: Author, 2016. Based on Global Competitiveness Index, World Economic Forum (2006-2014)

4.1.3.2. Human capital:

Human capital pays an important role in determining the development path of the country. Human capital is an important component of absorptive capacity as a country has to achieve a required level of human capital to understand and apply new knowledge and technology in the local economy. In the context of FDI human capital plays a significant role in transfer of knowledge from foreign firm to the local firms (E. Borensztein et al. 1998).In the present study rate of enrolment in tertiary education has been used as an indicator of human capital. The figure 28 presents the trend of tertiary enrolment in different geographical regions of Africa. Between 2006 and 2014 northern Africa has shown a sharper increase in tertiary enrolment while eastern, western and central Africa have reported only a slight increase in tertiary enrolment. On the other hand, tertiary enrolment is almost unchanged in southern Africa region during this time period.

Figure 27: Trend of human capital by geographical region in Africa (2006-2014)



Source: Author, 2016. Based on Global Competitiveness Index, World Economic Forum (2006-2014)

Northern Africa has the highest level of tertiary enrolment and it is much higher than other regions. Libya (56.15 %), Tunisia (32.39 %), Egypt (31.35 %) and Algeria (26.04 %) are the leading countries in terms of human capital. On the other hand, central Africa region has

lowest level of human capital throughout study period and reported a minimal increase in tertiary enrolment. Among central African countries Burundi (2.589 %) and Chad 1.774 %) have one of the lowest human capital. Malawi (0.67 %) and Zambia (2.37 %) from southern Africa and Tanzania from eastern Africa (2.00%) and Gambia (2.44 %), Gambia (2.44 %), Burkina Faso (2.98 %) and Sierra Leone (3.04 %) from western Africa are among the countries with lowest level of human capital.

4.1.3.3. Technology and innovation

Technology diffusion in the host country through FDI is considered to be an important channel through which technology of host country improves. It takes place mainly in three ways. First, the presence of foreign firms creates the competition for local firms which motivates them to innovate and upgrade their technology. Second, local firms learn from the foreign firms by collaborating and establishing business relation with them and by copying their technology. Third, the skilled labour which works in MNCs develop new skills and knowledge and later on when they join a domestic firm they share their knowledge and skills in the new firm or they open their own firms use their developed skills (Liu 2008; Kinoshita 2000b). In this way, FDI increases the level of technology and innovation in the host country which leads to higher productivity and boosts the local economy giving rise to new economic activities and creating jobs for the local people which in turn reduce income inequality in the host country. The table 14 below shows the summary of technology and innovation index and its components in Africa. It can be noticed that the number of observations for R&D expenditure is significantly low because of missing data for 2013 and 2014 along with large number of missing values. Similarly, data for number of published scientific articles is missing for year 2014 which reduced the number of observations for this indicator.

Table 14: Summary of technology and innovation and its components in Africa by region (2006-2014)

Variable	Obs.	Mean	Std. Dev.	Min.	Max.
Technology & Innovation	284	2.94	2.43	0.012	15.40
R&D expenditure	68	0.40	0.25	0.02	0.90
Scientific articles	280	830.49	1790.52	1.2	9679.10
Availability of technology	314	3.59	1.61	0	5.69
FDI technology transfer	314	3.81	1.59	0	5.92
Patents	314	6.52	28.89	0	223

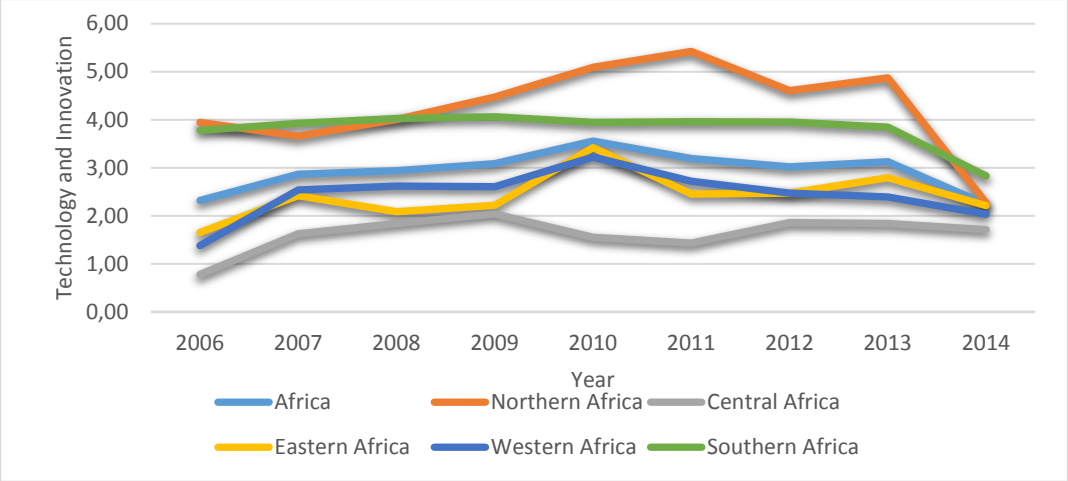
Source: Author, 2016. Based on Global Competitiveness Index, World Economic Forum (2006-2014)

Note: P2 distance index is calculated based on indicators from GCI

Because of missing data the index values for year 2013 and 2014 are lower and the graph shows a declining trend for these years (figure 29). As in case of absorptive capacity and human capital, eastern Africa is the leading region in terms of technology and innovation and it is the only region which shows a consistent increase in its technology and innovation. South Africa is the second region with higher level of technology and innovation but it does not show any improvement in technology between 2006 and 2014. Southern Africa is

followed by western and eastern Africa with similar level of technology and trend over time. As expected, central African regions has the lowest level of technology which can be associated with its lower absorptive capacity, lower human capital as well as little inflow of FDI.

Figure 28: Trend of technology and innovation by geographical region in Africa (2006-2014)



Source: Author, 2016. Based on Global Competitiveness Index, World Economic Forum (2006-2014)

4.1.3.4. Quality of institutions

The quality of institutions has several aspects and different studies have examined the role of different institutional conditions in determining the effects of FDI in the host countries. For instance Durham claimed that the effect of FDI on the host country is determined by institutional environment and financial market because they facilitate the technology spill over in the host country (Durham 2004). The present study uses several indicators to measure the quality of institutions. These institutions are government institutions and firm level institutions. In order to see the role of institutional quality several related indicators are combined in an index using P2 distance. The summary of index and its components is given in the table 15 below.

Table 15: Summary of quality of institutions and its components in Africa by region (2006-2014)

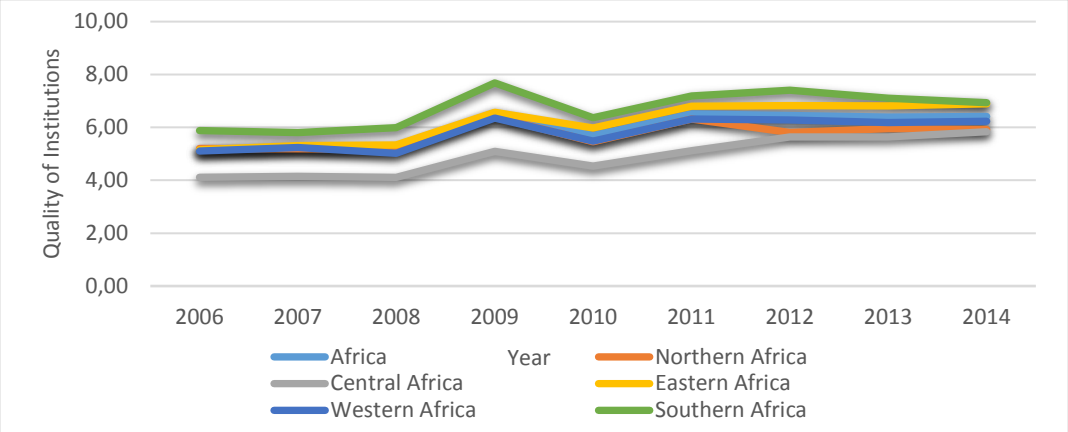
Variable	Obs	Mean	Std. Dev.	Min	Max
Quality of Institutions (index)	273	6.01	1.14	3.48	9.16
Intellectual property protection	275	2.85	1.28	0	5.46
Public trust in politicians	275	2.68	0.86	0	5.60
Judicial independence	275	3.44	1.06	0	5.67
Transparency of government	275	2.83	1.90	0	5.51
Ethical behavior of firms	275	3.80	0.65	0	5.28
Strength of auditing and reporting standards	275	4.19	0.94	0	6.73
Strength of investor protection	275	4.56	1.62	0	8

Source: Author, 2016. Based on Global Competitiveness Index, World Economic Forum (2006-2014)

Note: P2 distance index is calculated based on indicators from GCI

Unlike the factors discussed above, quality of institutions shows a different picture. The table16 shows that southern Africa is the region with highest quality of institutions. Although the regional difference is not large but eastern Africa stands at second place in terms of quality of institutions followed by western and northern Africa whereas central Africa is again lagging behind in but its quality of institutions has gradually improved between 2006 and 2014. Therefore, in year 2014, there is only a little variation in quality of institutions across regions. The trend of quality of institutions in Africa is similar to the trend of FDI as quality of institutions was almost unchanged between 2006 and 2008 but started improving since 2008 which is the year of sharp increase in FDI inflow in Africa. Since then institutional quality has been gradually improving in all African regions.

Table 16: Quality of institutions by region in Africa (2006-2014)



Source: Author, 2016. Based on Global Competitiveness Index, World Economic Forum (2006-2014)

4.2. Empirical analysis:

The purpose of empirical analysis is to characterise the relationship between FDI and income inequality and to explain this relationship in relation to other factors such as absorptive capacity, human capital, level of technology and innovation and quality of institutions which are assumed to determine the relationship between these two variables. The selection of variables is based on theory and before doing the panel regression; the data is tested for several assumptions and corrected accordingly for a robust analysis. Since there are contradictory theories which explain the relationship between FDI and income inequality, further there are contradictory evidences in the scientific literature which vary across continents and countries. Therefore, present study aims to test this relationship in the context of African countries. The inferential analysis is divided into two sub sections.

First section 4.2.1, examines the relationship between total inward FDI and income inequality in Africa and then similar analysis is done for FDI in four major sectors of economy viz. hi-tech, manufacturing, resource and services and income inequality. Section 4.2.2 analyses the factors which determine the relationship between FDI and income inequality.

4.2.1 The relationship between FDI and income inequality: total and sectoral analysis

Though there are lack of systematic studies which analyse the relationship between FDI and income inequality particularly in the context of Africa, recently there have been several studies which attempted to analyse the effects of FDI on income inequality. But there are contradictory arguments and evidences on the relationship between FDI and income inequality. Few studies have claimed that the relationship between FDI and income inequality is not direct but it is influenced by other factors (Wu and Hsu 2012; Lin et al. 2013; Kinishita and Lu 2006). Therefore, present study aims to characterise the relationship between FDI and income inequality in the context of African countries. First, through panel regression it attempts to see if there is direct relationship between FDI and income inequality and then it employs panel regression with interaction terms to examine if the relationship between these two variables is determined by other factors. Initially the analysis was started with 37 countries for which the data was available. But two outlier countries Mozambique and Liberia were excluded from the analysis as they were causing the relationship between FDI and income inequality to become non-linear. As these countries were removed from the panel data, the relationship became linear. The change in the relationship can be observed in the scatterplots shown in the annex. The first graph is based on 48 countries for which data on Gini coefficient and FDI is available while second graph is based on 35 countries excluding outliers and those countries for which data on interaction terms is not available.

To examine the relationship between FDI and income inequality two types of regression has been employed. The analysis started with panel regression using growth of Gini coefficient as dependent variable due to a little variation in the values of Gini coefficient across countries and time but no significant relationship was found between FDI and income inequality. But the signs of coefficient suggest that overall inward FDI increases the growth in income inequality. At sectoral level FDI in hi-tech, resource and service sectors reduces the growth of income inequality while FDI in manufacturing sectors leads to higher growth of income inequality. However, the results of this regression analysis are not statistically significant and the coefficient values are too small therefore the output tables of these regression results are not presented.

In the second stage, panel regression with interaction terms is employed. This model uses the same control variables which are used in the above mentioned model. The panel regression with interaction terms is done using two models. First model uses value of Gini coefficient as dependent variable and four moderator variables namely absorptive capacity, human capital, technology and innovation and quality of institutions which are assumed to moderate the effect of FDI on income inequality. Using these moderator variables, four interaction terms have been created by multiplying them with FDI. First, these interaction terms are included in separate models to exclusively examine their role to determine the effects of FDI on income inequality. Later on, all the interactions are included in one model in steps to see if their effect is preserved in the presence of other factors in determining the relationship between FDI and income inequality, then control variables are introduced in two steps. The model with value of Gini coefficient as dependent variable does not give statistically significant results except for one model.

Unlike the panel regression mentioned above, the signs of coefficients in this model indicate that overall FDI reduces income inequality in the presence of other factors while at sectoral

level, the interaction of inward FDI in resource with absorptive capacity and quality of institutions reduces income inequality and results are statistically significant, possibly because resource sector comprises a larger share in many African economies and it has been the largest recipient of FDI in these countries contributing to the growth of their economy for a longer period of time while other sectors have started emerging recently as FDI targets. On the other hand, results for other sectors are statistically not significant but negative sign of coefficient indicates that FDI in other sectors such as hi-tech, manufacturing and services reduces income inequality if absorptive capacity of host country increases and quality of institutions improves.

The insignificant results of the above model are possibly because of little variation in Gini coefficient across countries and over time as dependent variable should have sufficient heterogeneity to be explained by independent variable. To deal with this issue, finally a panel regression with interaction terms is employed using the annual growth of Gini coefficient as dependent variable which shows a stronger and statistically significant relationship between FDI and income inequality. The results of this model are considered as main results and are discussed in detail in this chapter. Since the study aims to examine the impact of sectoral FDI on income inequality and also attempts to analyse regional variation in this relationship, the first regression is done for total and sectoral FDI then in same regression analysis is repeated by incorporating dummy for regions to see if the relationship between FDI and income inequality varies across geographical regions. It is found that the relationship between FDI and income inequality became stronger and value of R square increased significantly by incorporating regional dummy which indicates that regional variation is important in explaining the relationship between FDI and income inequality. Therefore, output tables of regression models with region dummy are presented in the chapter while other tables can be referred in annex. The overview of the data analysis and regression models is also given in the annex 32 to annex 36.

4.2.1.1. Total FDI and income inequality

The effect of FDI on income inequality has been a topic of debate in last few decades and literature presents all king of results about this relationship. For instance Mundell theorised that inflow of FDI in developing countries leads to lower income inequality(Mundell 1957). Whereas several studies have claims that FDI leads to polarization and segmentation of economy leading to higher income inequality (Firebaugh and Beck 1994; Choi 2006; Ha 2012). While a few studies argue that the effect of FDI on income inequality is conditional upon local conditions of host countries (Wu and Hsu 2012; Lin et al. 2015; Kinishita and Lu 2006). In the light of these studies, present section aims to establish the relationship between FDI and income inequality in African countries.

The table 17 shows the results of panel regression with interaction terms using four moderator variables viz. absorptive capacity, human capital, level of technology. Interactions of these moderator variables have been created with FDI to see whether the impact of FDI is moderated by these variables.

Table 17: Model 1. Total FDI, growth of Gini coefficient and interaction terms

VARIABLES	Model 1.1 Gini growth	Model 1.2 Gini growth	Model 1.3 Gini growth	Model 1.4 Gini growth	Model 1.5 Gini growth	Model 1.6 Gini growth
Total FDI	0.0346	0.0460	0.0117	-0.918**	-1.083***	-0.846**
	(0.04)	(0.09)	(0.12)	(0.37)	(0.42)	(0.39)
Absorptive capacity	-0.140***	-0.131**	-0.219*	-0.128	-0.136	-0.129
	(0.04)	(0.06)	(0.12)	(0.12)	(0.10)	(0.13)
FDI share * Absorptive capacity	-0.00546	0.0117	0.0198	-0.0492	-0.0615*	-0.0477
	(0.01)	(0.02)	(0.02)	(0.03)	(0.03)	(0.05)
Human capital		-0.0191	-0.0112	-0.0189*	-0.0305***	-0.0226
		(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
FDI share * Tertiary enrollment		-0.00603	-0.00857	-0.000616	0.00313	-0.00109
		(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Technology & innovation			0.127	0.135	0.199*	0.0617
			(0.12)	(0.12)	(0.11)	(0.12)
FDI share * Technology & Innovation			0.00680	-0.00712	-0.0232	-0.00516
			(0.04)	(0.04)	(0.04)	(0.08)
Quality of institutions				-0.236	-0.298*	-0.183
				(0.17)	(0.17)	(0.21)
FDI share* Quality of Institutions				0.202***	0.240***	0.189**
				(0.07)	(0.08)	(0.08)
Initial Gini coef.					-2.383	-2.524
					(2.67)	(2.92)
Trade as % of GDP					0.0114*	0.00507
					(0.01)	(0.01)
Total population						8.68e-06**
						(0.00)
Size of country						-3.15e-07
						(0.00)
Distance from equator						-0.0249
						(0.04)

Initial per capita GDP growth					-0.0640	-0.0526
					(0.04)	(0.05)
Central Africa	0.0502	-0.123	0.0216	0.0857	-0.570	-0.738
	(0.83)	(0.81)	(0.72)	(0.75)	(0.80)	(1.41)
Eastern Africa	0.712	0.428	0.559	0.498	0.656	-0.416
	(0.59)	(0.67)	(0.70)	(0.79)	(0.78)	(1.55)
Western Africa	-0.471	-0.985*	-1.038**	-0.975*	-1.112	-1.733
	(0.43)	(0.55)	(0.52)	(0.57)	(0.69)	(1.13)
Southern Africa	0.382	-0.149	-0.147	-0.111	0.207	-0.838
	(0.57)	(0.64)	(0.60)	(0.63)	(0.87)	(1.76)
Constant	-0.287	0.162	0.103	1.074	1.840	2.544
	(0.42)	(0.51)	(0.51)	(0.78)	(1.27)	(2.96)
Observations	129	109	109	109	106	93
Number of countries	27	26	26	26	25	25
R-squared	0.2989	0.3399	0.3772	0.3768	0.4806	0.5045

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Author, 2016. Based on various sources

It can be observed in the table that model 1.1 includes only three independent variables FDI, absorptive capacity and their interaction terms and it shows that FDI does not have a significant impact on growth of Gini coefficient but positive sign of coefficient indicates that FDI increases income inequality whereas absorptive capacity significantly reduces income inequality. Model 1.2 and 1.3 which incorporates human capital and technology also shows the similar relationship whereas when quality of institutions is included in the model 1.4, the relationship between FDI and growth of Gini coefficient become statistically significant and the sign of coefficient becomes negative. This change indicates that in general, inward FDI increases income inequality in the host country but in the presence of better absorptive capacity, human capital, higher level of technology and improved quality of institutions it makes positive impact in the host country and reduces income inequality (Li and Liu 2005). The relationship between FDI and growth of Gini coefficient remains significant in model 1.5 and 1.6 even after including control variables. The overall model (model 1.6) explains the 50% relationship between total FDI and income inequality, while the value of R square varies from 30% in model 1.1 to 50% in model 1.6.

Model 1.5 shows that increased level of human capital reduces income inequality in the host country. The higher level of education in the country produces educated and skilled labour to be employed in white collar and professional jobs in formal sector which enables them to earn higher income. Whereas higher level of technology and innovation in the country increases income inequality because it creates smaller number of jobs in technology intensive sectors which require higher education and skills. On the other hand, interaction of FDI with local technology although not significant but shows a negative coefficient which indicates that if host country has improved level of technology and innovation then inflow of FDI leads to technology diffusion which spreads the new information and technology in the host

country giving rise to new economic activities and businesses. This process strengthens the local economy by increasing productivity and generating jobs which in turn reduces income inequality. Model 1.4.1.5 and 1.6 shows that better institutional environment reduces income inequality as it includes the protection of intellectual property, public trust in politicians which indicates lower corruption, judicial independence which ensures fair justice for all, transparency of government in policymaking which represent a fair political system, ethical behaviour of firms includes better wages, and working environment along with social protection. Strong auditing and reporting standards ensures lesser corruption at firm level and strong investor protection. Therefore, better quality of institutions reduces income inequality as it protects the investors and creates better business environment which attracts more investments and it also protects workers through lower corruption, transparent policymaking, judicial independence and ethical behaviour of firms.

On the other hand, interaction of institutional quality and FDI increases income inequality in the host country as shown in model 1.4, 1.5 and 1.6 by protecting foreign capital and technology which hinders the process of technology diffusion and it becomes difficult for host country to absorb and utilise foreign technology. This finding is aligned with the argument of Morgan as he explained that modern institutions are designed to facilitate market processes and they protect investors rather than workers (Morgan 2016). The higher share of trade in GDP (model 1.5 and 1.6) also leads to higher income inequality as it increases competition between foreign and domestic firms poses threat for the local economy. As shown in model 1.6, increase in the size of population leads to higher income inequality since higher fertility rates are found in lower income group which increases the percentage of people in the lower end of the income distribution. In addition, increase in the population leads to lesser availability of land and high land price. Since greenfield FDI opens new establishments in the host county and require land for construction therefore MNCs prefer to locate in countries with relatively lower land price and the countries with larger population attract lesser FDI which hinders their economic growth.

The regional variation in the relationship between FDI and income inequality has been examined by incorporating dummy for geographical regions in the regression models used in the previous section. The results show that there is no significant variation in the relationship between FDI and income inequality across regions.

Only western Africa has shown a relatively stronger impact of FDI in reducing income inequality. Among 11 countries of western Africa four countries namely Sierra Leone (-0.047), Nigeria (-0.015), Cote d'Ivoire (-0.028) and Cape Verde-0.014) have experienced a little decline in income inequality showing a negative change in Gini coefficient between 2006 and 2014. In terms of FDI the region is third largest recipient of FDI but there is huge variation within regions. For instance, Nigeria stands at second position in receiving FDI whereas Sierra Leone, Cote d'Ivoire and Cape Verde are among the countries which receive the lowest value of FDI in Africa. Nigeria is characterized by all favourable conditions such as high value of inward FDI, average absorptive capacity, better human capital and level of technology along with better institutional environment and receives high value of FDI in hi-tech sector which is associated with lower inequality. On the other hand, Sierra Leone is weak country in terms of FDI, absorptive capacity, human capital and technology but it has a better quality of institutions. Despite little FDI, Cote d'Ivoire and Cape Verde have average

absorptive capacity in Africa, better human capital and institutional quality which enabled them to reduce income inequality.

4.2.1.2. FDI in hi-tech sector and income inequality

Hi-tech sector is the smallest sector in Africa which receives only a small share of total inward FDI. For instance, in 2014 the share of hi-tech sector in total FDI was only 7 %. The results of panel regression with interact terms reveal that although it is a small sector but it is the most significant sector in the context of FDI and income inequality. The model 2 in table 18 below explains the 57% relationship between FDI in hi-tech sector and growth of Gini coefficient while the value of R square varies from 29% to 57% from model 2.1 to model 2.6.

The model 2.1 includes hi-tech FDI, absorptive capacity and their interaction and it shows that FDI in hi-tech sector increases income inequality in the country whereas increase in the absorptive capacity significantly reduces income inequality. Model 2.2 and 2.3 incorporates interaction of hi-tech FDI with human capital and technology respectively and shows similar results. But model 2.4 shows completely different result where increase in hi-tech FDI significantly reduces income inequality after incorporating interaction of FDI and quality of institutions along with other three interactions and the value of coefficient also increases significantly from 0.522 in model 2.3 to -24.34 in model 2.4. This relationship remains significant even after including control variables in model 2.5 and 2.6.

Model 2.4, 2.5 and 2.6 show that interaction FDI and absorptive capacity has a statistically significant relationship with growth of Gini coefficient which can be explained as inflow of FDI in hi-tech sector reduces income inequality in the society if the country has higher absorptive capacity. Since absorptive capacity used in the regression analysis is an index which combines several indicators, it includes improved infrastructure such as air infrastructure, electricity consumption, quality of electricity which attracts more domestic and foreign investment and increases productivity.

Other components of absorptive capacity are international internet bandwidth, mobile subscription and internet users which indicates improved connectivity, communication and access to and transfer of information which is one of the major requirements of most of the economic activities. There is no doubt that internet and mobile are the two major sources of information and the channels through which new information and knowledge penetrates into the society. Particularly, in the context of African countries, Internet and mobile plays important role in the functioning of small businesses and in informal market. Last but not the least the collaboration between universities and industries for R&D which promotes the innovation, improves the level of technology and enables the host county to learn and absorb new technology. Therefore, absorptive capacity reduces income inequality by increasing productivity and improving communication and access to information for all. This finding confirms the argument established in literature that absorptive capacity is a crucial factor in determining the effect of FDI on income inequality in the host country. It is evident that the inflow of hi-tech FDI reduces income inequality in countries with higher absorptive capacity (Wu and Hsu 2012; Lin et al. 2013).

Since hi-tech is a broad sector which comprises a number of sub-sector such as ICT & Internet Infrastructure, Design, Development & Testing, Education & Training,

Manufacturing, Sales, Marketing & Support, Business Services, Logistics, Distribution & Transportation, Headquarters, Maintenance & Servicing. It is observed that manufacturing is the largest subsector of the hi-tech sector which receives largest value of foreign investments as well as most of the jobs in hi-tech sector are created within manufacturing sub-sector. The major industries in hi-tech related manufacturing are chemicals, aerospace and pharmaceuticals, particularly chemical industry receives large investment and also creates large number of jobs.

FDI in hi-tech sector in Africa is able to reduce income inequality in two ways. First, the inflow of FDI in hi-tech sector is mainly associated with manufacturing activities and generates largest number of jobs per million USD of investment after manufacturing sector as compared to other sectors. Apart from job creation hi-tech is the most innovative sector which brings new technology in the host countries and its interaction and collaboration with local firms and institutions leads to knowledge sharing and diffusion of technology in the host countries and also increases the productivity of local firms through business collaboration. By employing local skilled workers, it provides an opportunity to learn and improve the human capital which in turn increases the absorptive capacity of the host country as people employed in these foreign firms can use their skills when they work with local firms. This process leads to technology diffusion(Tsai 1995). In this way FDI in hi-tech sector initiates circular motion for the development of the host country and contributes in reducing income inequality.

Human capital is one of the most important factors which contribute to reduce income inequality represented as tertiary enrollment in model 2. It has statistically significant coefficients in all sub-models. Human capital is educated and skilled workers which play a crucial role in the development of the country because education and skill converts the population into human capital and makes them employable in the formal sector in white collar jobs with higher incomes.

Table 18: Model 2. FDI in hi-tech sector, growth of Gini coefficient and interaction terms

VARIABLES	Model 2.1 Gini growth	Model 2.2 Gini growth	Model 2.3 Gini growth	Model 2.4 Gini growth	Model 2.5 Gini growth	Model 2.6 Gini growth
FDI in hi-tech sector	1.726	0.357	0.522	-24.34***	-27.07***	-25.50***
	(1.67)	(1.18)	(1.48)	(5.94)	(6.32)	(9.00)
Absorptive capacity	-0.1000**	-0.102	-0.0943	-0.0139	-0.0388	0.00628
	(0.05)	(0.08)	(0.11)	(0.10)	(0.11)	(0.11)
FDI share * Absorptive capacity	-0.443	0.0345	-0.854	-2.262***	-2.273***	-2.434***
	(0.34)	(0.29)	(0.83)	(0.72)	(0.76)	(0.63)
Tertiary enrollment		-0.0250*	-0.0273*	-0.0364***	-0.0397***	-0.0380**
		(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
FDI share * Tertiary enrollment		-0.132	-0.0615	0.127*	0.145**	0.141*

		(0.09)	(0.09)	(0.07)	(0.07)	(0.08)
Technology & innovation			-0.0255	-0.0308	0.0172	-0.132
			(0.10)	(0.11)	(0.11)	(0.10)
FDI share * Technology & Innovation			1.257	1.618*	1.471	1.705**
			(0.98)	(0.92)	(0.94)	(0.81)
Quality of institutions				-0.227	-0.304*	-0.235
				(0.16)	(0.17)	(0.24)
FDI share* Quality of Institutions				4.900***	5.408***	5.176***
				(1.02)	(1.13)	(1.63)
Initial Gini coef.					-1.460	-1.627
					(2.71)	(2.63)
Trade as % of GDP					0.00703	0.00615
					(0.01)	(0.01)
Total population						1.33e-05***
						(0.00)
Size of country						-2.91e-07
						(0.00)
Distance from equator						0.00105
						(0.04)
Initial per capita GDP growth					-0.0841**	-0.0854*
					(0.04)	(0.05)
Central Africa	0.0801	-0.425	-0.503	-0.500	-1.180	-0.946
	(0.83)	(0.87)	(0.85)	(0.78)	(0.78)	(1.26)
Eastern Africa	0.636	0.168	0.0450	0.100	0.452	0.258
	(0.49)	(0.61)	(0.53)	(0.53)	(0.55)	(1.43)
Western Africa	-0.453	-1.183**	-1.259**	-1.153**	-1.449**	-1.699
	(0.44)	(0.58)	(0.53)	(0.50)	(0.61)	(1.06)
Southern Africa	0.454	-0.407	-0.510	-0.403	-0.148	0.00114
	(0.59)	(0.70)	(0.67)	(0.71)	(0.96)	(1.64)
Constant	-0.388	0.399	0.496	1.450	2.403*	2.161
	(0.42)	(0.61)	(0.52)	(0.92)	(1.39)	(2.94)
Observations	129	109	109	109	106	93
Number of countries	27	26	26	26	25	25
R-squared	0.291	0.2978	0.3165	0.3708	0.5172	0.5748

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Author, 2016. Based on various sources

On the other hand, the interaction of FDI in hi-tech sector and human capital increases income inequality in host country (model 2.3, 2.4 and 2.5) by widening the income gap in society in two ways. First the income gap between those who work in MNCs and people who work in local firms increases because foreign firms pay higher salaries to their workers. Second, the jobs generated in foreign firms require skilled workers and employs people with higher level of education which creates income gap in skilled and unskilled workers. A recent study by Lin et.al also showed that there is a threshold level for human capital which determines the effect of FDI on income inequality in the host countries. Countries with human capital below that threshold level experience decline in their income inequality with the inflow of FDI and when human capital crosses that threshold level FDI increases income inequality by widening the income gap in society (Lin et al. 2013). Similarly, interaction of hi-tech FDI and local technology and innovation also causes an increase in income inequality because countries with high level of technology and innovation attracts hi-tech FDI in knowledge based sophisticated activities which generates only small number of jobs for highly skilled workers in specific activities. This further widens the income gap between skilled and unskilled workers and leads to higher income inequality.

In case of quality of institutions, model 2 shows the similar results as model 1 discusses above that better quality of institutions reduces income inequality by protecting national intellectual property rights, improving investment environment, strong auditing and reporting which increases productivity and also protects workers through lesser corruption, fair justice and ethical behavior of firms. On the other hand, the interaction of hi-tech FDI and improved quality of institutions leads to higher income inequality in the host country by protecting foreign capital and technology through intellectual property rights and legal mechanisms as explained earlier and it hinders the process of technology diffusion, further the technology gap between foreign economy and host country increases posing threat for local firms as they have to compete with foreign firms.

Among control variables increase in population also leads to higher income inequality. As explained earlier, increase in population causes scarcity of resources particularly land which increases land prices in the host country and foreign firms looking for cheap land avoid these countries. In addition, the higher fertility rates among poor people increase the income gap between rich and poor by increasing population in lower income decile. Initial per capita GDP growth also affects income inequality in the country as it represents the initial level of development of the country. Model 2.5 and 2.6 shows that higher initial growth rate of per capital GDP reduces income inequality, meaning relatively developed countries experience reduction in their income inequality as compared to those countries with lower level of initial economic development.

It is observed that compared to other regions western Africa has experienced reduced income inequality due to FDI in hi-tech sector although the share of FDI in total FDI of the region is smaller than other sectors but it has increased since 2009. The region is in the initial phase of development and it experienced a significant increase in per capita GDP during 2006 to 2014, which indicates the growth of economy. Along with this region has been improving its absorptive capacity, human capital and quality of institutions. All these factors are associated with decline in income inequality. All these factors contribute to the reduction in income inequality. On the other hand, Northern African countries such as Egypt, Algeria and Morocco along with South Africa receive highest value of hi-tech FDI in Africa and they are in among the strongest economies with highest absorptive capacity, human capital, technology and innovation as well as quality of institutions. All these factors along with large value of FDI in these countries contribute to lower income inequality expect South Africa.

Despite all these favourable conditions, due to its long history of apartheid which still has its impact on society the country is characterized by polarized and segmented society based on race and class with high level of income inequality which has remained almost unchanged between-2006 and 2014.

4.2.1.3. FDI in manufacturing sector and income inequality:

Manufacturing sector is one of the major sectors of African economy and receives largest share of inward FDI that is 50 % of total inward FDI in year 2014. Therefore, influence of FDI in this sector on income inequality is particularly important in the context of Africa. The results of panel regression with interaction terms are presented in table 19, the model 3 in the table below. The first two models which include FDI, absorptive capacity (model 3.1) and human capital (model 3.2) does not show a significant relationship between FDI in manufacturing sector and income inequality but positive sign of coefficient indicates that manufacturing FDI increases income inequality in the host country. But after incorporating technology and innovation in the model 3.3 the coefficient become negative. Further, model 3.4 which incorporates quality of institutions shows a statistically significant relationship between manufacturing FDI and income inequality and this relationship becomes stronger with larger value of coefficient in model 3.5 and 3.6 which includes the control variables. This shows that inward FDI in manufacturing sector reduces income inequality. It is also important to be noticed that FDI in manufacturing sector generates largest number of jobs compared to other sectors that is 6 jobs per million USD of investment as Greenfield FDI in manufacturing sectors creates new establishments and products employing local people.

Further, manufacturing sectors is one of the largest sectors in African economy and it has great potential for backward and forward linkages with primary sector/resource sector and tertiary sector particularly with hi-tech sector in Africa which makes this sector more important in reducing income inequality. By expanding its network and establishing stronger backward and forward linkages with other sectors, manufacturing sector improves the macro economic conditions of the country and reduces income inequality. Since the relationship between manufacturing FDI and income inequality changes and becomes stronger after incorporating other factors, this indicates that the FDI in manufacturing sectors does not have a direct impact on income inequality in host countries but it is determined by other factors related to social and economic condition of the host country. The overall model 3.6 explains 58 % relationship between manufacturing FDI and income inequality while value of R square varies from 29% in model 3.1 to 58% in model 3.6.

Apart from FDI, absorptive capacity of the host country is the most important factor which reduces income inequality and their relationship is significant in all the models. Absorptive capacity plays a crucial role in the growth of manufacturing sectors because manufacturing sector requires well developed physical infrastructure and sufficient supply and quality of electricity supply. Use of mobile and internet connection facilitates communication, provides improved access to information, helps in marketing, building networks and establishing business relations which are important for the growth and productivity of manufacturing sector. In this way, in the context of manufacturing sector, absorptive capacity plays important role in reducing income inequality. On the other hand, in interaction of manufacturing FDI and absorptive capacity shows a weaker but positive relationship with

income inequality which indicates that manufacturing FDI in countries with higher absorptive capacity causes increase in income inequality whereas countries with lower absorptive capacity benefit from FDI in manufacturing sector and experience decline in income inequality (Wu and Hsu 2012). The possible explanation is that countries with higher absorptive capacity attracts FDI in machine oriented activities which replace local labour creating unemployment and thus increase income inequality whereas manufacturing FDI in countries with lower absorptive capacity goes into labour intensive industries and activities which generate jobs for local people, particularly for unskilled workers providing them source of income and in turn reduces income inequality in the host country.

The model 3.6 shows that interaction of manufacturing FDI and technology and innovation in host country increases income inequality. The countries with higher level of technology and innovation attract FDI in high end manufacturing activities which are technology based and require lesser number of workers in specific and skilled jobs thus increase income inequality in the country.

Similarly, interaction of manufacturing FDI and quality of institutions also increases income inequality in the host countries. As explained in the previous section better institutional environment protects the foreign capital and technology which leads to larger technology gap between foreign economy and host country which increases competition for local firms and lower their profit and thus creating income inequality in the country. Increase in the population is another important indicator which increases income inequality in the country which is explained in the previous section.

FDI in Manufacturing sector has a significant contribution in reducing income inequality particularly in western Africa because although the value is small but manufacturing comprises a large share of FDI in this region whereas the top destinations of manufacturing FDI in Africa are Egypt, Nigeria, Libya, Tunisia and South Africa. These countries have experienced decline in their income inequality as they are characterized by all favorable factors such as strong local economy, high value of inward FDI and high level of absorptive capacity, human capital, technology and better institutional environment. The interaction of these countries result into a better macroeconomic environment which improves the income distribution in the country by generating employment and reducing poverty and in turn results into lower income inequality. South Africa with the most unequal society is an exception in this case due to its social structure which is still divided based on race and class due to historical reasons.

Table 19: Model 3. FDI in manufacturing sector, growth of Gini coefficient and interaction terms

VARIABLES	Model 3.1 Gini growth	Model 3.2 Gini growth	Model 3.3 Gini growth	Model 3.4 Gini growth	Model 3.5 Gini growth	Model 3.6 Gini growth
FDI in manufacturing sector	0.0959	0.0249	-0.110	-2.339**	-2.404**	-3.439**
	(0.07)	(0.23)	(0.25)	(1.12)	(1.16)	(1.56)
Absorptive capacity	-0.140***	-0.145***	-0.257**	-0.231	-0.237**	-0.227*
	(0.04)	(0.06)	(0.13)	(0.14)	(0.12)	(0.12)

FDI share * Absorptive capacity	-0.0116	0.0352*	0.0685**	-0.0354	-0.0469	0.0480
	(0.01)	(0.02)	(0.03)	(0.05)	(0.05)	(0.10)
Tertiary enrollment		-0.0195	-0.00563	-0.00995	-0.0246	-0.00898
		(0.01)	(0.01)	(0.01)	(0.02)	(0.02)
FDI share * Tertiary enrollment		-0.0117	-0.0239	-0.00526	-0.000934	-0.0629
		(0.01)	(0.02)	(0.02)	(0.02)	(0.04)
Technology & innovation			0.149	0.150	0.188*	0.00278
			(0.13)	(0.13)	(0.11)	(0.12)
FDI share * Technology & Innovation			0.0388	0.0242	0.00670	0.290**
			(0.08)	(0.07)	(0.07)	(0.14)
Quality of institutions				-0.0499	-0.102	-0.0483
				(0.13)	(0.14)	(0.18)
FDI share* Quality of Institutions				0.398**	0.416**	0.463*
				(0.18)	(0.18)	(0.26)
Initial Gini coef.					-1.164	-0.851
					(2.74)	(2.81)
Trade as % of GDP					0.00848	0.00781
					(0.01)	(0.01)
Total population						9.83e-06**
						(0.00)
Size of country						1.62e-06
						(0.00)
Distance from equator						-0.0234
						(0.04)
Initial per capita GDP growth					-0.0643	-0.0664
					(0.04)	(0.05)
Central Africa	0.107	-0.133	0.143	0.132	-0.700	-0.900
	(0.80)	(0.79)	(0.64)	(0.67)	(0.80)	(1.20)
Eastern Africa	0.778	0.478	0.791	0.700	0.708	-0.0594
	(0.60)	(0.63)	(0.68)	(0.73)	(0.74)	(1.35)
Western Africa	-0.449	-1.020**	-1.094**	-1.120**	-1.409**	-1.773*
	(0.44)	(0.51)	(0.45)	(0.48)	(0.65)	(0.99)
Southern Africa	0.433	-0.105	-0.0697	-0.145	-0.126	-1.043
	(0.57)	(0.64)	(0.58)	(0.60)	(0.86)	(1.57)
Constant	-0.322	0.262	0.156	0.431	1.101	1.336
	(0.42)	(0.48)	(0.44)	(0.62)	(1.16)	(2.68)
Observations	129	109	109	109	106	93
Number of countries	27	26	26	26	25	25
R-squared	0.2943	0.35	0.3904	0.39	0.4626	0.5779

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Author, 2016. Based on various sources

4.2.1.4. FDI in resource sector and income inequality:

In African context, resource sector is one of the major sector and second largest recipient of FDI accounting for 34 % share of total FDI after manufacturing sector (50%). The output of regression model is presented in table 20 below. The first model 4.1 includes FDI, absorptive capacity and interaction of these two. It is observed that although the relationship between resource FDI and income inequality is not statistically significant but negative coefficient indicates that inward FDI in resource sector reduces income inequality in host country. But model 4.2 and 4.3 which incorporate human capital and technology depict that FDI in resource sector increases income inequality in the country whereas in next three models which include quality of institutions and control variable the relationship becomes insignificant and sign of coefficient changes from positive to negative which indicates that the relationship between resource FDI and income inequality is not statistically significant but inward FDI in resource sectors reduces income inequality. One of the major reason why FDI in resource sector is associated with higher income inequality is that compared to other regions it does not generate sufficient jobs in the host countries. The number of jobs generated by per million USD FDI is only 2 whereas hi-tech and manufacturing sector which are associated with lower income inequality generate 5 and 6 jobs per million USD FDI.

Another important factor is human capital which reduces income inequality in host country although its impact becomes statistically insignificant in the final model. The education and skills make people employable which are absorbed in the resource sector which include industries such as extraction and mining which require large number of workers. But the interaction between resource FDI and human capital increases income inequality meaning inflow of FDI in resource sector in the countries with higher human capital leads to higher income inequality. Higher human capital is associated with developed economies and they tend to attract resource FDI which is machine oriented and generates lesser number of jobs that require specific skills. Thus resource FDI widens the income gap in society as it benefits those who are already at the upper end of income distribution. This leads to higher income inequality in the host country.

Similarly, interaction of resource FDI and quality of institutions increases income inequality reason being better quality of institutions protects foreign capital and increases gap in productivity of foreign firms and local firms which leads to the income gap and in turn increases income inequality. Increase in population again causes higher income inequality for the reasons explained in earlier sections.

Resource sector is the second largest sectors in terms of inward FDI in Africa. Southern Africa is the largest recipient of resource FDI particularly South Africa where resource FDI accounts for the largest share in FDI and it has not been able to reduce income inequality this country. Apart from South Africa Angola, Nigeria, Egypt, Uganda, Morocco and Algeria have attracted largest value of resource FDI in the period between 2006 and 2014. These countries have lower level of income inequality but it cannot be contributed to resource FDI

as they also attract high value of FDI in more productive sectors such as hi-tech and manufacturing.

Table 20: Model 4. FDI in resource sector, growth of Gini coefficient and interaction terms

VARIABLES	Model 4.1 Gini growth	Model 4.2 Gini growth	Model 4.3 Gini growth	Model 4.4 Gini growth	Model 4.5 Gini growth	Model 4.6 Gini growth
FDI in resource sector	-0.0447	0.348**	0.481***	-0.258	-0.380	-0.131
	(0.20)	(0.15)	(0.17)	(0.42)	(0.41)	(0.46)
Absorptive capacity	-0.154***	-0.0807	-0.162	-0.135	-0.140	-0.0952
	(0.05)	(0.05)	(0.11)	(0.12)	(0.11)	(0.10)
FDI share * Absorptive capacity	0.00420	-0.133*	-0.112	-0.241	-0.233	-0.224
	(0.06)	(0.07)	(0.13)	(0.16)	(0.15)	(0.14)
Tertiary enrollment		-0.0307**	-0.0268**	-0.0278**	-0.0380**	-0.0409
		(0.01)	(0.01)	(0.01)	(0.02)	(0.03)
FDI share * Tertiary enrollment		0.0281*	0.0303*	0.0392**	0.0440**	0.0617**
		(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Technology & innovation			0.167	0.165	0.208*	0.0771
			(0.12)	(0.12)	(0.11)	(0.12)
FDI share * Technology & Innovation			-0.102	-0.0535	-0.0910	-0.146
			(0.18)	(0.19)	(0.19)	(0.17)
Quality of institutions				-0.0672	-0.0867	-0.0373
				(0.19)	(0.20)	(0.23)
FDI share* Quality of Institutions				0.184*	0.218**	0.169
				(0.10)	(0.10)	(0.12)
Initial Gini coef.					-2.218	-2.232
					(2.99)	(3.34)
Trade as % of GDP					0.0111	0.00255
					(0.01)	(0.01)
Total population						9.01e-06**
						(0.00)

Size of country						-7.55e-07
						(0.00)
Distance from equator						-0.0168
						(0.04)
Initial per capita GDP growth					-0.0626	-0.0501
					(0.04)	(0.05)
Central Africa	0.0459	-0.131	0.0137	0.0603	-0.568	-0.574
	(0.72)	(0.81)	(0.72)	(0.73)	(0.81)	(1.35)
Eastern Africa	0.700	0.533	0.660	0.546	0.663	-0.0667
	(0.56)	(0.58)	(0.58)	(0.65)	(0.65)	(1.54)
Western Africa	-0.480	-0.894*	-0.906**	-0.890*	-0.988	-1.549
	(0.41)	(0.47)	(0.43)	(0.46)	(0.62)	(1.06)
Southern Africa	0.408	-0.0108	-0.0119	0.0391	0.307	-0.338
	(0.55)	(0.64)	(0.60)	(0.64)	(0.97)	(1.71)
Constant	-0.195	0.0102	-0.157	0.105	0.574	1.531
	(0.39)	(0.44)	(0.41)	(0.82)	(1.64)	(3.16)
Observations	129	109	109	109	106	93
Number of countries	27	26	26	26	25	25
R-squared	0.3148	0.3553	0.3848	0.393	0.4832	0.4656

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Author, 2016. Based on various sources

The resource sector is mainly composed of extraction of metals and natural resources like oil and gas, manufacturing of metals and food and tobacco. Large proportion of FDI in resource sector comes in extraction industry which creates most of the jobs in this sector. According to literature there are three channels of job creation in extraction industry direct, indirect and induced. Direct jobs are created in the initial phase of exploration in the oil, and mining fields. The number of jobs created in this phase is very low due to the involvement of high level of technology. While second phase that is development or construction phase, creates most of the direct jobs which provide jobs to local workers in labour intensive construction related activities and for specialists like geologists, mine engineers, mine works and truck drivers. Studies have argued that extraction industry generates a little direct employment (World Bank, 2012).

4.2.1.5. FDI in service sector and income inequality:

The FDI in service sector does not have a statistically significant impact on income inequality but the negative regression coefficient indicates the service FDI reduces income inequality in the host country. Model 5.1 in table 21 shows that increase in absorptive capacity of host country significantly reduces income inequality but its effect becomes insignificant when

other factors are incorporated in the other models. Another important factor is tertiary enrolment as model 5.2, 5.4 and 5.5 indicate that increase in the human capital reduces the growth of income inequality. In the context of service sectors, it is clear that this sector requires skilled workers with relatively higher level of education. Therefore, increase in human capital provides the skilled worker to the service sector by making people employable through education. On the other hand, other factors do not have a significant effect on income inequality. Among control variables, population is significantly associated with income inequality implying that increase in population leads to higher income inequality in the country.

Northern African countries Morocco, Egypt, Tunisia and Algeria along with South Africa and Nigeria receive the largest value of FDI in service sector. All these countries except South Africa have lowest levels of income inequality in Africa. Here it is also important to note that these countries receive high value of FDI in relatively more productive sectors such as manufacturing and hi-tech. Therefore, with lower income inequality these countries cannot be contributed to service FDI.

Table 21: Model 4. FDI in service sector, growth of Gini coefficient and interaction terms

VARIABLES	Model 5.1 Gini growth	Model 5.2 Gini growth	Model 5.3 Gini growth	Model 5.4 Gini growth	Model 5.5 Gini growth	Model 5.6 Gini growth
FDI in service sector	-0.0968	0.0482	-0.188	-1.665	-2.758	-2.315
	(0.38)	(0.44)	(0.52)	(1.41)	(1.71)	(3.42)
Absorptive capacity	-0.155***	-0.106	-0.156	-0.116	-0.109	-0.0901
	(0.04)	(0.07)	(0.11)	(0.13)	(0.11)	(0.15)
FDI share * Absorptive capacity	0.00465	-0.0171	-0.0703	-0.166	-0.234	-0.220
	(0.05)	(0.15)	(0.17)	(0.18)	(0.19)	(0.31)
Tertiary enrollment		-0.0258*	-0.0207	-0.0263*	-0.0406**	-0.0327
		(0.01)	(0.02)	(0.02)	(0.02)	(0.03)
FDI share * Tertiary enrollment		0.000444	-0.0260	-0.00312	0.00741	0.00603
		(0.04)	(0.05)	(0.06)	(0.06)	(0.10)
Technology & innovation			0.0755	0.0950	0.124	-0.0428
			(0.10)	(0.10)	(0.10)	(0.12)
FDI share * Technology & Innovation			0.227	0.101	0.126	0.158
			(0.24)	(0.31)	(0.30)	(0.39)

Quality of institutions				-0.121	-0.193	-0.0998
				(0.19)	(0.16)	(0.25)
FDI share* Quality of Institutions				0.357	0.533	0.438
				(0.30)	(0.32)	(0.67)
Initial Gini coef.					-1.347	-1.589
					(2.81)	(2.77)
Trade as % of GDP					0.0105	0.00114
					(0.01)	(0.01)
Total population						9.26e-06**
						(0.00)
Size of country						-8.09e-07
						(0.00)
Distance from equator						-0.0253
						(0.05)
Initial per capita GDP growth					-0.0692	-0.0620
					(0.04)	(0.05)
Central Africa	0.0140	-0.121	-0.0738	-0.114	-0.905	-1.222
	(0.78)	(0.82)	(0.76)	(0.75)	(0.85)	(1.46)
Eastern Africa	0.718	0.482	0.486	0.551	0.595	-0.619
	(0.57)	(0.62)	(0.66)	(0.74)	(0.76)	(1.66)
Western Africa	-0.500	-0.918*	-1.006**	-1.007*	-1.266*	-1.969*
	(0.41)	(0.50)	(0.50)	(0.52)	(0.66)	(1.19)
Southern Africa	0.391	-0.123	-0.245	-0.274	-0.234	-1.199
	(0.56)	(0.65)	(0.67)	(0.67)	(0.92)	(2.07)
Constant	-0.164	0.132	0.149	0.667	1.380	2.604
	(0.35)	(0.48)	(0.50)	(0.84)	(1.17)	(2.56)
Observations	129	109	109	109	106	93
Number of countries	27	26	26	26	25	25
R-squared	0.3157	0.3489	0.3655	0.4003	0.4657	0.4677

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Author, 2016. Based on various sources

4.2.2. Relationship between FDI and income inequality: Analysis of total and sectoral FDI across geographical regions

The regional variation in the relationship between FDI and income inequality has been examined by incorporating dummy for geographical regions in the regression models presented in the previous section. The results show that there is no significant variation in the relationship between FDI and income inequality across regions. Only western Africa has shown a relatively stronger impact of FDI in reducing income inequality particularly total FDI and FDI in manufacturing and service sector because this region receives larger share of FDI in these two sectors. Among 11 countries of western Africa four countries namely Sierra Leone (-0.047), Nigeria (-0.015), Cote d'Ivoire (-0.028) and Cape Verde-0.014) have experienced a little decline in income inequality showing a negative change in Gini coefficient between 2006 and 2014. In terms of FDI the region is third largest recipient of FDI but there is a huge variation within regions. For instance, Nigeria stands at second position in receiving FDI whereas Sierra Leone, Cote d'Ivoire and Cape Verde are among the countries which receive the lowest value of FDI in Africa. Nigeria is characterized by all favourable conditions such as high value of inward FDI, average absorptive capacity, better human capital and level of technology along with better institutional environment. On the other hand, Sierra Leone is weak country in terms of FDI, absorptive capacity, human capital and technology but it has a better quality of institutions. Despite little FDI, Cote d'Ivoire and Cape Verde have average absorptive capacity in Africa, better human capital and institutional quality which enabled them to reduce income inequality. This region has been improving its absorptive capacity, human capital and quality of institutions. All these factors are associated with decline in income inequality.

On the other hand, Northern African countries such as Egypt, Algeria and Morocco receive highest value of hi-tech FDI in Africa and they are among the strongest economies with highest absorptive capacity, human capital, technology and innovation as well as quality of institutions. All these factors along with large value of FDI in these countries contribute to lower income inequality. South Africa is also among the most developed African countries which receive high value of FDI along with higher absorptive capacity, human capital, technology and quality of institutions. Despite all these favourable conditions, due to its long history of apartheid which still has its impact on society the country is characterized by high level of income inequality which has remained almost unchanged between-2006 and 2014.

Central African countries such as Burundi, Cameroon, Chad and Gabon are the most underdeveloped countries which receive a minimal value of FDI. Possibly their lower income inequality is associated with low level of economic development because as the economy grows it experiences increase in income inequality in initial phases and these countries have not even reached at that level of economic growth.

4.3. Factors that determine the relationship between FDI and income inequality:

According to literature based on dependency theory, the relationship between FDI and income inequality is not direct and FDI may increase or decrease income inequality in host

country depending on local conditions. This relationship is determined by other factors such as absorptive capacity, human capital, technology diffusion and institutional environment. FDI reduces income inequality in the host country if the host country has higher absorptive capacity, human capital and better quality of institutions and FDI is able to diffuse new technology in the host country which depends on the current level of the local technology and innovation(Li and Liu 2005; Wu and Hsu 2012; Lin et al. 2013). Therefore, the present section aims to examine the role of these factors in determining the impact of FDI on income inequality using panel regression with interaction terms. Given below is the summary table 22 which presents the factors that significantly affect income inequality in host countries.

Table 22: Significant moderator variables

Factors that determine the relationship between FDI and growth of income inequality		
Sr. No.	**FDI sector**	**Significant Factors**
1	Total FDI	FDI # Absorptive capacity (-)*
		FDI share # Quality of Institutions (+)**
		Total Population (+)**
2	Hitech FDI	FDI # Absorptive capacity (-)***
		Human capital (-)**
		FDI # Human capital (+)*
		FDI # Technology & Innovation (+)**
		FDI # Quality of Institutions (+)***
		Total Population (+)***
		Initial per capita GDP growth rate (-)*
3	Manufacturing FDI	Absorptive capacity (-)***
		FDI # Technology & Innovation (+)**
		FDI # Quality of Institutions (+)*
		Total Population (+)**
4	Resource FDI	Absorptive capacity (-)***
		FDI # Absorptive capacity (-)*
		Human capital (-)***
		FDI # Human capital (+)**
		FDI share # Quality of Institutions (+)**
		Total Population (+)**
5	Service FDI	Total Population (+)**
Source: Author, 2016, based on panel regression with interaction terms and panel regression		

The summary table 2 is based on the panel regression which used unbundled indicators which were combined into index of absorptive capacity, technology diffusion and quality of institutions. The # sign represents the interaction between variables. Although the role of these factors has already been discussed in the previous section which focuses on the relationship between FDI and income inequality but this section exclusively focuses on the factors which determine the relationship between FDI and income inequality. The regression

results reveal that the role of these factors is sector specific as the significance of these factors vary across sectors.

The table clearly shows that absorptive capacity is the most important factor which determines the relationship between FDI and income inequality and it positively affect the relationship particularly in case of total inward FDI and FDI in hi-tech sector. This implies that country with higher absorptive capacity benefits from the foreign investment because it is able to absorb and utilise new technology coming through FDI for increasing its productivity by indigenising foreign technology according to local conditions and requirements whereas FDI in countries with lower absorptive capacity increases the technology gap between foreign firms and domestic firms and creates competition for local firms and further reduces the economic gains of local firms. Thus it increases income inequality by widening income gap between workers in foreign firms and those who work in local firms. Since absorptive capacity is the index which combines several indicators, a panel regression has been used to identify the role of each component in affecting income inequality.

Among the components of absorptive capacity, electricity consumption and mobile subscription are the most important indicators which reduce income inequality in the country because electricity supply and means of communications are essential for the functioning of any economic activity and their sufficient access increases the productivity of economy which in turn reduces income inequality whereas quality of electricity supply and improved air infrastructure are associated with higher income inequality.

Second important indicator which affects the relationship between FDI (total and sectoral) and income inequality is quality of institutions. Here it is important to note that the interaction between FDI and quality of institutions increases income inequality in the host countries. This suggests that FDI increases income inequality in the countries which have better institutional environment. The better quality of institutions increases income inequality in the host country by protecting foreign capital and technology through intellectual property rights and legal mechanisms as explained in previous sections and it hinders the process of technology diffusion, further the technology gap between foreign economy and host country increases posing threat for local firms as they have to compete with foreign firms (Morgan 2016). Among the components of institutional quality, the strength of investors' protection significantly increases income inequality because it protects the foreign capital and technology whereas higher auditing and reporting standards reduce income inequality by reducing firm level corruption.

Human capital is another most important factor which determine and affects the impact of hi-tech and resource FDI on income inequality. The inflow of FDI in these sectors in countries with higher level of human capital increases income inequality in the society. Lin et.al also found the similar relationship between FDI and human capital using threshold regression model. They claimed that there is a critical threshold value of human capital and FDI reduces income inequality if host country's human capital is below that threshold whereas beyond that threshold level of human capital, FDI increases income inequality (Lin et al. 2013).

Inward FDI in hi-tech sector in the countries with higher level of human capital increases income inequality by widening the income gap in society in two ways. First the income gap between those who work in MNCs and people who work in local firms increases because foreign firms pay higher salaries to their workers. Second, the jobs generated in foreign firms require skilled workers and employs people with higher level of education which creates income gap in skilled and unskilled workers. Similarly, inflow of FDI in resource sector in countries with higher level of human capital increases income inequality because this foreign

investment is machine oriented and it replaces labour. In addition, FDI in resource sector generates fewer jobs per million USD FDI and require specific skills.

According to the literature, the interaction of local technology and innovation in the host country with the inward FDI leads to technology diffusion in the country which through different channels such as collaboration between foreign firms and local firms, transfer of local human capital from foreign firms to local firms and through replicating the foreign technology by local firms(Fu et al. 2011; Liu and Wang 2003). There are mix results in literature on the technology diffusion through FDI. According to the popular view technology diffusion improves existing technology of the host country and increases productivity of local firms and strengthens the local economy which in turns reduces income inequality. In the present analysis, technology diffusion is found to be a crucial determinant the impact of inward FDI in hi-tech and manufacturing sector on the income inequality in the host country.

Table 23: Significant components of moderator variables

Specific Factors that determine the relationship between FDI and growth of income inequality					
Sr. No.	**FDI sector**	**Secific moderating factors**			
		Absorptive capacity	**Human capital**	**Technology Diffusion**	**Quality of institutions**
1	Total FDI	Electricity consumption (-)***	Human capital (-)**	Availability of latest technology (-)**	Strength of auditing and reporting standards (-)*
		quality of electricity supply (+)**			Strength of investor protection (+)*
		Mobile subscription (-)*			
2	Hitech FDI	Air infrastructure (+)**	Human capital(-)***	Availability of latest technology (-)**	Strength of investor protection (+)**
		Electricity consumption (-)***			
		quality of electricity supply (+)***			
		Mobile subsciption (-)**			
		Electricity consumption (-)***			
3	Manufacturing FDI	quality of electricity supply (+)***	Human capital (-)**	Availability of latest technology (-)**	Strength of auditing and reporting standards (-)*
		Mobile subsciption (-)*			Strength of investor protection (+)*
		Air infrastructure (+)*			
4	Resource FDI	Electricity consumption (-)***	Human capital (-)**	Availability of latest technology (-)**	Strength of auditing and reporting standards (-)*
		quality of electricity supply (+)***		Distance from equator (-)**	Strength of investor protection (+)*
		Electricity consumption (-)***			

5	Servic e FDI	quality of electricity supply (+)**	Human capital(-)**	Availability of latest technology (-)**	Strength of auditing and reporting standards (-)*
		Mobile subsciption (-)*			Strength of investor protection (+)**
Source: Author, 2016,based on panel regression with unbundled factors					

The findings reveal that interaction between FDI and local technology increases income inequality in the host country meaning that inflow of hi-tech and manufacturing FDI in countries with high level of technology and innovation increases income inequality in the society. If the country has high level of technology and innovation, then it attracts FDI in high end and sophisticated activities within hi-tech and manufacturing sector which generates fewer jobs which require specialised skills. This also widens the technology gap between foreign firms and local firms reducing economic gains of local firms. This process affects the income distribution in the host country where already privileged people gets the benefits from the foreign investment. While interpreting the role of technology diffusion, it is important to note that present study analyses the impact of Greenfield FDI whereas most of the existing studies analyse either gross FDI which includes inward and outward FDI both or total FDI which is sum of the greenfield FDI, brownfield FDI and mergers and acquisitions. Few studies (Lall 2002; Liu 2008) have pointed out that the Greenfield FDI does not lead to technology diffusion in the host country because it is the fresh investment which establishes a new business in the host country which is completely owned by foreign firm and they protect their intellectual property through law as they do not want to share their knowledge and technology with the host country. On the other hand, mergers and acquisition is the soft FDI which leads to technology diffusion in the host country by sharing knowledge and establishing linkages with local firms. Among the components of technology diffusion, the availability of latest technology is the most significant factor which reduces income inequality since it is the prerequisite for technology diffusion to take place. According to Liu and Zou the access to foreign technology along with the local expenditure on innovation together leads to technology diffusion (Liu and Zou 2008).

4.4. Summary

Based on the inferential analysis it is found the relationship between FDI and income inequality is not a direct relationship. Since no significant relationship was found in panel regression without and with control variables whereas relationship comes out to be significant when interaction of FDI with absorptive capacity, human capital, technology and innovation and quality of institutions was introduced in the model as shown in Table 17. Therefore, inflow of FDI that is total FDI leads to lower income inequality in African countries. Not only the relationship between FDI and income inequality but its interaction with other factors has significant impact on income inequality. It is observed that the effect of FDI on income inequality is sector specific, particularly in case of Africa, the inflow of FDI in hi-tech and manufacturing sectors contributes to a lower income inequality. Whereas FDI in other sectors do not have a statistically significant effect on income inequality.

At regional level, only western African region has strong relationship between inward FDI and income inequality where FDI has led to a decline in income inequality whereas in case of other regions, the effect of FDI on income inequality is not significant. It is also important to note that western Africa is not a homogeneous region. It includes Nigeria which attracts one

of the highest value of FDI in Africa while other countries are among the most underdeveloped countries with lowest value of inward FDI. Out of 11 countries in this region, only four countries namely Sierra Leone (-0.047), Nigeria (-0.015), Cote d'Ivoire (-0.028) and Cape Verde-0.014) have experienced a little decline in income inequality showing a negative change in Gini coefficient between 2006 and 2014.

The findings in the section 4.3 suggests that the effect of FDI on income inequality in the host country is moderated by other factors particularly, absorptive capacity, human capital and institutional quality. The results of interaction model show that FDI alone does not have a significant effect on income inequality but the interaction of FDI with other factors not only change the sign of coefficient but also has statistically significant impact on income inequality. Absorptive capacity of the host country is the most important factor which positively determine the effect of FDI on income inequality in the host country, indicating that countries with higher absorptive capacity experience decline in income inequality as a result of inward FDI. For example, in western Africa, Cote d'Ivoire and Cape Verde have average absorptive capacity in Africa, better human capital and institutional quality which enabled them to reduce income inequality despite a minimal foreign investment in these countries. This region has been improving its absorptive capacity, human capital and quality of institutions. All these factors are associated with decline in income inequality in this region.

More specifically Electricity consumption and mobile phone are the most important factors which contribute to lower income inequity through interaction with FDI. On the other hand, human capital is a significant factor which reduces income inequality but its interaction with income inequality but its interaction with FDI causes higher income inequality in the host country. Similarly, countries with higher level of technology and better quality of institutions experience increase in income inequality with the inflow FDI. But their two sub components which are, availability of latest technology in the country and strength of auditing and reporting standards reduce income inequality in the country.

Chapter 5: Conclusions and Recommendations

5.1. Conclusions:

The increasing world economic integration is influencing all countries of the world and all aspects of human life. Due to the economic benefits countries are competing to be part of the global economic system and FDI is the major channel through which countries can reap the benefits of increasing globalization. FDI is considered as a channel of growth and economic development for the country therefore, many developing countries have gone through economic reforms adopting liberalisation policies towards FDI for achieving higher economic development. There are large number of studies which examine the relationship of FDI and economic growth but due to the high levels of income inequality along with large amount of inward FDI in many developing countries, the focus has shifted to the effect of FDI on income inequality. There have been contradicting views about the impact of FDI on the economies of recipient countries. Also, there are contradictory evidences in the literature explaining the relationship between FDI and income inequality therefore a better understanding of this relationship is essential for efficient policy interventions for reducing income inequality in the society. The present research aims to explain the relationship between FDI and income inequality using dependency theory. It also attempts to identify the factors which determine this relationship in African countries.

Based on the statistical analysis, it is evident that the relationship between FDI and income inequality is not direct but it is sector specific and determined by other factors. This finding is aligned with the literature based on dependency theory (Wu and Hsu 2012; Lin et al. 2013) and confirms argument of Li and Liu that the effect of FDI varies across countries and it can have positive or negative impact on inequality based on the on the marco-economic conditions, institutional environment, and level of technological in the recipient economy. (Li and Liu 2005)

First of all, in general total FDI reduces income inequality in the host country. But this relationship varies at sectoral level. The study analyses the inward FDI in four broad sectors of economy viz. hi-tech, manufacturing, resources and services. Among these four sectors, the inward FDI in hi-tech and manufacturing sector significantly reduces income inequality in the host countries. This finding answers the first research question and supports the argument by Basu and Guariglia that the impact of FDI on the host country is determined by type and behaviour of FDI as well as local economic conditions of host countries(Basu and Guariglia 2007).
In the context of Africa, hi-tech sector and manufacturing sector are linked because a large part of hi-tech FDI in Africa comes in manufacturing subsector in activities such as automotive, pharmaceuticals and chemicals. The other important subsectors of hi-tech sector which receive FDI are business services, research and development, education and training, Logistics, Distribution & Transportation and Sales, Marketing and Support. Within manufacturing sector, the major industries which receive FDI are metals, automotive components, building & construction materials, beverages, coal, oil and natural gas and textiles etc. Hi-tech and manufacturing, both the sectors have a huge potential to reduce income inequality in Africa countries by creating backward and forward linkages between foreign firms and local economy which can help in expanding these sectors in the host countries by creation of new economic activities and production associated with these sectors as well as in other sectors by creating jobs and increasing purchasing power and in turn the

demand for local products. New industries and firms can be established where the knowledge and skills learned while working in foreign firms can be applied to achieve higher productivity. This process strengthens the local economy and enables it to exploit the incoming FDI for its benefit and redistribute the income in the society. On the other hand, FDI in resource sector and service sector do not have a statistically significant relationship with income inequality.

The answer to second research question which deals regional variation in impact of FDI on income inequality is that FDI has a significant impact on income inequality only in western Africa where income inequality has reduced between 2006 to 2014 whereas in case of other regions their relationship is not significant. In terms of FDI Western Africa is third largest recipient of FDI but there is huge variation within regions. For instance, Nigeria stands at second position in receiving FDI Sierra Leone, Cote d'Ivoire and Cape Verde are among the countries which receive the lowest value of FDI in Africa. Nigeria is characterized by all favourable conditions such as high value of inward FDI, average absorptive capacity, better human capital and level of technology along with better institutional environment and receives high value of FDI in hi-tech sector which is associated with lower inequality. On the other hand, Sierra Leone is weak country in terms of FDI, absorptive capacity, human capital and technology but it has a better quality of institutions. Despite little FDI, Cote d'Ivoire and Cape Verde have average absorptive capacity in Africa, better human capital and institutional quality which enabled them to reduce income inequality.

Based on dependency theory literature, four main factors were namely absorptive capacity, human capital, technology diffusion and quality of institutions are incorporated in the study to examine their role in determining the impact of FDI on income inequality. It is found that all these factors influence the impact of total and sectoral FDI on income inequality(Li and Liu 2005) but absorptive capacity is the most important factor that positively determine the relationship between FDI and income inequality (Wu and Hsu 2012). In general, a higher absorptive capacity in the country is associated with lower income inequality that is countries with higher absorptive capacity have lower income inequality. This finding answers the third research question and it is discussed below in detail.

In the context of FDI, total inward FDI as well as FDI in hi-tech sector reduces income inequality if the host country has higher absorptive capacity because country is able to absorb and utilize new knowledge and technology coming with FDI by indigenising it according to the local requirements and conditions which makes the local economy strong and increases the productivity and reduces income inequality by creating employment whereas FDI leads to higher income inequality in the countries with lower absorptive capacity because these countries are not able to absorb new technology to increase productivity and strengthen local economy. FDI in countries with lower absorptive capacity increases the technology gap between foreign firms and domestic firms and creates competition for local firms and further reduces the economic gains of local firms. Thus it increases income inequality by widening income gap between worker in foreign firms and those who work in local firms. Absorptive capacity is also linked to the innovative capacity of the country as higher absorptive capacity leads to innovation and increase the level of technology of the host country and higher level of technology further increases the absorptive capacity. These two factors are simultaneously determined (Criscuolo and Narula 2008). Among the several components of absorptive capacity, the two most important components are electricity consumption and mobile

subscription which reduce income inequality in the country because electricity supply and means of communications are essential for any economic activity and their sufficient availability increases the productivity of economy which in turn reduces income inequality.

Second important indicator which determines the relationship between FDI (total and sectoral) and income inequality is quality of institutions. In general, better institutional environment reduces income inequality as it includes the protection of intellectual property, public trust in politicians which indicates lower corruption, judicial independence ensuring fair justice for all, transparency of government in policymaking representing a fair political system, ethical behaviour of firms meaning better wages, and working environment along with social protection. Strong auditing and reporting standards ensures lesser corruption at firm level and strong investor protection promotes investment. Therefore, better quality of institutions reduces income inequality as it protects the investors and creates better business environment which attracts more investments and it also protects workers through lower corruption, transparent policymaking, judicial independence and ethical behaviour of firms.

On the other hand, in the context of inward FDI, better quality of institutions causes FDI to increase income inequality in the host country as it protects the foreign capital and technology which hinders the process of technology diffusion and it becomes difficult for host country to access and absorb and foreign technology. This further increases the technology gap between foreign firms and local economy posing threat for local firms as they have to compete with foreign firms in the market. This reduces the economic gains of local firms and increase income gap between workers of foreign firms and those who work in local firm which leads to higher income inequality in the host country This process exaggerate particularly in case of Greenfield FDI because this is fresh foreign investment which establishes new firms and they are wholly owned by the foreign firm and they tend to protect their technology therefore better institutional environment helps foreign investors to protect their intellectual capital. Among the components of institutional quality, the strength of investors protection significantly increases income inequality because it protects the foreign capital and technology whereas higher auditing and reporting standards reduce income inequality by reducing firm level corruption.

Human capital is also one of the most important factors which reduce income inequality in the society. Because Education and skills converts the population into human capital and makes them employable in white collar jobs in the formal sector. But human capital is also an important factor which determine the impact of hi-tech and resource FDI on income inequality. The study finds that the inflow of FDI in hi-tech and resource sectors in countries with higher level of human capital increases income inequality in the society. Herein hi-tech FDI in countries with higher human capital increases income inequality in two ways. First the income gap between those who work in MNCs and people who work in local firms increases because foreign firms pay higher salaries to their workers. Second, the jobs generated in foreign firms require skilled workers and employs people with higher level of education which creates income gap in skilled and unskilled workers. Similarly, inflow of FDI in resource sector in countries with higher level of human capital increases income inequality because this foreign investment is machine oriented and it replaces labour. FDI in resource sector generates fewer jobs per million USD FDI. In addition, only a small number of skilled and educated worker can be employed in resource sectors. Lin et.al also found the similar relationship between FDI and human capital using threshold regression model. They claimed

that there is a critical threshold value of human capital and FDI reduces income inequality if host country's human capital is below that threshold whereas beyond that threshold level of human capital, FDI increases income inequality (Lin et al. 2013).

Technology diffusion is another crucial determinant the impact of inward FDI in hi-tech and manufacturing sector on the income inequality in the host country. The interaction of FDI with local technology and innovation leads to technology diffusion in the host country. In this study, the interaction between FDI and local technology increases income inequality in the host country indicating that inflow of hi-tech and manufacturing FDI in countries with high level of technology and innovation increases income inequality in the society. If the country has high level of technology and innovation, then it attracts FDI in high end and sophisticated activities within hi-tech and manufacturing sector which generates fewer jobs which require specialised skills. This also widens the technology gap between foreign firms and local firms reducing economic gains of local firms. This process affects the income distribution in the host country where already privileged people get the benefits from the foreign investment and section of society which does not have access to FDI related technology remains marginalised.

While interpreting the role of technology diffusion, it is important to note that present study analyses the impact of Greenfield FDI whereas most of the existing studies analyse either gross FDI which includes inward and outward FDI both or total FDI which is sum of the greenfield FDI, brownfield FDI and mergers and acquisitions. Few studies (Lall 2002; Liu 2008) have pointed out that the Greenfield FDI does not lead to technology diffusion in the host country because it is the fresh investment which establishes a new business in the host country which is completely owned by foreign firm and they protect their intellectual property through law as they do not want to share their knowledge and technology with the host country. On the other hand, mergers and acquisition is the soft FDI which leads to technology diffusion in the host country by sharing knowledge and establishing linkages with local firms. Among the components of technology diffusion, the availability of latest technology is the most significant factor which reduces income inequality since it is the prerequisite for technology diffusion to take place. According to Liu and Zou the access to foreign technology along with the local expenditure on innovation together leads to technology diffusion (Liu and Zou 2008).

To conclude, the analysis of total and sectoral FDI in relation to income inequality in African countries confirms the argument of dependency theory that the relationship between FDI and income inequality is not direct rather it is determined by local factors such as absorptive capacity, human capital, technology and innovation and institutional environment. Further the present study found that role of FDI is also sector specific where FDI in hi-tech and manufacturing sector reduces income inequality in African countries while inward FDI in other sectors does not make a significant impact in the host countries. At regional level, there is no significant relationship between FDI and income inequality because of lack of heterogeneity in the sample of countries.

5.2: Policy Recommendations

The findings of this research contributes to the existing knowledge of the relationship between inward Greenfield FDI particularly sectoral FDI and income inequality and the factors which determine this relationship in the context of African countries. Based on the results of the study following recommendations are proposed.

Since FDI is a measure of global economic integration therefore countries should use it as channel to become more integrated in to the global economy for reaping the economic benefits from it. But it should be cautiously used for reducing income inequality in the country because the role of FDI in reducing income inequality is conditional upon several other factors.

Total FDI can only reduce income inequality if host country has higher absorptive capacity. Therefore, African countries should develop their absorptive capacity by improving their infrastructure and electricity supply as both of these factors increase the efficiency and productivity of firms. As a means of communication, mobile networks should be improved throughout the countries and it should be available on affordable prices. Because easy and fast communication is important for any economic activity and business and mobile connection is also important for accessing and transferring information and it should reach the most marginalized section of society to integrate them into the mainstream.

In the context of African countries FDI in two sectors viz. hi-tech and manufacturing have huge potential to reduce income inequality therefore African countries should target these two sectors for attracting foreign investment. Since hi-tech sector attract only small share of total FDI in Africa and it is concentrated in few countries, other countries should develop their absorptive capacity as mentioned above to attract FDI in hi-tech sector. The growth of hi-tech sector also leads to higher level of technology and innovation in host county which leads to technology diffusion and higher absorptive capacity. Since a large part of FDI in hi-tech sector comes in manufacturing subsector, strong linkages should be established between hi-tech and manufacturing sector which will develop the manufacturing sector and will improve its productivity.

Countries should focus on the development of manufacturing sector. A large share of FDI in manufacturing sector comes in extraction industries which generates most of the employment in this sector. To develop the manufacturing sector, instead of producing intermediary goods countries should produce final goods which will increase the productivity and will also generate more employment in this sector leading to lower income inequality. Manufacturing has huge potential for reducing income inequality in African countries. By expanding its network and establishing stronger backward linkage with resource sector and forward linkages with tertiary sector particularly hi-tech sector it can create new industries and economic activities which will generate more employment in the countries and improve the macro economic conditions of the country and reduces income inequality. Manufacturing sector is the largest recipient of FDI therefore it can create network of relations between foreign firms and local firms through backward-forward linkages which will increase the productivity and income of workers in local firms. Manufacturing sector also expands other sectors through horizontal linkages such as increased purchasing power of workers which increases demand for the products of other sector.

Human capital is significant factor that reduce income inequality in African countries therefore a sufficient part of government expenditure should be spend on educational institutions particularly in primary and secondary education due to the low literacy levels in African countries. A large share of population in Africa is young and improved level of education convert people into human capital will make them employable in decent jobs in formal sectors and they will contribute to the economic development of the country.

Among the technology related factors, the availability of technology is the most important factor which reduces income inequality. To make the technology available in the country, government should invest in higher education, R&D and innovations which increases the level of technology and also increases the absorptive capacity of the country. These two factors reduce inequality and also attract foreign investment in the country.

African countries should improve the quality of their government institutions and firm level institutions. A better institutional environment is associated with lower income inequality, particularly stronger auditing and reporting standards significantly contributes to reducing income inequality.

Since increase in population is associated with higher income inequality, since higher fertility rates are found among the poor section of society, the increase in their population results into higher income inequality. Therefore, African countries should adopt policies to control their population.

5.3. Limitations of the research

The limitations of the present study are given below:

1. Due to the lack of household level data on income study could not incorporate alternative measures of income inequality such as income distribution and median income.
2. The unavailability of data on African countries is a major limitation. The data for several countries was not available therefore, the study analyses confined to only 35 African countries.
3. The data contains a number of missing values which lead to smaller number of observations despite panel data for nine years
4. The study area of this research is Africa and the number of countries analysed in this research are 35 which is not sufficient to generalise the relationship between FDI and income inequality because this relationship is determined by several other factors. As the study shows that there is not enough variation in the income inequality across countries and there is no considerable change in the values of Gini coefficient over the period of nine years therefore the results of this study should not be generalised to other continents.
5. The Gini coefficient used in this research is based on statistical prediction rather than household survey. Although FDI Markets is an authentic and reliable source of data but income inequality is one of the major issues that developing countries are facing particularly African countries therefore its measurement should be based on the data collected from the household survey.

5.4. Recommendation for the future research

1. A comparative analysis of domestic and foreign investment can be done to see whether higher domestic investment is able to reduce income inequality.
2. Since technology diffusion in hi-tech and manufacturing sector leads to higher income inequality it is possibly due to the fact that the previous studies which claim that technology diffusion strengthens the local economy and leads to lower income inequality have analysed total FDI which is sum of inward Greenfield, Brownfield and Mergers and Acquisitions. There are few studies which claim that FDI in the form

of Mergers and Acquisitions leads to technology diffusion as compared to Greenfield FDI. Therefore, a similar study can be done using Mergers and Acquisitions to see this argument is true in the case of African countries.

3. There are two aspects of FDI as a measure of global economic integration these are inward and outward FDI but present study analysed only inward FDI particularly Greenfield FDI therefore in order to have a better understanding of general relationship between FDI and income inequality a study can be done using gross FDI which includes total inward and outward FDI.
4. Due to the little variation in Gini coefficient across countries and time in the context of Africa, the results of this study are not generalizable. It is recommended that to understand the general relationship between FDI and income inequality the research should include large number of countries from all over the world which will incorporate sufficient heterogeneity in the sample. This will give an unbiased outcome of relationship between FDI and income inequality in general.
5. Related to the point mentioned above, an analysis can be done using threshold regression which divide the sample into two groups based the threshold value of the indicator that determine the relationship between FDI and income inequality. The countries below threshold value and those above threshold value have an opposite relationship between FDI and income inequality. But to employ threshold regression there should be sufficient heterogeneity among countries then only it gives the result. So the relationship between FDI and income inequality can be analysed based on threshold regression using heterogeneous data of countries.
6. It is recommended that for a more robust analysis the relationship between FDI and income inequality should be based on household level income data collected through household survey. Income inequality should be measured by Gini coefficient calculated using total household income as well as household disposable income. A comparison of both the Gini coefficients is useful but the Gini coefficient calculated from household disposable income gives relatively more accurate estimate of income inequality because disposable is the remaining income for household expenses after paying for taxes, rents and bills for other amenities.

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ANNEXURE

Annex 1.

Description of indicators				
Variable	**Indicators**	**Unit of raw indicator**	**Modified unit of indicator**	**Source**
Dependent variable	Annual growth of Gini coefficient	coefficient	annual growth rate	Oxford Economics
	Gini coefficient	coefficient	coefficient	Oxford Economics
	Growth of average household income of lowest income decile	USD	USD	Euro Monitor Passport survey
Independent variable	total and sectoral FDI as % to GDP	million USD	% of GDP	FDI Markets
Absorptive capacity	Air Transport	Metric tons-kilometres (Millions)	Metric tons-kilometres (Millions)	World Development Indicators, World Bank
	Electric power consumption	(kWh per capita)	(kWh per capita)	World Development Indicators, World Bank
	Quality of electricity supply	1 to 7 (weighted average)	2 to 7 (weighted average)	World Economic Forum
	International Internet bandwidth	(Bits per second per person)	(Bits per second per person)	World Economic Forum

	Internet users	Percentage	Percentage	World Development Indicators, World Bank
	Mobile telephine subscriptions	Percentage	Percentage	World Economic Forum
	University industry collaboration in R&D	1 to 7 (weighted average)	2 to 7 (weighted average)	World Economic Forum
Human capital	Tertiary education enrollment	ratio	ratio	World Economic Forum
Technology Diffusion	Scientific and technical journal articles	Number	Number	World Economic Forum
	Research and development expenditure	% of GDP	% of GDP	World Development Indicators, World Bank
	availability of latest technology	(1 = not at all; 7 = to a great extent) weighted average	(1 = not at all; 7 = to a great extent) weighted average	World Economic Forum
	FDI and technology transfer	(1 = not at all; 7 = to a great extent) weighted average	(1 = not at all; 7 = to a great extent) weighted average	World Economic Forum
	Patent applications	Number of applications filed under the Patent Cooperation Treaty (PCT) per million population	Number of applications filed under the Patent Cooperation Treaty (PCT) per million population	World Economic Forum

Quality of institutions	Public trust in politicians	(1 = extremely low; 7 = extremely high)weighted average	(1 = extremely low; 7 = extremely high)weighted average	World Economic Forum
	Judicial independence	(1= not independent at all; 7=entirely independent) weighted average	(1= not independent at all; 7=entirely independent) weighted average	World Economic Forum
	Transparency of government in policymaking	(1=extremely difficult; 7=extremely easy) weighted average	(1=extremely difficult; 7=extremely easy) weighted average	World Economic Forum
	Intellectual property protection	(1 = not at all; 7 = to a great extent) weighted average	(1 = not at all; 7 = to a great extent) weighted average	World Economic Forum
Control variables	Trade	% of GDP	% of GDP	Oxford Economics
	Initial Gini coefficient	coefficient	coefficient	Oxford Economics
	Growth of per capita GDP for year 2006	USD	annual growth rate	Euro Monitor Passport
	Total Population	millions	millions	Euro Monitor Passport
	Country size	square kilometre	square kilometre	Food and Agriculture Organisation, UN

	Latitude	degree	degree	findlatitudelongitude.com
Source: Author, 2016. Based on various sources				

Annex 2

Value and Growth of Gini coefficient in Africa (2006-2014)

year	Gini coefficient	Growth of Gini coefficient
2006	0.420	-0.094
2007	0.419	-0.221
2008	0.418	-0.241
2009	0.417	-0.221
2010	0.416	-0.299
2011	0.415	-0.249
2012	0.413	-0.323
2013	0.411	-0.430
2014	0.411	-0.179

Source: Author, 2016. Based on Oxford Economics (2006-2014)

Annex 3

Trend of Gini coefficient by region in Africa (2006-2014)

year	Africa	Northern Africa	Central Africa	Eastern Africa	Western Africa	Southern Africa
2006	0.420	0.383	0.357	0.380	0.406	0.549
2007	0.419	0.382	0.357	0.380	0.406	0.544
2008	0.418	0.382	0.359	0.378	0.405	0.541
2009	0.417	0.383	0.360	0.377	0.403	0.537
2010	0.416	0.383	0.361	0.376	0.401	0.537
2011	0.415	0.384	0.361	0.374	0.398	0.538
2012	0.413	0.386	0.360	0.371	0.396	0.537
2013	0.411	0.385	0.361	0.370	0.395	0.530
2014	0.411	0.386	0.361	0.368	0.394	0.529

Source: Author, 2016. Based on Oxford Economics (2006-2014)

Annex 4

Annual Growth of Gini coefficient across regions in Africa (2006-2014)

year	Africa	Northern Africa	Central Africa	Eastern Africa	Western Africa	Southern Africa

2006	-0.094	-0.199	-0.604	0.000	0.188	-0.251
2007	-0.221	-0.141	-0.031	-0.001	-0.064	-0.863
2008	-0.241	-0.033	0.454	-0.592	-0.147	-0.615
2009	-0.221	0.312	0.406	-0.188	-0.457	-0.700
2010	-0.299	-0.048	0.242	-0.389	-0.676	-0.138
2011	-0.249	0.338	-0.096	-0.644	-0.595	0.101
2012	-0.323	0.376	-0.108	-0.633	-0.486	-0.477
2013	-0.430	-0.191	0.101	-0.359	-0.318	-1.184
2014	-0.179	0.188	0.071	-0.578	-0.297	-0.055

Source: Author, 2016. Based on Oxford Economics (2006-2014)

Annex 5

Annual growth of average disposable income of households in lowest and highest income decile in African countries (2006-2015)

Country	2006	2007	2008	2009	2010	2011	2012	2013	2014
	Growth of average income in lowest income decile (in %)								
Algeria	-5.82	3.88	-2.36	26.50	-6.06	-4.66	4.61	7.20	8.02
Cameroon	0.05	2.03	1.34	-3.80	-0.86	1.75	2.81	3.06	2.81
Egypt	0.89	4.01	6.35	3.05	0.49	2.05	6.13	14.04	-0.92
Kenya	0.07	2.05	-1.11	1.00	6.79	6.02	2.91	6.94	3.70
Morocco	5.90	3.37	5.82	5.27	1.63	5.80	2.81	4.34	1.42
Nigeria	-10.66	31.09	-11.66	20.85	-8.75	2.86	-7.99	29.87	2.09
South Africa	-7.65	3.81	-0.28	-0.08	3.27	4.94	3.44	2.58	2.27
Tunisia	7.65	4.47	4.08	0.85	3.34	1.58	4.40	1.77	2.78

Country	2006	2007	2008	2009	2010	2011	2012	2013	2014
	Growth of average income in highest income decile (in %)								
Algeria	-5.19	4.54	-1.70	27.27	-5.49	-4.12	5.27	7.89	8.62
Cameroon	3.31	6.17	5.46	1.03	1.61	5.08	5.39	4.70	4.48
Egypt	1.79	4.79	7.13	3.95	1.10	2.74	6.78	14.69	-0.44
Kenya	10.32	7.13	0.50	3.21	8.52	8.33	2.89	8.12	3.69
Morocco	5.05	2.22	4.35	5.45	1.70	5.76	2.76	4.25	1.34
Nigeria	-10.74	30.88	-11.77	20.70	-8.88	2.75	-8.06	29.74	2.07
South Africa	2.60	3.76	-0.05	-0.16	2.74	4.64	3.61	2.85	2.40
Tunisia	7.71	4.64	4.33	1.05	3.60	1.77	4.57	1.95	2.90

Source: Author, 2016. Based on Euro Monitor Passport survey (2006-2014)

Annex 6

Average disposable income of households in lowest and highest income decile in African countries (2006-2014)

Country	2006	2007	2008	2009	2010	2011	2012	2013	2014
	Average income in lowest income decile (US $)								
Algeria	7479	7769	7585	9596	9014	8594	8990	9637	10409
Cameroon	1029	1050	1064	1024	1015	1033	1062	1094	1125

Egypt	9490	9871	10498	10818	10871	11094	11774	13427	13303
Kenya	1208	1233	1219	1231	1315	1394	1435	1534	1591
Morocco	4079	4217	4462	4697	4774	5051	5193	5419	5496
Nigeria	2007	2630	2324	2808	2563	2636	2425	3150	3216
South Africa	586	608	606	606	626	656	679	697	712
Tunisia	7692	8035	8363	8434	8716	8854	9244	9407	9669

Country	2006	2007	2008	2009	2010	2011	2012	2013	2014
	Average income in highest income decile (US $)								
Algeria	73539	76877	75570	96181	90905	87159	91754	98997	107532
Cameroon	29079	30875	32560	32895	33425	35123	37015	38755	40491
Egypt	89382	93662	100339	104308	105451	108338	115683	132674	132093
Kenya	30805	33001	33166	34229	37147	40242	41405	44767	46417
Morocco	60814	62162	64868	68403	69567	73574	75608	78822	79877
Nigeria	58907	77099	68025	82109	74820	76881	70688	91712	93612
South Africa	111849	116055	116001	115816	118985	124510	129000	132679	135859
Tunisia	87417	91471	95430	96428	99899	101669	106312	108382	111528

Source: Author, 2016. Based on Euro Monitor Passport survey (2006-2014)

Annex 7

Ratio of average income in 10th and 1st income decile in African countries (2006-1014)

Country	2006	2007	2008	2009	2010	2011	2012	2013	2014
Algeria	9.83	9.90	9.96	10.02	10.08	10.14	10.21	10.27	10.33
Cameroon	28.26	29.41	30.60	32.14	32.94	34.02	34.87	35.43	36.00
Egypt	9.42	9.49	9.56	9.64	9.70	9.77	9.83	9.88	9.93
Kenya	25.50	26.77	27.20	27.80	28.25	28.87	28.86	29.18	29.18
Morocco	14.91	14.74	14.54	14.56	14.57	14.57	14.56	14.55	14.53
Nigeria	29.36	29.31	29.27	29.24	29.20	29.17	29.14	29.12	29.11
South Africa	191.00	190.91	191.36	191.21	190.22	189.69	189.99	190.49	190.73
Tunisia	11.37	11.38	11.41	11.43	11.46	11.48	11.50	11.52	11.53

Source: Author, 2016. Based on Euro Monitor Passport survey (2006-2014)

Annex 8

Trend of sectoral FDI in Africa (2006-2014)

Year	Total FDI	Hitech	Manufacturing	Resource	Services
2006	70697.0	5294.4	36361.0	21160.7	7880.9
2007	64387.3	5311.6	30522.7	17654.7	10898.3
2008	114114.0	4258.7	41854.2	39411.2	28589.9
2009	58082.1	3581.1	20420.6	18240.0	15840.5
2010	51718.4	5664.7	18911.4	12305.3	14837.0
2011	45010.9	4675.4	18674.1	14088.3	7573.1
2012	34708.9	4872.6	11238.9	10878.9	7718.4

2013	34344.6	2771.1	11700.3	6003.4	13869.8
2014	103078.9	7414.0	51777.6	34986.4	8900.9

Source: Author, 2016. Based on FDI Markets (2006-2014)

Annex 9

Trend of sectoral FDI in Northern Africa (2006-2014)

Year	Total FDI	Hitech	Manufacturing	Resource	Services
2006	44369	3774	28978	7573	4044
2007	43909	5113	26176	4976	7644
2008	46182	2922	17725	9354	16181
2009	30497	2561	14870	4637	8430
2010	14093	829	4583	2792	5889
2011	9879	1149	6756	276	1699
2012	10917	1462	3823	4107	1524
2013	8130	902	4140	1609	1479
2014	62191	5961	46144	8273	1813

Source: Author, 2016. Based on FDI Markets (2006-2014)

Annex 10

Trend of sectoral FDI in Southern Africa (2006-2014)

Year	Total FDI	Hitech	Manufacturing	Resource	Services
2006	8441	1326	1921	4081	1113
2007	9697	157	1630	6669	1242
2008	26980	868	6242	12246	7624
2009	13984	608	3962	7138	2275
2010	8993	1905	2806	2311	1971
2011	15636	1910	1846	9186	2693
2012	11425	1188	4457	4437	1342
2013	8663	718	2544	3172	2229
2014	20370	234	1575	16849	1712

Source: Author, 2016. Based on FDI Markets (2006-2014)

Annex 11

Trend of sectoral FDI in Eastern Africa (2006-2014)

Year	Total FDI	Hitech	Manufacturing	Resource	Services
2006	2304.8	47.2	544.3	0.0	1713.3
2007	4688.6	26.8	269.3	3300.0	1092.5
2008	6844.3	245.0	1448.6	4154.1	996.6
2009	3785.4	159.3	549.7	1270.5	1805.9
2010	10697.7	259.9	3616.5	5500.6	1320.7
2011	8945.0	1273.3	3039.3	3317.6	1314.9
2012	2743.8	342.1	589.7	350.0	1462.0
2013	5775.0	297.7	1368.8	384.5	3724.0

2014	5477.0	780.4	1904.6	1047.1	1744.9

Source: Author, 2016. Based on FDI Markets (2006-2014)

Annex 12

Trend of sectoral FDI in western Africa (2006-2014)

Year	Total FDI	Hitech	Manufacturing	Resource	Services
2006	13961	147	4859	7944	1010
2007	3351	15	2447	250	638
2008	33200	223	16289	12900	3788
2009	9132	252	841	5194	2845
2010	11515	1371	2903	1702	5539
2011	10386	343	7025	1309	1709
2012	8826	1380	2092	1984	3370
2013	11371	836	3571	838	6127
2014	14033	283	1527	8817	3406

Source: Author, 2016. Based on FDI Markets (2006-2014)

Annex 13

Trend of sectoral FDI in Central Africa (2006-2014)

Year	Total FDI	Hitech	Manufacturing	Resource	Services
2006	1621.4	0	58.4	1563	0
2007	2741.869	0	0	2460	281.8685
2008	908	0	150	758	0
2009	682.5	0	197.8	0	484.7
2010	6419.5	1300	5002.5	0	117
2011	165.1	0	7.5	0	157.6
2012	797.6	500	277	0	20.6
2013	406.2	17.7	76.8	0	311.7
2014	1008.257	155.5	626.6573	0	226.1

Source: Author, 2016. Based on FDI Markets (2006-2014)

Annex 14

Sectoral composition of FDI in Africa (2006-2014)

Year	Hitech	Manufacturing	Resource	Services
2006	7.49	51.43	29.93	11.15
2007	8.25	47.40	27.42	16.93
2008	3.73	36.68	34.54	25.05
2009	6.17	35.16	31.40	27.27

2010	10.95	36.57	23.79	28.69
2011	10.39	41.49	31.30	16.83
2012	14.04	32.38	31.34	22.24
2013	8.07	34.07	17.48	40.38
2014	7.19	50.23	33.94	8.64

Source: Author, 2016. Based on FDI Markets (2006-2014)

Annex 15

Share of FDI as percentage of GDP by region in Africa (2006-2014)

Year	Africa	Northern Africa	Central Africa	Eastern Africa	Western Africa	Southern Africa
2006	1.52	3.27	1.76	0.64	1.20	1.27
2007	1.72	4.29	1.55	2.08	0.30	1.51
2008	2.69	2.81	1.14	2.32	2.32	4.45
2009	1.53	1.95	0.51	1.16	0.76	3.32
2010	2.05	0.81	3.77	4.04	1.14	1.56
2011	1.97	0.51	0.20	2.52	1.45	4.47
2012	1.14	0.42	0.54	0.55	1.20	2.60
2013	1.09	0.39	0.32	1.17	1.28	1.77
2014	0.96	1.73	0.78	1.02	0.86	0.48

Source: Author, 2016. Based on FDI Markets (2006-2014)

Annex 16

Sectoral composition of FDI in Northern Africa (2006-2014)

Year	Hitech	Manufacturing	Resource	Services
2006	8.51	65.31	17.07	9.11
2007	11.64	59.61	11.33	17.41
2008	6.33	38.38	20.25	35.04
2009	8.40	48.76	15.20	27.64
2010	5.88	32.52	19.81	41.79
2011	11.63	68.39	2.79	17.20
2012	13.40	35.02	37.62	13.96
2013	11.10	50.92	19.79	18.19
2014	9.59	74.20	13.30	2.91

Source: Author, 2016. Based on FDI Markets (2006-2014)

Annex 17

Sectoral composition of FDI in Eastern Africa (2006-2014)

Year	Hitech	Manufacturing	Resource	Services
2006	2.05	23.62	0.00	74.34
2007	0.57	5.74	70.38	23.30
2008	3.58	21.17	60.69	14.56

2009	4.21	14.52	33.56	47.71
2010	2.43	33.81	51.42	12.35
2011	14.23	33.98	37.09	14.70
2012	12.47	21.49	12.76	53.28
2013	5.16	23.70	6.66	64.48
2014	14.25	34.77	19.12	31.86

Source: Author, 2016. Based on FDI Markets (2006-2014)

Annex18

Sectoral composition of FDI in Western Africa (2006-2014)

Year	Hitech	Manufacturing	Resource	Services
2006	1.06	34.81	56.90	7.24
2007	0.46	73.04	7.46	19.04
2008	0.67	49.06	38.85	11.41
2009	2.76	9.21	56.88	31.15
2010	11.91	25.21	14.78	48.10
2011	3.30	67.64	12.60	16.45
2012	15.64	23.70	22.48	38.18
2013	7.35	31.40	7.37	53.88
2014	2.02	10.88	62.83	24.27

Source: Author, 2016. Based on FDI Markets (2006-2014)

Annex 19

Sectoral composition of FDI in Central Africa (2006-2014)

Year	Hitech	Manufacturing	Resource	Services
2006	0.00	3.60	96.40	0.00
2007	0.00	0.00	89.72	10.28
2008	0.00	16.52	83.48	0.00
2009	0.00	28.98	0.00	71.02
2010	20.25	77.93	0.00	1.82
2011	0.00	4.54	0.00	95.46
2012	62.69	34.73	0.00	2.58
2013	4.36	18.91	0.00	76.74
2014	15.42	62.15	0.00	22.42

Source: Author, 2016. Based on FDI Markets (2006-2014)

Annex 20

Sectoral composition of FDI in Southern Africa (2006-2014)

Year	Hitech	Manufacturing	Resource	Services
2006	15.71	22.76	48.35	13.19
2007	1.61	16.81	68.77	12.80
2008	3.22	23.13	45.39	28.26
2009	4.35	28.33	51.05	16.27

2010	21.18	31.20	25.70	21.92
2011	12.22	11.81	58.75	17.22
2012	10.40	39.01	38.84	11.75
2013	8.29	29.37	36.61	25.73
2014	1.15	7.73	82.72	8.40

Source: Author, 2016. Based on FDI Markets (2006-2014)

Annex 21

Number of jobs generated by FDI (per million USD) by sector and region in Africa

Region	Hitech	Manufacturing	Resource	Services	Total FDI
NorthernAfrica	6.42	5.13	0.74	2.53	2.92
CentralAfrica	4.25	6.63	1.56	2.88	3.93
EasternAfrica	3.83	7.97	3.62	2.00	3.36
WesternAfrica	5.09	4.23	2.49	1.94	2.69
SouthernAfrica	5.17	5.85	2.40	2.22	3.30
Africa	5.15	5.96	2.25	2.23	3.17

Source: Author (2016). Calculation based on FDI Markets (2006-2014)

Annex 22

Names of source and target countries for FDI and country codes

Country	Code	Country	Code
Algeria	DZ	Libya	LY
Angola	AO	Luxembourg	LU
Australia	AU	Madagascar	MG
Austria	AT	Malawi	MW
Bahamas	BS	Malaysia	MY
Bahrain	BH	Mali	ML
Bangladesh	BD	Malta	MT
Belarus	BY	Martinique	FR
Belgium	BE	Mauritania	MR
Benin	BJ	Mauritius	MU
Bermuda	BM	Mexico	MX
Bosnia-Herzegovina	BA	Moldova	MD
Botswana	BW	Mongolia	MN
Brazil	BR	Morocco	MA
Bulgaria	BG	Mozambique	MZ
Burkina Faso	BF	Myanmar (Burma)	MM
Burundi	BI	Namibia	NA
Cameroon	CM	Netherlands	NL
Canada	CA	New Zealand	NU
Cape Verde	CV	Niger	NE
Cayman Islands	KY	Nigeria	NG
Central African Republic	CF	Norway	NO

Chad	TD	Oman	OM
Chile	CL	Pakistan	PK
China	CN	Philippines	PH
Comoros	KM	Poland	PL
Congo (DRC)	CD	Portugal	PT
Cote d'Ivoire (Ivory Coast)	CI	Qatar	QA
Croatia	HR	Republic of the Congo	CD
Cuba	CU	Romania	RO
Cyprus	CY	Russia	RU
Czech Republic	CZ	Rwanda	RW
Denmark	DK	Sao Tome and Principe	ST
Djibouti	DJ	Saudi Arabia	SA
Egypt	EG	Senegal	SN
Equatorial Guinea	GQ	Serbia	RS
Eritrea	ER	Seychelles	SC
Estonia	EE	Sierra Leone	SL
Ethiopia	ET	Singapore	SG
Finland	FI	Slovakia	SK
France	FR	Slovenia	SI
Gabon	GA	Somalia	SO
Gambia	GM	South Africa	ZA
Germany	DE	South Korea	KR
Ghana	GH	South Sudan	SS
Greece	GR	Spain	ES
Guinea	GN	Sri Lanka	LK
Guinea Bissau	GW	Sudan	SD
Haiti	HT	Swaziland	SZ
Hong Kong	HK	Sweden	SE
Hungary	HU	Switzerland	CH
Iceland	IS	Syria	SY
India	IN	Taiwan	TW
Indonesia	ID	Tanzania	TZ
Iran	IR	Thailand	TH
Ireland	IE	Togo	TG
Israel	IL	Tunisia	TN
Italy	IT	Turkey	TR
Jamaica	JM	UAE	AE
Japan	JP	Uganda	UG
Jordan	JO	UK	GB
Kazakhstan	KZ	Ukraine	UA
Kenya	KE	United States	US
Kuwait	KW	Vietnam	VN
Latvia	LV	Zambia	ZM
Lebanon	LB	Zimbabwe	ZW
Lesotho	LS		

Liberia	LR	

Source: Author, 2016. Based on FDI Markets

Annex 23

Trend of Absorptive Capacity by region in Africa (2006-2014)

year	Africa	Northern Africa	Central Africa	Eastern Africa	Western Africa	Southern Africa
2006	2.89	4.89	1.65	2.99	1.09	4.62
2007	3.24	5.94	1.79	3.18	1.52	4.51
2008	3.78	6.94	1.98	3.45	2.38	4.63
2009	4.39	8.41	2.21	4.07	2.84	4.94
2010	5.21	9.71	2.26	5.06	3.29	6.20
2011	5.61	9.66	2.27	5.95	3.55	6.95
2012	4.96	6.92	3.04	5.00	3.79	6.18
2013	5.38	7.89	3.35	5.36	3.97	6.64
2014	4.91	6.48	3.23	5.30	3.97	5.62

Source: Author, 2016. Based on Global Competitiveness Index, World Economic Forum (2006-2014)

Note: P2 distance index is calculated based on indicators from GCI

Annex 24

Trend of Tertiary Enrollment by region in Africa (2006-2014)

year	Africa	Northern Africa	Central Africa	Eastern Africa	Western Africa	Southern Africa
2006	8.35	19.20	3.50	4.83	1.33	7.75
2007	9.48	25.18	2.94	4.97	3.86	6.73
2008	9.68	26.45	3.35	5.07	4.95	6.47
2009	9.91	26.77	3.40	4.72	5.66	6.58
2010	9.93	26.34	4.09	6.58	6.68	5.90
2011	9.07	21.89	4.57	6.79	7.77	5.80
2012	10.51	27.01	5.63	7.12	8.48	6.85
2013	11.66	28.36	6.26	9.70	9.10	6.39
2014	12.18	29.82	6.46	10.60	8.27	7.52

Source: Author, 2016. Based on Global Competitiveness Index, World Economic Forum(2006-2014)

Annex 25

Trend of Technology and Innovation by region in Africa (2006-2014)

year	Africa	Northern Africa	Central Africa	Eastern Africa	Western Africa	Southern Africa
2006	2.32	3.95	0.78	1.65	1.38	3.78
2007	2.87	3.66	1.63	2.42	2.54	3.93
2008	2.94	4.00	1.84	2.09	2.62	4.02

2009	3.09	4.47	2.04	2.22	2.60	4.06
2010	3.56	5.09	1.55	3.42	3.23	3.95
2011	3.19	5.42	1.43	2.46	2.72	3.96
2012	3.02	4.61	1.86	2.47	2.48	3.95
2013	3.13	4.87	1.84	2.80	2.39	3.85
2014	2.24	2.27	1.71	2.21	2.03	2.83

Source: Author, 2016. Based on Global Competitiveness Index, World Economic Forum (2006-2014)

Note: P2 distance index is calculated based on indicators from GCI

Annex 26

Trend of Quality of Institutions by region in Africa (2006-2014)

year	Africa	Northern Africa	Central Africa	Eastern Africa	Western Africa	Southern Africa
2006	5.18	5.21	4.12	5.15	5.10	5.87
2007	5.23	5.19	4.15	5.32	5.24	5.80
2008	5.22	5.19	4.11	5.33	5.02	5.98
2009	6.55	6.40	5.09	6.57	6.35	7.68
2010	5.69	5.46	4.54	5.97	5.49	6.37
2011	6.50	6.31	5.12	6.80	6.31	7.19
2012	6.45	5.81	5.64	6.82	6.28	7.41
2013	6.39	5.96	5.63	6.81	6.19	7.10
2014	6.41	5.91	5.84	6.89	6.23	6.94

Source: Author, 2016. Based on Global Competitiveness Index, World Economic Forum (2006-2014)

Note: P2 distance index is calculated based on indicators from GCI

Annex 27

Total FDI, Gini coefficient and interaction terms

VARIABLES	(1) Gini coef.	(2) Gini coef.	(3) Gini coef.	(4) Gini coef.	(5) Gini coef.	(6) Gini coef.
Total FDI	-0.000613	-0.000150	-0.000522	-0.000730	-0.000604	-0.000741
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Absorptive capacity	-0.00109	-0.000968	-0.000955	0.000263	0.000533	0.00118*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FDI share * Absorptive capacity	-1.20e-06	-0.000171	-0.000162	-0.000149	-0.000167	-0.000191
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Tertiary enrollment		0.000241	0.000247	0.000582	0.000701	0.000616

		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FDI share * Tertiary enrollment		4.14e-05	1.56e-05	2.07e-05	1.97e-05	1.73e-05
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Technology & innovation			-0.000146	-0.000413	-0.000652	-0.00103
			(0.00)	(0.00)	(0.00)	(0.00)
FDI share * Technology & Innovation			0.000179	0.000159	0.000353	0.000441
			(0.00)	(0.00)	(0.00)	(0.00)
Quality of institutions				-0.00545**	-0.00486**	-0.00361
				(0.00)	(0.00)	(0.00)
FDI share* Quality of Institutions				2.45e-05	-0.000134	-0.000158
				(0.00)	(0.00)	(0.00)
Trade as % of GDP					-7.60e-05	-0.000126
					(0.00)	(0.00)
Total population						-9.31e-07*
						(0.00)
Size of country						2.69e-07
						(0.00)
Distance from equator						-0.000418
						(0.00)
Initial per capita GDP growth					0.00239	0.00271
					(0.00)	(0.00)
region_id = 2	-0.0300	-0.0233	-0.0235	-0.0136	0.00281	-0.00182
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)
region_id = 3	-0.0121	-0.00744	-0.00765	0.00624	0.00994	0.0191
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.07)
region_id = 4	0.0114	0.0150	0.0149	0.0274	0.0414	0.0543
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)
region_id = 5	0.152***	0.162***	0.162***	0.176***	0.185***	0.166
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.10)
Constant	0.393***	0.385***	0.386***	0.399***	0.384***	0.386***
	(0.02)	(0.03)	(0.03)	(0.03)	(0.04)	(0.06)

Observations	315	266	266	266	251	222
Number of c_id	35	35	35	35	34	34

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Author, 2016. Based on various sources

Annex 28

FDI in hi-tech sector, Gini coefficient and interaction terms

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Gini coef.	Gini coef.	Gini coef.	Gini coef.	Gini coef.	Gini coef.
FDI in hitech sector	0.000609	-0.0188	-0.0216	-0.0102	-0.000580	0.0172
	(0.00)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)
Absorptive capacity	-0.000933	-0.00153	-0.00154	-6.65e-05	9.68e-05	0.00100
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FDI share * Absorptive capacity	-0.000827	0.00220	0.000907	-0.000152	-4.44e-05	-0.00173
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Tertiary enrollment		0.000258	0.000262	0.000580	0.000706	0.000588
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FDI share * Tertiary enrollment		1.83e-05	1.89e-05	2.28e-05	4.29e-05	4.81e-05
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Technology & innovation			-0.000189	-0.000344	-0.000167	-0.000605
			(0.00)	(0.00)	(0.00)	(0.00)
FDI share * Technology & Innovation			0.00359	0.00192	0.00122	0.00202
			(0.00)	(0.00)	(0.00)	(0.00)
Quality of institutions				-0.00530**	-0.00493**	-0.00400*
				(0.00)	(0.00)	(0.00)
FDI share* Quality of Institutions				-2.11e-05	-0.00133	-0.00305
				(0.00)	(0.00)	(0.00)
Trade as % of					-7.58e-05	-0.000123

GDP						
					(0.00)	(0.00)
Total population						-8.29e-07*
						(0.00)
Size of country						2.46e-07
						(0.00)
Distance from equator						-0.000439
						(0.00)
Initial per capita GDP growth					0.00240	0.00268
					(0.00)	(0.00)
region_id = 2	-0.0293	-0.0247	-0.0249	-0.0147	0.00241	-0.00301
	(0.02)	(0.03)	(0.03)	(0.03)	(0.04)	(0.05)
region_id = 3	-0.0120	-0.00784	-0.00787	0.00580	0.0104	0.0164
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.07)
region_id = 4	0.0119	0.0137	0.0135	0.0262	0.0407	0.0515
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)
region_id = 5	0.152***	0.161***	0.161***	0.175***	0.185***	0.165
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.10)
Constant	0.391***	0.389***	0.390***	0.401***	0.386***	0.389***
	(0.02)	(0.03)	(0.03)	(0.03)	(0.04)	(0.06)
Observations	315	266	266	266	251	222
Number of c_id	35	35	35	35	34	34

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Author, 2016. Based on various sources

Annex 29

FDI in manufacturing sector, Gini coefficient and interaction terms

VARIABLES	(1) Gini coef.	(2) Gini coef.	(3) Gini coef.	(4) Gini coef.	(5) Gini coef.	(6) Gini coef.
FDI in manufacturing sector	-0.00128	-0.00158	-0.00128	-0.00324	-0.00401	-0.00562
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Absorptive capacity	-0.00114	-0.00142	-0.00154*	-0.000182	-2.83e-05	0.000617
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FDI share *	0.000148	0.000223	0.000200	-4.72e-05	4.35e-05	-7.32e-05

Absorptive capacity						
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Tertiary enrollment		0.000333	0.000337	0.000671	0.000850	0.000815
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FDI share * Tertiary enrollment		-1.30e-05	1.69e-05	8.28e-05	3.24e-05	6.88e-05
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Technology & innovation			0.000353	0.000109	-0.000109	-0.000568
			(0.00)	(0.00)	(0.00)	(0.00)
FDI share * Technology & Innovation			-0.000165	-0.000261	5.80e-05	4.89e-05
			(0.00)	(0.00)	(0.00)	(0.00)
Quality of institutions				-0.00554**	-0.00517**	-0.00412
				(0.00)	(0.00)	(0.00)
FDI share* Quality of Institutions				0.000417	0.000369	0.000627
				(0.00)	(0.00)	(0.00)
Trade as % of GDP					-0.000127	-0.000196
					(0.00)	(0.00)
Total population						-9.39e-07**
						(0.00)
Size of country						2.66e-07
						(0.00)
Distance from equator						-0.000498
						(0.00)
Initial per capita GDP growth					0.00250	0.00288
					(0.00)	(0.00)
region_id = 2	-0.0298	-0.0227	-0.0223	-0.0119	0.00461	-0.00147
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
region_id = 3	-0.0122	-0.00723	-0.00687	0.00742	0.0103	0.0169
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.07)
region_id = 4	0.0116	0.0152	0.0155	0.0284	0.0422	0.0540
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)
region_id = 5	0.152***	0.162***	0.162***	0.177***	0.187***	0.165
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.10)
Constant	0.393***	0.386***	0.385***	0.398***	0.387***	0.394***

	(0.02)	(0.03)	(0.03)	(0.03)	(0.04)	(0.06)
Observations	315	266	266	266	251	222
Number of c_id	35	35	35	35	34	34

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Author, 2016. Based on various sources

Annex 30

FDI in resource sector, Gini coefficient and interaction terms

VARIABLES	(1) Gini coef.	(2) Gini coef.	(3) Gini coef.	(4) Gini coef.	(5) Gini coef.	(6) Gini coef.
FDI in resource sector	0.00227***	0.00230**	0.00186	-0.00110	-0.00174	0.000785
	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)
Absorptive capacity	-0.000885	-0.00102	-0.00107	0.000185	0.000348	0.000786
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FDI share * Absorptive capacity	-0.000734***	-0.000774***	-0.000763***	-0.000940**	-0.00112**	-0.000939**
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Tertiary enrollment		0.000336	0.000343	0.000660	0.000787	0.000679
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FDI share * Tertiary enrollment		7.65e-05	6.36e-05	7.36e-05	0.000135	6.00e-05
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Technology & innovation			9.86e-05	-0.000191	-0.000254	-0.000775
			(0.00)	(0.00)	(0.00)	(0.00)
FDI share * Technology & Innovation			0.000191	0.000221	0.000542	0.000440
			(0.00)	(0.00)	(0.00)	(0.00)
Quality of institutions				-0.00556**	-0.00509***	-0.00389*

				(0.00)	(0.00)	(0.00)
FDI share* Quality of Institutions				0.000589	0.000578	0.000102
				(0.00)	(0.00)	(0.00)
Trade as % of GDP					-8.83e-05	-0.000147
					(0.00)	(0.00)
Total population						-7.15e-07*
						(0.00)
Size of country						2.30e-07
						(0.00)
Distance from equator						-0.000588
						(0.00)
Initial per capita GDP growth					0.00247	0.00274
					(0.00)	(0.00)
region_id = 2	-0.0298	-0.0218	-0.0215	-0.0121	0.00450	-0.00597
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
region_id = 3	-0.0123	-0.00671	-0.00660	0.00675	0.00989	0.00728
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.07)
region_id = 4	0.0117	0.0163	0.0164	0.0283	0.0422	0.0474
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)
region_id = 5	0.153***	0.164***	0.164***	0.178***	0.187***	0.159
	(0.05)	(0.06)	(0.06)	(0.06)	(0.06)	(0.10)
Constant	0.391***	0.383***	0.383***	0.397***	0.383***	0.393***
	(0.02)	(0.03)	(0.03)	(0.03)	(0.04)	(0.06)
Observations	315	266	266	266	251	222
Number of c_id	35	35	35	35	34	34

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Author, 2016. Based on various sources

Annex 31

FDI in service sector, Gini coefficient and interaction terms

VARIABLES	(1) Gini coef.	(2) Gini coef.	(3) Gini coef.	(4) Gini coef.	(5) Gini coef.	(6) Gini coef.
FDI in hitech sector	2.96e-06	-0.00206	-0.00245	-0.00822	-0.00923	-0.0102
	(0.00)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)
Absorptive capacity	-0.000910	-0.00125	-0.00128	1.75e-07	0.000138	0.000762
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FDI share * Absorptive capacity	-0.000211	3.01e-05	-2.05e-05	-0.000185	-0.000420	-0.000667
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Tertiary enrollment		0.000304	0.000313	0.000647	0.000814	0.000736
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
FDI share * Tertiary enrollment		5.72e-05	3.13e-05	2.19e-05	3.45e-05	3.85e-05
		(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Technology & innovation			8.73e-05	-0.000299	-0.000312	-0.000904
			(0.00)	(0.00)	(0.00)	(0.00)
FDI share * Technology & Innovation			0.000293	0.000546	0.000937	0.00117
			(0.00)	(0.00)	(0.00)	(0.00)
Quality of institutions				-0.00583**	-0.00530**	-0.00419
				(0.00)	(0.00)	(0.00)
FDI share* Quality of Institutions				0.000917	0.000998	0.00122
				(0.00)	(0.00)	(0.00)
Trade as % of GDP					-0.000120	-0.000194
					(0.00)	(0.00)
Total population						-8.94e-07*
						(0.00)
Size of country						2.62e-07

						(0.00)
Distance from equator						-0.000544
						(0.00)
Initial per capita GDP growth					0.00258	0.00293
					(0.00)	(0.00)
region_id = 2	-0.0294	-0.0227	-0.0224	-0.0131	0.00403	-0.00469
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.04)
region_id = 3	-0.0119	-0.00704	-0.00679	0.00683	0.00968	0.0125
	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.07)
region_id = 4	0.0123	0.0159	0.0162	0.0283	0.0429	0.0522
	(0.02)	(0.03)	(0.03)	(0.03)	(0.03)	(0.05)
region_id = 5	0.152***	0.162***	0.162***	0.176***	0.186***	0.160
	(0.06)	(0.06)	(0.06)	(0.06)	(0.06)	(0.10)
Constant	0.391***	0.385***	0.385***	0.401***	0.388***	0.397***
	(0.02)	(0.03)	(0.03)	(0.03)	(0.04)	(0.07)
Observations	315	266	266	266	251	222
Number of c_id	35	35	35	35	34	34

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Author, 2016. Based on various sources

Annex 32

Model 1. Total FDI, growth of Gini coefficient and interaction terms

VARIABLES	Model 1.1 Gini growth	Model 1.2 Gini growth	Model 1.3 Gini growth	Model 1.4 Gini growth	Model 1.5 Gini growth	Model 1.6 Gini growth
Total FDI	0.0511	0.0632	0.0203	-0.960***	-1.112***	-0.903**
	(0.04)	(0.08)	(0.11)	(0.36)	(0.40)	(0.37)
Absorptive capacity	-0.119***	-0.0994*	-0.153	-0.0678	-0.0836	-0.0876
	(0.04)	(0.06)	(0.12)	(0.12)	(0.10)	(0.14)
FDI share * Absorptive capacity	-0.00800	0.00832	0.0139	-0.0580*	-0.0710**	-0.0548
	(0.01)	(0.02)	(0.02)	(0.03)	(0.03)	(0.05)

Tertiary enrollment		-0.0170*	-0.0110	-0.0189	-0.0283**	-0.0109
		(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
FDI share * Tertiary enrollment		-0.00559	-0.00956	-0.000911	0.00262	-0.00210
		(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
Technology & innovation			0.0711	0.0900	0.164	0.0720
			(0.14)	(0.13)	(0.12)	(0.12)
FDI share * Technology & Innovation			0.0185	0.00138	-0.0150	0.00517
			(0.04)	(0.04)	(0.04)	(0.08)
Quality of institutions				-0.247*	-0.251*	-0.181
				(0.14)	(0.14)	(0.20)
FDI share* Quality of Institutions				0.213***	0.251***	0.203***
				(0.07)	(0.07)	(0.07)
Initial Gini coef.					-1.850	-4.158
					(2.48)	(3.80)
Trade as % of GDP					0.0113	0.00720
					(0.01)	(0.01)
Total population						4.28e-06
						(0.00)
Size of country						2.79e-06
						(0.00)
Distance from equator						-0.0261
						(0.02)
Initial per capita GDP growth					-0.0178	-0.00512
					(0.03)	(0.04)
Constant	-0.318	-0.269	-0.291	0.767	0.730	1.555
	(0.23)	(0.32)	(0.33)	(0.68)	(0.98)	(1.97)
Observations	129	109	109	109	106	93
Number of c_id	27	26	26	26	25	25
R-squared	0.1767	0.2029	0.2086	0.233	0.2665	0.3888

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Author, 2016. Based on various sources

Annex 33

Model 1. FDI in hitech sector, growth of Gini coefficient and interaction terms

VARIABLES	Model 1.1 Gini growth	Model 1.2 Gini growth	Model 1.3 Gini growth	Model 1.4 Gini growth	Model 1.5 Gini growth	Model 1.6 Gini growth
H-tech FDI	1.934	0.837	0.951	-24.48***	-24.42***	-20.69**
	(1.70)	(1.17)	(1.40)	(5.90)	(6.06)	(8.30)
Absorptive capacity	-0.0809*	-0.0659	-0.0505	0.0273	0.0179	0.0315
	(0.05)	(0.08)	(0.10)	(0.09)	(0.08)	(0.08)
FDI share * Absorptive capacity	-0.475	-0.0578	-0.984	-2.410***	-2.380***	-2.191***
	(0.35)	(0.29)	(0.80)	(0.68)	(0.65)	(0.63)
Tertiary enrollment		-0.0190	-0.0204	-0.0307***	-0.0372***	-0.0237**
		(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
FDI share * Tertiary enrollment		-0.123	-0.0516	0.140**	0.136**	0.104
		(0.09)	(0.09)	(0.06)	(0.06)	(0.07)
Technology & innovation			-0.0474	-0.0470	-0.0253	-0.109
			(0.10)	(0.11)	(0.10)	(0.12)
FDI share * Technology & Innovation			1.341	1.698*	1.678*	1.412
			(0.97)	(0.90)	(0.89)	(0.89)
Quality of institutions				-0.241*	-0.214	-0.146
				(0.14)	(0.15)	(0.21)
FDI share* Quality of Institutions				5.006***	4.997***	4.401***
				(1.01)	(1.04)	(1.52)
Initial Gini coef.					-1.620	-2.980
					(2.61)	(3.36)

Trade as % of GDP					0.00620	0.00351
					(0.01)	(0.01)
Total population						7.53e-06*
						(0.00)
Size of country						2.80e-06
						(0.00)
Distance from equator						-0.0171
						(0.02)
Initial per capita GDP growth					-0.0165	-0.0125
					(0.03)	(0.03)
Constant	-0.390	-0.268	-0.228	0.883	1.064	1.269
	(0.25)	(0.31)	(0.32)	(0.82)	(1.10)	(1.79)
Observations	129	109	109	109	106	93
Number of c_id	27	26	26	26	25	25
R-squared	0.1718	0.171	0.1886	0.247	0.2597	0.3667

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Annex 34

Model 1. FDI in manufacturing sector, growth of Gini coefficient and interaction terms

VARIABLES	Model 1.1 Gini growth	Model 1.2 Gini growth	Model 1.3 Gini growth	Model 1.4 Gini growth	Model 1.5 Gini growth	Model 1.6 Gini growth
FDI in manufacturing sector	0.0963	-0.0122	-0.180	-2.517***	-2.454**	-3.230**
	(0.07)	(0.21)	(0.26)	(0.96)	(0.97)	(1.56)
Absorptive capacity	-0.123***	-0.111**	-0.169	-0.142	-0.164	-0.164
	(0.04)	(0.05)	(0.12)	(0.13)	(0.12)	(0.12)
FDI share * Absorptive capacity	-0.0123	0.0305	0.0595*	-0.0496	-0.0537	0.0437
	(0.01)	(0.02)	(0.03)	(0.04)	(0.04)	(0.10)

Tertiary enrollment		-0.0182*	-0.0109	-0.0148	-0.0213	0.00424
		(0.01)	(0.01)	(0.01)	(0.01)	(0.02)
FDI share * Tertiary enrollment		-0.00901	-0.0240	-0.00444	-0.00117	-0.0619
		(0.01)	(0.02)	(0.02)	(0.02)	(0.05)
Technology & innovation			0.0737	0.0786	0.127	-0.0355
			(0.14)	(0.14)	(0.13)	(0.12)
FDI share * Technology & Innovation			0.0619	0.0450	0.0272	0.296**
			(0.08)	(0.07)	(0.07)	(0.15)
Quality of institutions				-0.0723	-0.0467	-0.0249
				(0.12)	(0.12)	(0.18)
FDI share* Quality of Institutions				0.419***	0.415***	0.428*
				(0.15)	(0.15)	(0.26)
Initial Gini coef.					-1.390	-3.236
					(2.71)	(3.62)
Trade as % of GDP					0.00774	0.00593
					(0.01)	(0.01)
Total population						6.63e-06
						(0.00)
Size of country						3.62e-06
						(0.00)
Distance from equator						-0.0269
						(0.02)
Initial per capita GDP growth					-0.00949	-0.00638
					(0.03)	(0.04)
Constant	-0.291	-0.149	-0.163	0.182	0.103	0.907
	(0.25)	(0.29)	(0.30)	(0.60)	(1.04)	(1.74)
Observations	129	109	109	109	106	93
Number of c_id	27	26	26	26	25	25

R-squared	0.1673	0.2037	0.2034	0.2023	0.2137	0.4138

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Author, 2016. Based on various sources

Annex 35

Model 1. FDI in resource sector, growth of Gini coefficient and interaction terms

VARIABLES	Model 1.1 Gini growth	Model 1.2 Gini growth	Model 1.3 Gini growth	Model 1.4 Gini growth	Model 1.5 Gini growth	Model 1.6 Gini growth
Resource FDI	-0.0606	0.323**	0.459***	-0.458	-0.507	-0.373
	(0.21)	(0.16)	(0.16)	(0.47)	(0.45)	(0.47)
Absorptive capacity	-0.138***	-0.0565	-0.124	-0.0964	-0.120	-0.0795
	(0.05)	(0.05)	(0.11)	(0.12)	(0.11)	(0.10)
FDI share * Absorptive capacity	0.0128	-0.120	-0.0898	-0.251	-0.228	-0.215
	(0.07)	(0.08)	(0.14)	(0.18)	(0.16)	(0.15)
Tertiary enrollment		-0.0290***	-0.0269**	-0.0279**	-0.0355**	-0.0300
		(0.01)	(0.01)	(0.01)	(0.02)	(0.03)
FDI share * Tertiary enrollment		0.0269*	0.0289*	0.0402**	0.0446***	0.0581*
		(0.02)	(0.01)	(0.02)	(0.02)	(0.03)
Technology & innovation			0.144	0.146	0.206*	0.127
			(0.13)	(0.12)	(0.12)	(0.12)
FDI share * Technology & Innovation			-0.115	-0.0578	-0.108	-0.181
			(0.18)	(0.20)	(0.19)	(0.19)
Quality of institutions				-0.0697	-0.0380	-0.0381
				(0.17)	(0.17)	(0.21)
FDI share* Quality of Institutions				0.229**	0.248**	0.230**
				(0.11)	(0.11)	(0.11)
Initial Gini coef.					-1.520	-3.887

					(2.48)	(3.91)
Trade as % of GDP					0.0121	0.00610
					(0.01)	(0.01)
Total population						4.40e-06
						(0.00)
Size of country						2.34e-06
						(0.00)
Distance from equator						-0.0266
						(0.02)
Initial per capita GDP growth					-0.0200	-0.00580
					(0.04)	(0.04)
Constant	-0.197	-0.306	-0.413	-0.161	-0.554	0.780
	(0.23)	(0.27)	(0.27)	(0.82)	(1.33)	(2.07)
Observations	129	109	109	109	106	93
Number of c_id	27	26	26	26	25	25
R-squared	0.1877	0.2014	0.2064	0.2489	0.2696	0.3498

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Author, 2016. Based on various sources

Annex 36

Model 1. Total FDI, growth of Gini coefficient and interaction terms

VARIABLES	Model 1.1 Gini growth	Model 1.2 Gini growth	Model 1.3 Gini growth	Model 1.4 Gini growth	Model 1.5 Gini growth	Model 1.6 Gini growth
Service FDI	-0.00941	0.116	-0.135	-1.428	-2.604	-2.151
	(0.35)	(0.42)	(0.51)	(1.35)	(1.59)	(3.20)
Absorptive capacity	-0.134***	-0.0799	-0.114	-0.0818	-0.0737	-0.0690
	(0.04)	(0.06)	(0.11)	(0.12)	(0.10)	(0.14)
FDI share * Absorptive capacity	-0.00536	-0.0195	-0.0763	-0.160	-0.240	-0.221

	(0.05)	(0.14)	(0.16)	(0.17)	(0.18)	(0.29)
Tertiary enrollment		-0.0227**	-0.0181	-0.0224	-0.0344**	-0.0168
		(0.01)	(0.02)	(0.02)	(0.02)	(0.03)
FDI share * Tertiary enrollment		-0.000744	-0.0276	-0.00743	0.00457	0.00664
		(0.04)	(0.05)	(0.06)	(0.06)	(0.10)
Technology & innovation			0.0462	0.0636	0.101	-0.0127
			(0.11)	(0.11)	(0.10)	(0.11)
FDI share * Technology & Innovation			0.239	0.127	0.152	0.159
			(0.24)	(0.31)	(0.30)	(0.38)
Quality of institutions				-0.103	-0.146	-0.0779
				(0.17)	(0.14)	(0.25)
FDI share* Quality of Institutions				0.314	0.511*	0.421
				(0.29)	(0.31)	(0.62)
Initial Gini coef.					-1.738	-3.360
					(2.76)	(3.81)
Trade as % of GDP					0.00974	0.00211
					(0.01)	(0.01)
Total population						4.79e-06
						(0.00)
Size of country						1.93e-06
						(0.00)
Distance from equator						-0.0228
						(0.02)
Initial per capita GDP growth					-0.0117	0.00120
					(0.03)	(0.04)
Constant	-0.209	-0.258	-0.264	0.175	0.503	1.369
	(0.24)	(0.34)	(0.34)	(0.83)	(1.26)	(2.11)
Observations	129	109	109	109	106	93
Number of c_id	27	26	26	26	25	25
R-squared	0.1851	0.2111	0.2171	0.234	0.2444	0.3407

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Source: Author, 2016. Based on various sources

Annex 37

Model 10. Total FDI, growth of income in lowest income decile and interaction terms

	Model 10.1	Model 10.2	Model 10.3	Model 10.4	Model 10.5	Model 10.6
VARIABLES	income growth	income growth	income growth	income growth	income growth	income growth
Total FDI	-1.661	-1.400	-1.455	-0.402	-0.775	-1.300
	(1.525)	(1.348)	(1.320)	(2.776)	(3.132)	(3.868)
Absorptive capacity	-0.299	-0.455	-0.772	-0.904	-0.991	-0.760
	(0.326)	(0.307)	(0.572)	(0.685)	(0.732)	(0.559)
FDI share * Absorptive capacity	0.209	0.255	0.310	0.342	0.325	0.221
	(0.189)	(0.165)	(0.236)	(0.224)	(0.218)	(0.226)
Tertiary enrollment		0.0653	0.0740	0.0772	0.0544	-0.159
		(0.0724)	(0.0838)	(0.0992)	(0.116)	(0.116)
FDI share * Tertiary enrollment		-0.0256	-0.0342	-0.0326	-0.0291	-0.00458
		(0.0337)	(0.0525)	(0.0649)	(0.0687)	(0.131)
Technology & innovation			0.369	0.279	0.431	0.762
			(0.491)	(0.509)	(0.721)	(0.809)
FDI share * Technology & Innovation			-0.0189	0.0190	-0.0425	-0.153
			(0.269)	(0.311)	(0.390)	(0.846)
Quality of institutions				0.921	0.813	1.070
				(1.106)	(1.137)	(1.674)
FDI share* Quality of Institutions				-0.247	-0.133	0.0822
				(0.695)	(0.794)	(0.942)
Trade share					0.0287	0.0371
					(0.0436)	(0.0349)
Total population						3.08e-05**
						(1.21e-05)

Size of the country						5.41e-06
						(5.49e-06)
Distance from equator						0.125**
						(0.0493)
Constant	5.713*	5.727	5.814	1.491	0.661	-4.929
	(3.047)	(4.011)	(3.821)	(4.163)	(3.958)	(7.111)
Observations	72	70	70	70	70	62
Number of c_id	8	8	8	8	8	8
R Square	0.5343	0.3173	0.4118	0.3746	0.4854	0.9762
Robust standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						
Source: Author, 2016. Based on several sources						

Annex 38

Model 6. Hitech FDI, growth of income in lowest income decile and interaction terms

	Model 6.1	Model 6.2	Model 6.3	Model 6.4	Model 6.5	Model 6.6
VARIABLES	income growth	income growth	income growth	income growth	income growth	income growth
FDI in hitech sector	-7.121	-3.902	-5.560	-1.368	-2.886	-37.62
	(9.239)	(13.25)	(15.71)	(18.94)	(17.26)	(38.44)
Absorptive capacity	-0.129	-0.462	-0.894	-1.153	-1.173	-1.229*
	(0.284)	(0.338)	(0.566)	(0.767)	(0.740)	(0.740)
FDI share * Absorptive capacity	0.754	1.874	4.162	4.559	4.539	3.514
	(1.183)	(1.301)	(2.738)	(3.002)	(3.046)	(3.259)
Tertiary enrollment		0.142***	0.125*	0.138*	0.133*	-0.162***
		(0.0472)	(0.0654)	(0.0743)	(0.0712)	(0.0624)
FDI share * Tertiary enrollment		-0.697***	-0.556*	-0.593*	-0.586**	-0.617
		(0.186)	(0.301)	(0.310)	(0.297)	(0.435)

Technology & innovation			0.765	0.679	0.700	1.131**
			(0.503)	(0.473)	(0.480)	(0.454)
FDI share * Technology & Innovation			-4.134	-4.026	-4.038	-3.147
			(2.761)	(2.882)	(2.873)	(3.931)
Quality of institutions				1.296	1.267	1.603
				(1.262)	(1.279)	(1.707)
FDI share* Quality of Institutions				-1.054	-0.783	5.709
				(3.904)	(4.261)	(7.719)
Trade share					0.00623	0.0299
					(0.0237)	(0.0417)
Total population						1.76e-05
						(1.72e-05)
Size of the country						1.78e-05*
						(9.80e-06)
Distance from equator						0.177***
						(0.0488)
Constant	4.371*	4.504	4.162	-1.806	-1.900	-7.372
	(2.447)	(3.890)	(3.616)	(4.922)	(5.139)	(6.317)
Observations	72	70	70	70	70	62
Number of c_id	8	8	8	8	8	8
R Square	0.0403	0.2341	0.4933	0.3691	0.3651	0.9854
Robust standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						
Source: Author, 2016. Based on several sources						

Annex 39

Model 7. Manufacturing FDI, growth of income in lowest income decile and interaction terms

	Model 7.1	Model 7.2	Model 7.3	Model 7.4	Model 7.5	Model 7.6
VARIABLES	income growth	income growth	income growth	income growth	income growth	income growth
FDI in manufacturing sector	-1.371	-1.349	-1.495	3.561	3.177	-3.001
	(1.094)	(1.018)	(1.092)	(4.270)	(4.184)	(9.346)
Absorptive capacity	-0.112	-0.250	-0.517	-0.658	-0.734	-0.605
	(0.165)	(0.196)	(0.474)	(0.612)	(0.670)	(0.453)
FDI share * Absorptive capacity	0.179	0.266	0.400	0.555	0.506	0.327
	(0.142)	(0.244)	(0.401)	(0.407)	(0.369)	(0.432)
Tertiary enrollment		0.0412	0.0434	0.0403	0.0199	-0.203*
		(0.0443)	(0.0445)	(0.0536)	(0.0717)	(0.110)
FDI share * Tertiary enrollment		-0.0261	-0.0434	-0.0138	-0.00139	0.174
		(0.0560)	(0.0720)	(0.0944)	(0.0998)	(0.211)
Technology & innovation			0.323	0.220	0.323	0.970
			(0.416)	(0.376)	(0.506)	(0.718)
FDI share * Technology & Innovation			-0.0557	0.0581	-0.0179	-1.383
			(0.324)	(0.291)	(0.357)	(1.695)
Quality of institutions				1.098	1.063	0.793
				(0.971)	(0.960)	(1.166)
FDI share* Quality of Institutions				-1.214	-1.087	0.701
				(1.064)	(1.025)	(2.206)
Trade share					0.0246	0.0410
					(0.0358)	(0.0339)

Total population						3.50e-05***
						(1.02e-05)
Size of the country						3.68e-06
						(3.96e-06)
Distance from equator						0.116***
						(0.0446)
Constant	4.180**	4.639*	4.760*	-0.412	-1.315	-4.808
	(1.644)	(2.743)	(2.694)	(3.640)	(4.145)	(5.199)
Observations	72	70	70	70	70	62
Number of c_id	8	8	8	8	8	8
R Sqaure	0.6642	0.2973	0.3069	0.2553	0.33	0.9797
Robust standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						
Source: Author, 2016. Based on several sources						

Annex 40

Model 8. Resource FDI, growth of income in lowest income decile and interaction terms

	Model 8.1	Model 8.2	Model 8.3	Model 8.4	Model 8.5	Model 8.6
VARIABLES	income growth	income growth	income growth	income growth	income growth	income growth
FDI in resource sector	-2.451	-0.772	0.740	-0.820	-3.201	-3.361
	(3.017)	(1.476)	(1.483)	(8.516)	(9.500)	(14.48)
Absorptive capacity	-0.138	-0.373	-0.713	-0.867	-1.063	-1.053*
	(0.236)	(0.243)	(0.492)	(0.668)	(0.738)	(0.628)
FDI share * Absorptive capacity	0.308	0.733***	1.279**	1.342**	1.382**	1.371*
	(0.352)	(0.259)	(0.554)	(0.618)	(0.674)	(0.798)
Tertiary enrollment		0.129***	0.113**	0.124*	0.0919	-0.125*
		(0.0345)	(0.0571)	(0.0687)	(0.0781)	(0.0723)

FDI share * Tertiary enrollment		-0.376***	-0.344**	-0.368**	-0.389*	-0.534**
		(0.117)	(0.154)	(0.179)	(0.210)	(0.245)
Technology & innovation			0.754	0.714	0.950	1.276**
			(0.566)	(0.570)	(0.739)	(0.624)
FDI share * Technology & Innovation			-1.626	-1.739	-2.028	-1.865
			(1.039)	(1.282)	(1.556)	(2.071)
Quality of institutions				0.790	0.690	1.374
				(1.281)	(1.273)	(1.598)
FDI share* Quality of Institutions				0.383	0.993	1.188
				(2.190)	(2.473)	(3.537)
Trade share					0.0500	0.0706**
					(0.0399)	(0.0312)
Total population						3.39e-05***
						(1.07e-05)
Size of the country						9.75e-06
						(6.47e-06)
Distance from equator						0.143***
						(0.0358)
Constant	4.409*	4.378	3.814	0.00397	-1.728	-9.900
	(2.390)	(3.004)	(2.693)	(5.227)	(5.912)	(7.402)
Observations	72	70	70	70	70	62
Number of c_id	8	8	8	8	8	8
R Square	0.1612	0.028	0.0616	0.0472	0.0908	0.9614
Robust standard errors in parentheses						
*** p<0.01, ** p<0.05, * p<0.1						
Source: Author, 2016. Based on several sources						

Annex 41

Model 6. Service FDI, growth of income in lowest income decile and interaction terms

	Model 9.1	Model 9.2	Model 9.3	Model 9.4	Model 9.5	Model 9.6
VARIABLES	income growth	income growth	income growth	income growth	income growth	income growth
FDI in service sector	0.172	0.137	-0.0886	5.052	2.844	0.0232
	(2.845)	(3.483)	(3.309)	(4.613)	(4.984)	(5.646)
Absorptive capacity	-0.0224	-0.269	-0.584	-0.861	-0.998	-0.810
	(0.158)	(0.208)	(0.459)	(0.582)	(0.616)	(0.552)
FDI share * Absorptive capacity	-0.0104	0.432	0.504	0.871	0.791	0.566
	(0.280)	(0.476)	(0.655)	(0.593)	(0.538)	(0.608)
Tertiary enrollment		0.0989**	0.124*	0.138**	0.110	-0.110
		(0.0467)	(0.0653)	(0.0692)	(0.0711)	(0.103)
FDI share * Tertiary enrollment		-0.170**	-0.270**	-0.309**	-0.320**	-0.294**
		(0.0744)	(0.138)	(0.156)	(0.153)	(0.139)
Technology & innovation			0.308	0.182	0.372	0.551
			(0.482)	(0.496)	(0.601)	(0.549)
FDI share * Technology & Innovation			0.388	0.787	0.572	0.829
			(0.967)	(1.217)	(1.274)	(1.151)
Quality of institutions				1.364	1.203	1.762
				(1.071)	(1.062)	(1.234)
FDI share* Quality of Institutions				-1.450	-0.852	-0.517
				(0.983)	(1.118)	(1.132)
Trade share					0.0484	0.0536
					(0.0373)	(0.0343)
Total population						3.01e-05***
						(1.10e-05)
Size of the country						7.51e-06
						(5.04e-06)
Distance from equator						0.145***
						(0.0418)
Constant	3.358**	3.450	3.447	-2.709	-4.121	-10.35*
	(1.604)	(2.910)	(2.780)	(4.297)	(5.031)	(5.617)
Observations	72	70	70	70	70	62
Number of c_id	8	8	8	8	8	8
R Square	0.1288	0.1509	0.1839	0.2111	0.4398	0.9607
Robust standard errors in parentheses						

*** p<0.01, ** p<0.05, * p<0.1

Source: Author, 2016. Based on several sources

Annex 42

Role of absorptive capacity in determining the relationship between FDI and growth of Gini coefficient by sector

VARIABLES	Total FDI Gini growth	Hitech FDI Gini growth	Manufacturing FDI Gini growth	Resource FDI Gini growth	Service FDI Gini growth
Total FDI	0.0239	-3.146**	0.00257	0.762**	0.238
	(0.04)	(1.43)	(0.04)	(0.37)	(0.32)
Air infrastructure	0.00223	0.00254**	0.00227	0.00312*	0.00201
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Electricity consumption	-0.00100***	-0.00118***	-0.00102***	-0.00103***	-0.000979***
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
quality of electricity supply	0.274**	0.451***	0.284***	0.295***	0.270**
	(0.11)	(0.13)	(0.11)	(0.10)	(0.11)
International internet bandwidth	0.000277	0.000415	0.000266	0.000412	0.000304
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Internet users	-0.0254	-0.0466	-0.0264	-0.0576	-0.0272
	(0.06)	(0.06)	(0.06)	(0.06)	(0.05)
Mobile subscription	-0.0183*	-0.0190**	-0.0185*	-0.0145	-0.0177*
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
University-industry collaboration in R&D	-0.478	-0.941	-0.442	-0.789	-0.482
	(0.84)	(0.70)	(0.83)	(0.77)	(0.84)
Trade as % of GDP	0.0242	0.0177	0.0250	0.0230	0.0233
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Initial per capita GDP growth	-0.0682	-0.0936*	-0.0653	-0.0321	-0.0655
	(0.07)	(0.05)	(0.07)	(0.08)	(0.06)
Initial Gini coef.	-1.422	5.557**	-1.264	-3.926*	-1.331
	(1.11)	(2.74)	(1.24)	(2.18)	(1.18)
Total population	9.38e-06*	1.10e-05**	9.62e-06*	9.41e-06**	1.03e-05*
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Size of country	4.02e-06	1.02e-07	3.87e-06	1.70e-06	4.41e-06

	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Distance from equator	-0.0437***	-0.0310***	-0.0420***	-0.0427***	-0.0476***
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Constant	-0.799	-2.128	-1.051	1.220	-0.894
	(3.51)	(2.59)	(3.50)	(3.50)	(3.65)
Observations	40	40	40	40	40
Number of countries	15	15	15	15	15
R-squared	0.6994	0.7658	0.7003	0.7718	0.4441

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Author 2016. Based on various sources

Annex 43

Role of human capital in determining impact of sectoral FDI on growth of Gini coefficient

VARIABLES	Total FDI Gini growth	Hitech FDI Gini growth	Manufacturing FDI Gini growth	Resource FDI Gini growth	Service FDI Gini growth
FDI as share of GDP	0.0129	-1.569	-0.00348	0.106**	0.0414
	(0.03)	(1.06)	(0.03)	(0.05)	(0.28)
Human capital	-0.0340**	-0.0353***	-0.0343**	-0.0337**	-0.0339**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Trade as % of GDP	0.00159	0.000755	0.00160	0.00292	0.00166
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Initial per capita GDP growth	-0.000411	-0.00565	-0.000688	-0.00285	-5.05e-05
	(0.04)	(0.04)	(0.04)	(0.04)	(0.04)
Initial Gini coef.	-4.478	-3.330	-4.432	-4.613	-4.436
	(4.01)	(3.53)	(4.04)	(3.88)	(4.05)
Total population	4.93e-06	4.48e-06	4.99e-06	5.15e-06	5.06e-06
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Size of country	2.48e-06	2.47e-06	2.34e-06	2.63e-06	2.47e-06
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Distance from equator	-0.0226	-0.0184	-0.0222	-0.0229	-0.0225
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Constant	1.092	0.808	1.100	1.010	1.065
	(1.51)	(1.39)	(1.51)	(1.51)	(1.53)
Observations	93	93	93	93	93
Number of countries	25	25	25	25	25
R-squared	0.3015	0.2784	0.2984	0.3002	0.303

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Source: Author, 2016. Based on various sources

Annex 44

Role of technology and innovation in determining the impact of sectoral FDI on growth of Gini coefficient

VARIABLES	Total FDI Gini growth	Hitech FDI Gini growth	Manufacturing FDI Gini growth	Resource FDI Gini growth	Service FDI Gini growth
FDI as share of GDP	0.0298	-0.940	0.0521	-0.00643	0.0266
	(0.03)	(0.64)	(0.03)	(0.11)	(0.27)
Scientific and technical journal articles	0.000139	0.000141	0.000147	0.000120	0.000123
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Availability of latest technology	-0.329**	-0.401**	-0.325**	-0.336**	-0.338**
	(0.14)	(0.16)	(0.14)	(0.14)	(0.14)
FDI and technology transfer	0.139	0.197	0.132	0.131	0.132
	(0.11)	(0.12)	(0.11)	(0.11)	(0.11)
Patents	-0.0125	-0.0122	-0.0132	-0.0116	-0.0117
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Trade as % of GDP	-0.000383	0.000603	-0.000456	0.000337	0.000413
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Initial per capita GDP growth	0.00563	0.00100	0.00829	0.00622	0.00626
	(0.05)	(0.05)	(0.05)	(0.05)	(0.05)
Initial Gini coef.	-3.272	-2.089	-3.248	-3.123	-3.130
	(3.46)	(3.26)	(3.49)	(3.53)	(3.52)
Total population	2.73e-06	2.58e-06	2.55e-06	3.55e-06	3.50e-06
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

Size of country	1.20e-06	9.16e-07	1.17e-06	9.26e-07	1.02e-06
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Distance from equator	-0.0352*	-0.0310	-0.0363*	-0.0335*	-0.0338
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Constant	1.167	0.746	1.191	1.159	1.140
	(1.38)	(1.31)	(1.37)	(1.41)	(1.41)
Observations	112	112	112	112	112
Number of countries	26	26	26	26	26
R-squared	0.318	0.3043	0.3124	0.3215	0.3219

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Author 2016. Based on various sources

Annex 45

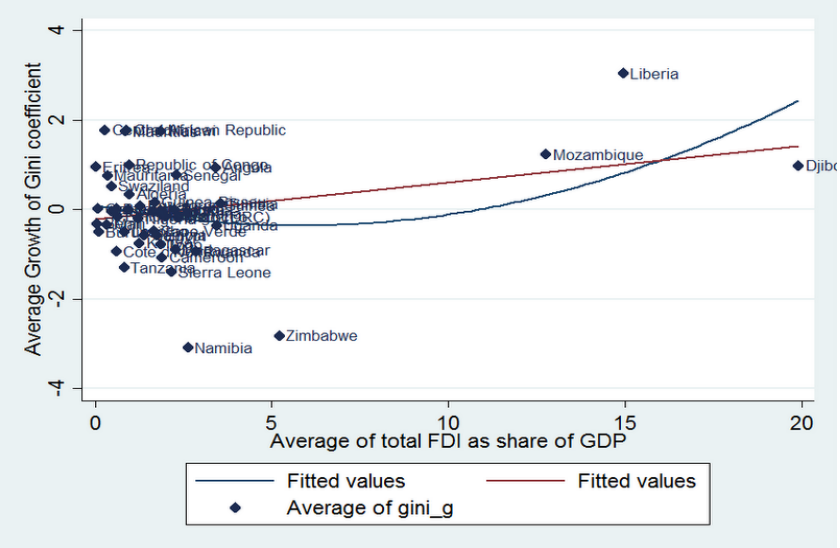
Role of quality of institutions in determining the impact of sectoral FDI on growth of Gini coefficient

VARIABLES	Total FDI Gini growth	Hitech FDI Gini growth	Manufacturing FDI Gini growth	Resource FDI Gini growth	Service FDI Gini growth
Total FDI	0.0377	-1.198	0.0344	0.0682**	0.0834
	(0.03)	(0.90)	(0.04)	(0.03)	(0.23)
Intellectual property protection	0.00183	-0.0346	0.000924	0.00625	0.00954
	(0.08)	(0.08)	(0.08)	(0.08)	(0.08)
Public trust in politicians	-0.398	-0.419	-0.373	-0.375	-0.353
	(0.43)	(0.42)	(0.43)	(0.42)	(0.40)
Judicial independence	0.0922	0.0604	0.0955	0.107	0.115
	(0.22)	(0.22)	(0.22)	(0.21)	(0.22)
Transparency of government in policymaking	-0.0703	-0.107	-0.0767	-0.0751	-0.0787
	(0.08)	(0.07)	(0.08)	(0.08)	(0.07)
Ethical behaviour of firms	0.508	0.509	0.493	0.469	0.425
	(0.56)	(0.53)	(0.57)	(0.54)	(0.54)
Strength of auditing and reporting standards	-0.663*	-0.533	-0.660*	-0.616*	-0.641*
	(0.37)	(0.34)	(0.38)	(0.37)	(0.36)
Strength of investor protection	0.264*	0.279**	0.264*	0.250*	0.264**
	(0.14)	(0.13)	(0.14)	(0.13)	(0.13)

Trade as % of GDP	-0.00776	-0.00891	-0.00850	-0.00687	-0.00840
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Initial per capita GDP growth	0.00846	0.0116	0.00888	0.00801	0.00784
	(0.06)	(0.05)	(0.06)	(0.05)	(0.06)
Initial Gini coef.	-3.274	-1.995	-3.174	-3.254	-3.126
	(4.10)	(3.72)	(4.19)	(4.09)	(4.20)
Total population	-1.08e-06	-2.22e-06	-1.12e-06	-8.10e-07	-1.10e-06
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Size of country	-2.47e-06	-2.55e-06	-2.67e-06	-2.49e-06	-2.64e-06
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Distance from equator	-0.0238	-0.0170	-0.0235	-0.0227	-0.0227
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)
Constant	1.926	1.343	1.979	1.767	1.965
	(1.79)	(1.67)	(1.79)	(1.86)	(1.80)
Observations	99	99	99	99	99
Number of countries	25	25	25	25	25
R-squared	0.3783	0.3219	0.3754	0.3657	0.3801

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Author 2016. Based on various sources

Figure 1:scatterplot of Growth of Gini coefficient and FDI as percentage of GDP with regression line



Source: Author, 2016. Based on Oxford Economics and FDI Markets (2006-2014), prepared in STATA

Figure 1:scatterplot of Growth of Gini coefficient and FDI as percentage of GDP with regression line

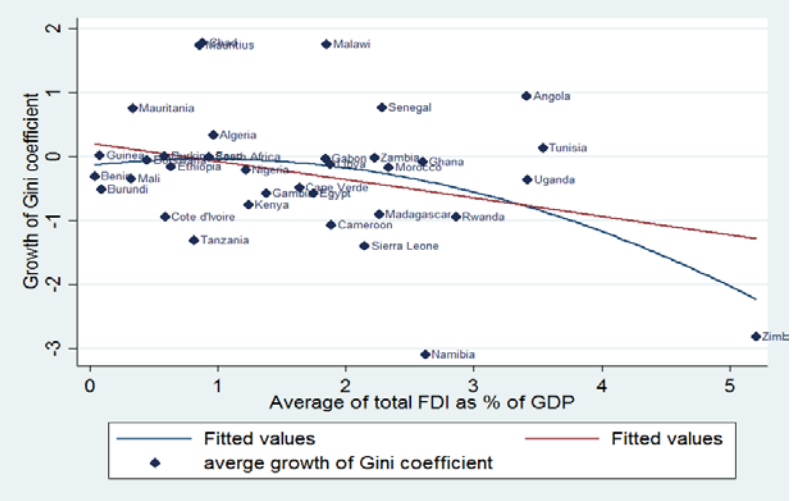
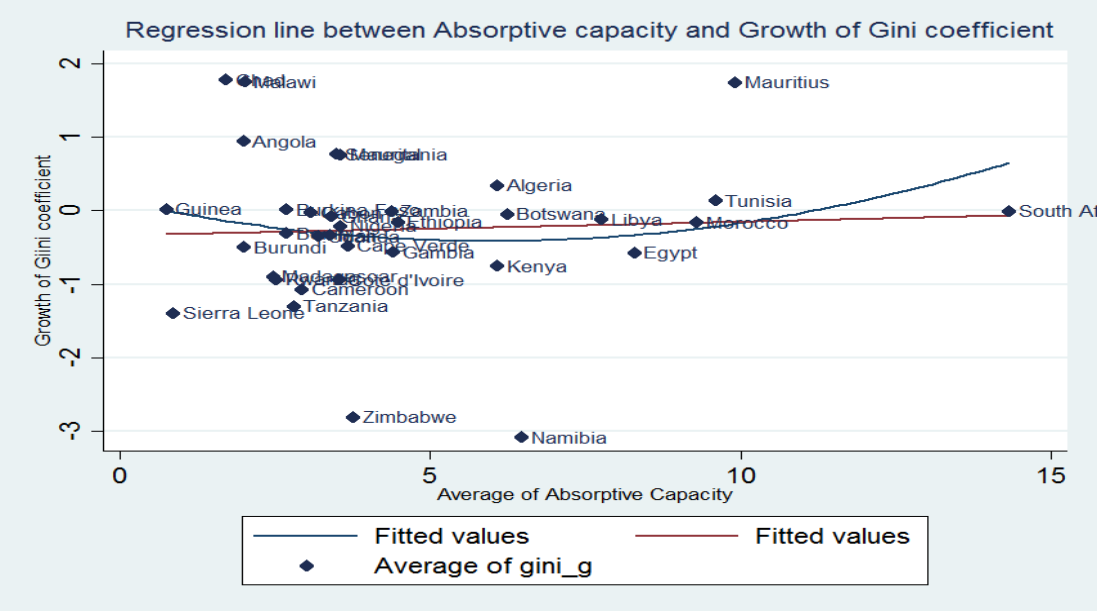
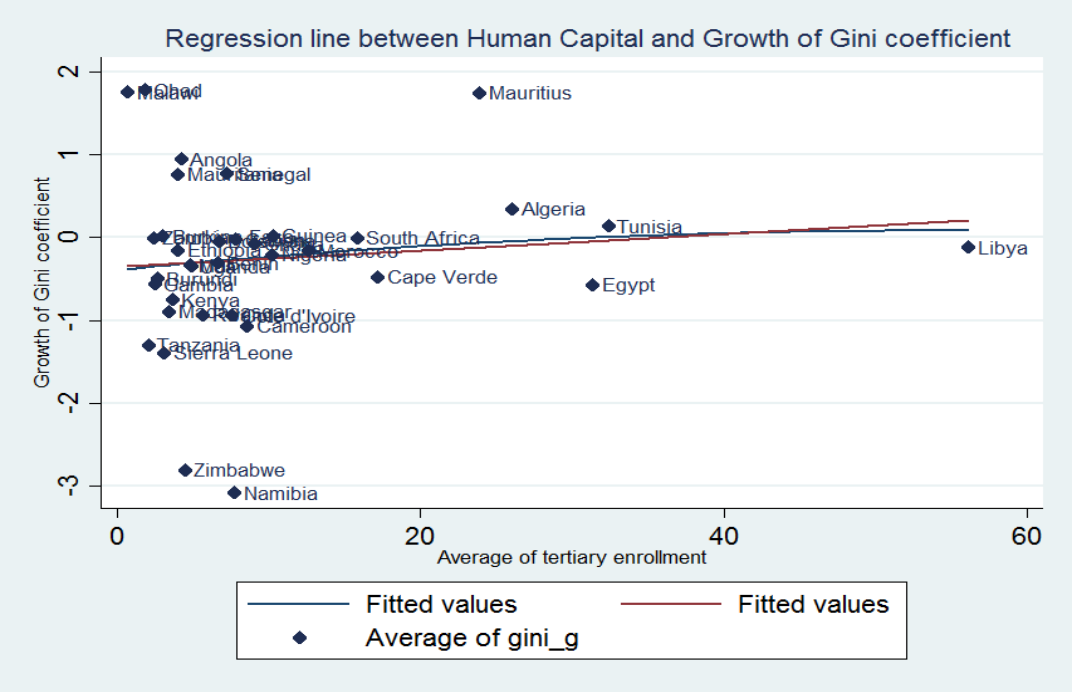
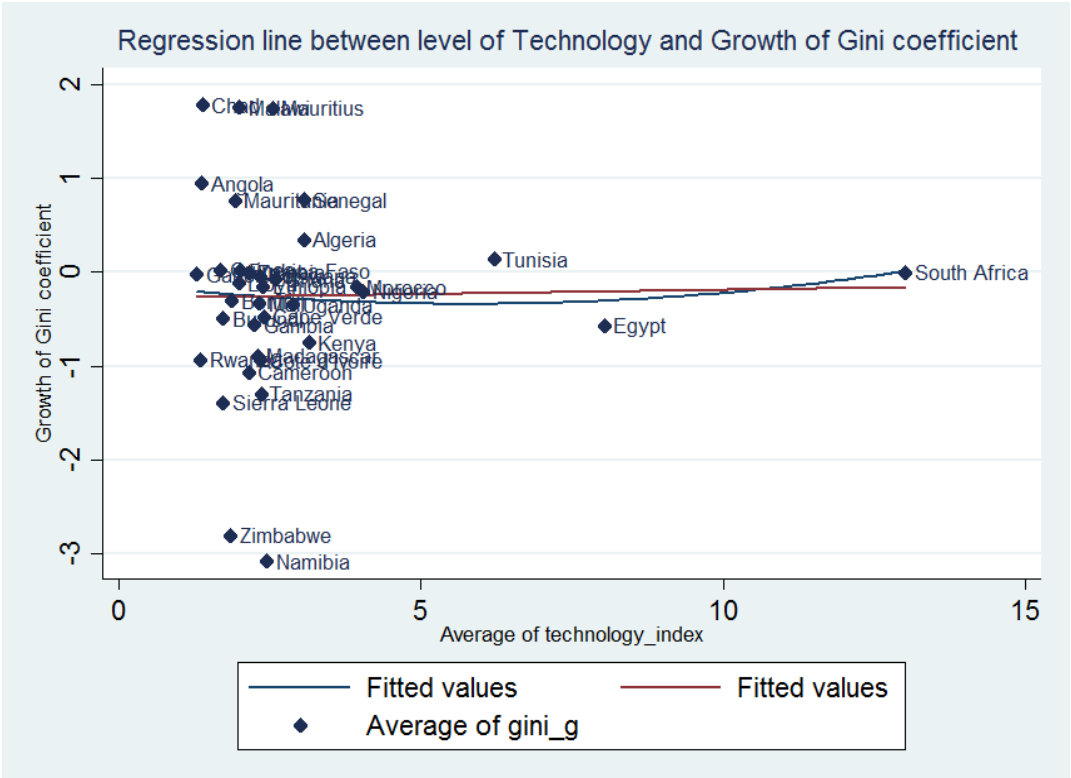
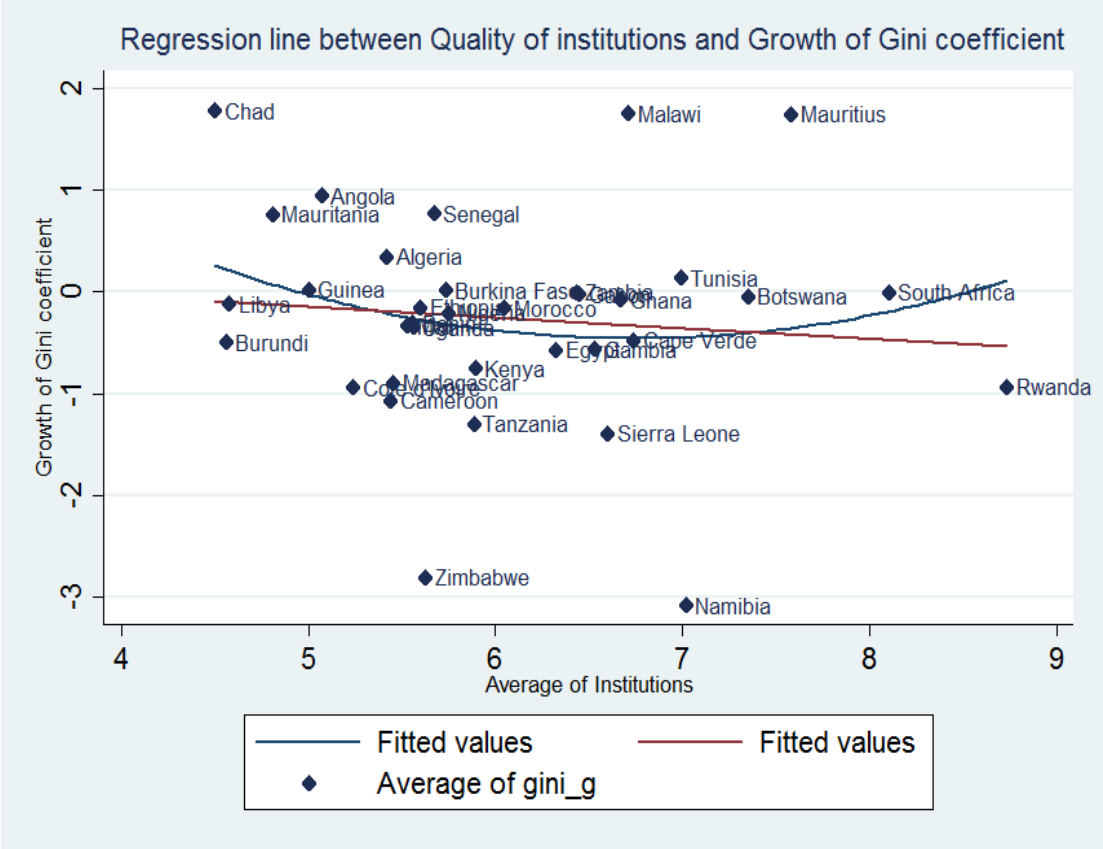


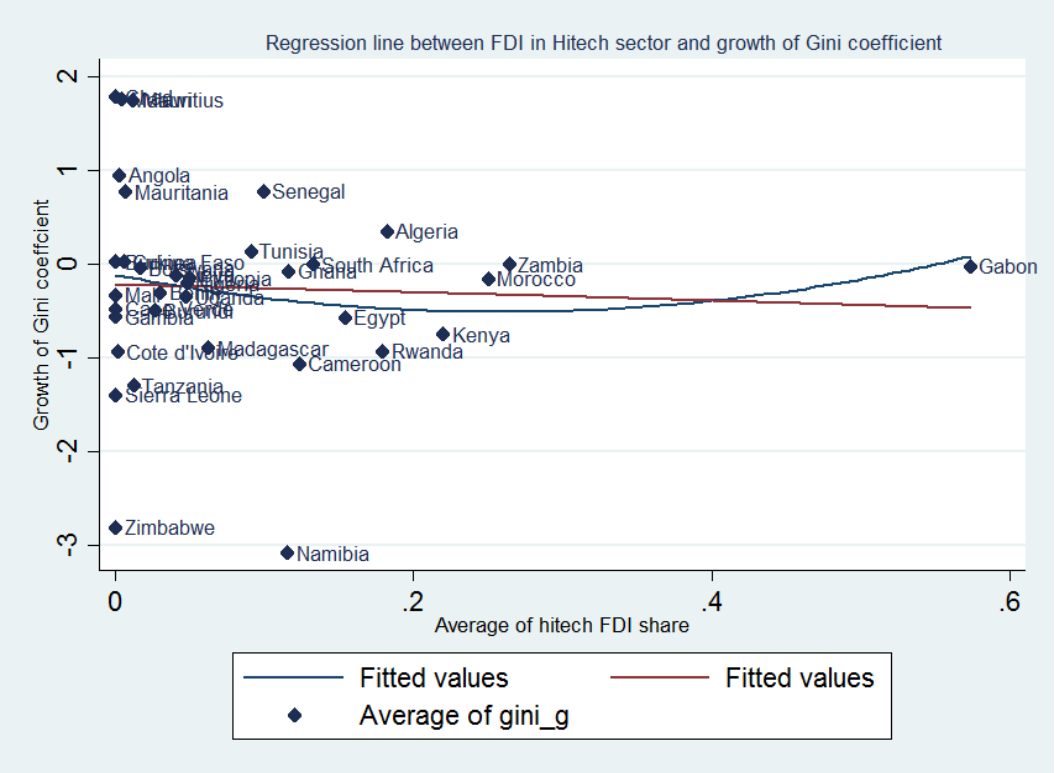
Figure 1:scatterplot of Growth of Gini coefficient and FDI as percentage of GDP with regression line

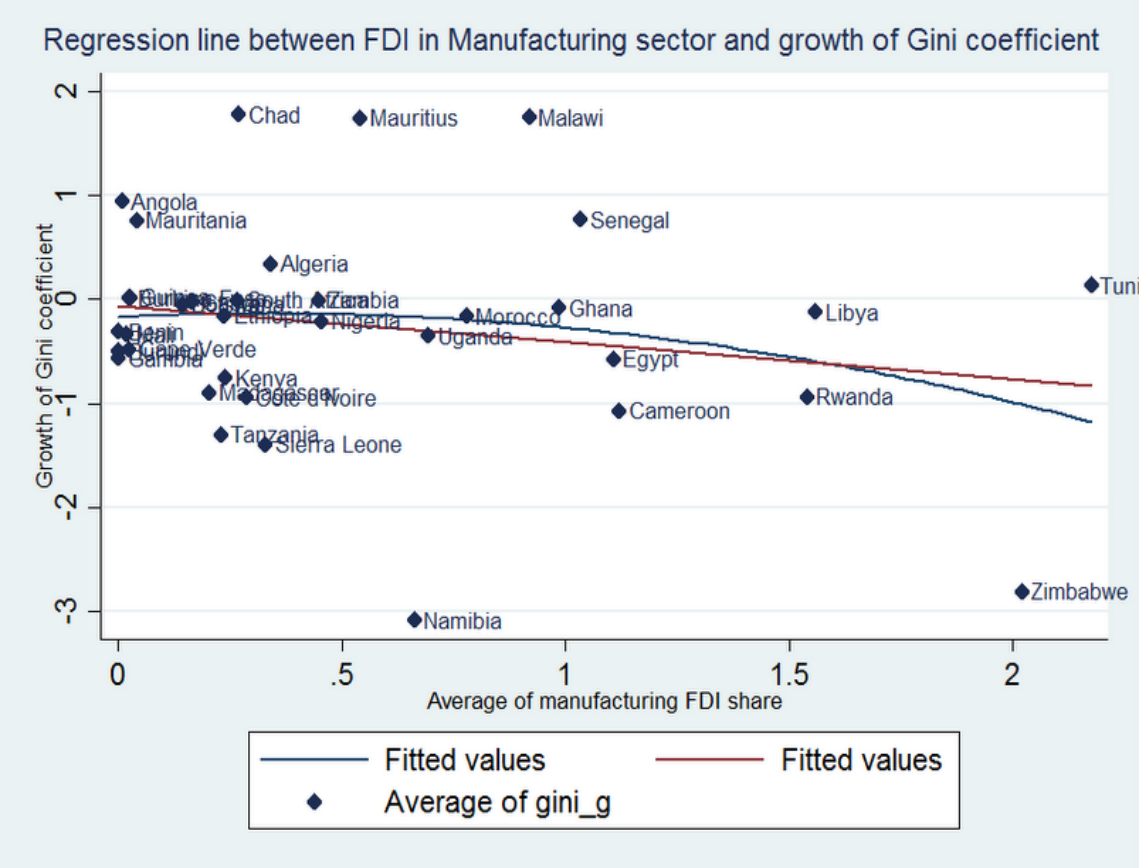


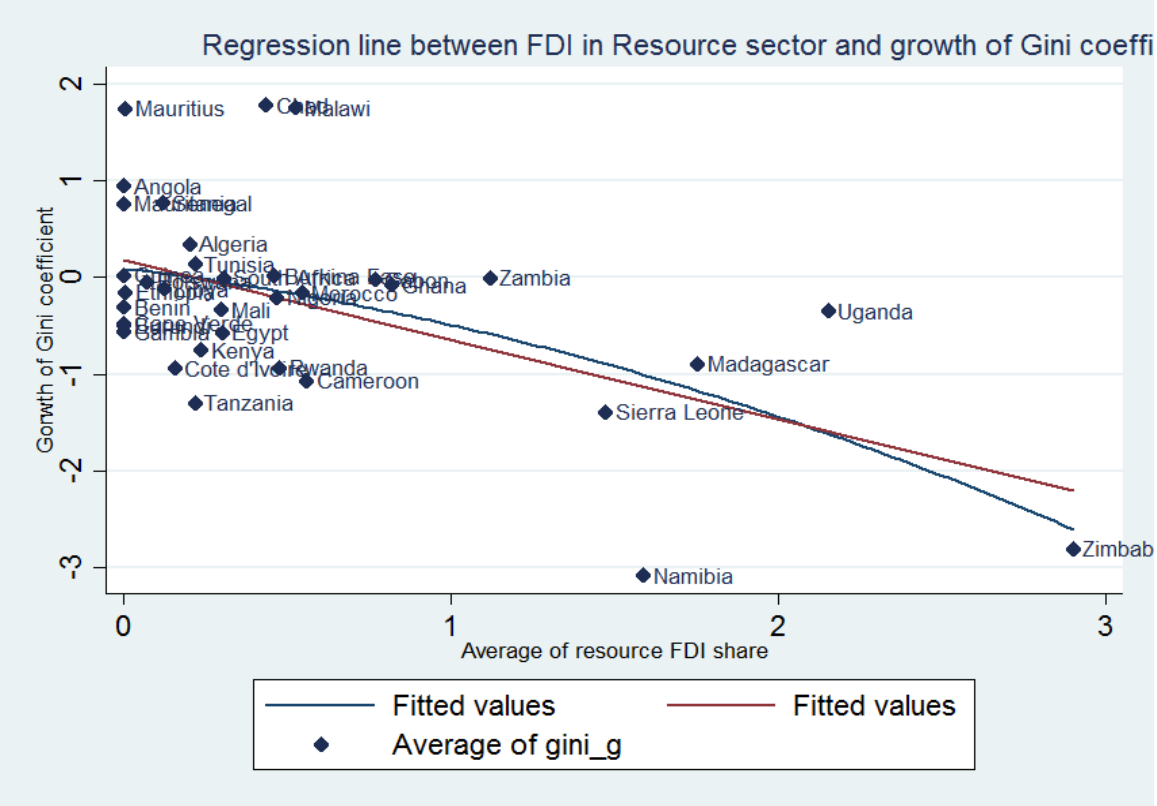

Regression line between Human Capital and Growth of Gini coefficient
Growth of Gini coefficient
Average of tertiary enrollment
Mauritius
Angola
Algeria
Tunisia
South Africa
Libya
Cape Verde
Egypt
Cameroon
Tanzania
Sierra Leone
Zimbabwe
Namibia
Fitted values
Fitted values
Average of gini_g

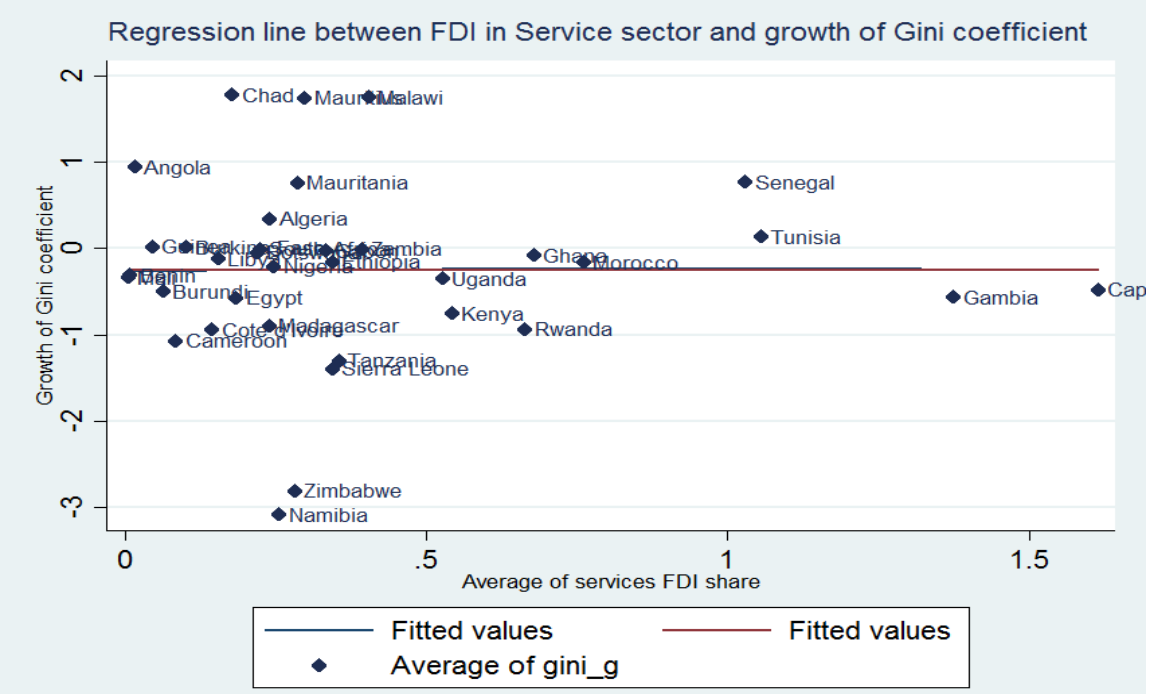

Regression line between level of Technology and Growth of Gini coefficient
Growth of Gini coefficient
Average of technology_index
Mauritius
Angola
Algeria
Tunisia
South Africa
Egypt
Kenya
Cameroon
Tanzania
Sierra Leone
Zimbabwe
Namibia
Fitted values
Fitted values
Average of gini_g


Regression line between Quality of institutions and Growth of Gini coefficient
Growth of Gini coefficient
Average of Institutions
Chad
Malawi
Mauritius
Angola
Mauritania
Senegal
Algeria
Tunisia
Guinea
Libya
Botswana
South Africa
Ghana
Morocco
Burundi
Cape Verde
Kenya
Rwanda
Cameroon
Tanzania
Sierra Leone
Zimbabwe
Namibia
Fitted values
Fitted values
Average of gini_g


Regression line between FDI in Hitech sector and growth of Gini coefficient
Growth of Gini coefficient
Average of hitech FDI share
Angola
Mauritania
Senegal
Algeria
Tunisia
South Africa
Zambia
Morocco
Gabon
Egypt
Kenya
Madagascar
Rwanda
Cameroon
Tanzania
Sierra Leone
Zimbabwe
Namibia
Fitted values
Fitted values
Average of gini_g


Regression line between FDI in Manufacturing sector and growth of Gini coefficient
Growth of Gini coefficient
2
1
0
-1
-2
-3
Chad
Mauritius
Malawi
Angola
Mauritania
Senegal
Algeria
Tuni
Zambia
Morocco
Ghana
Libya
Ethiopia
Nigeria
Uganda
Egypt
Kenya
Cote d'Ivoire
Rwanda
Cameroon
Tanzania
Sierra Leone
Zimbabwe
Namibia
0
.5
1
1.5
2
Average of manufacturing FDI share
Fitted values
Fitted values
Average of gini_g


Regression line between FDI in Resource sector and growth of Gini coeffi
Gorwth of Gini coefficient
2
1
0
-1
-2
-3
Mauritius
Malawi
Angola
Algeria
Tunisia
Zambia
Uganda
Mali
Egypt
Kenya
Madagascar
Rwanda
Cameroon
Tanzania
Sierra Leone
Namibia
0
1
2
3
Average of resource FDI share
Fitted values
Fitted values
Average of gini_g


Regression line between FDI in Service sector and growth of Gini coefficient
Growth of Gini coefficient
2
1
0
-1
-2
-3
Chad
Angola
Mauritania
Senegal
Algeria
Tunisia
Ghana
Morocco
Uganda
Egypt
Kenya
Rwanda
Gambia
Madagascar
Cameroon
Tanzania
Sierra Leone
Zimbabwe
Namibia
0
.5
1
1.5
Average of services FDI share
Fitted values
Fitted values
Average of gini_g

Annex 2: IHS copyright form

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