Summer 8-4-2022

Effects of Foreign Direct Investment on Inclusive Growth and Employment

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doi: https://doi.org/10.57709/30628201

ABSTRACT

EFFECTS OF FOREIGN DIRECT INVESTMENT ON
INCLUSIVE GROWTH AND EMPLOYMENT

BY

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August, 2022

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This dissertation studies the effects of foreign direct investment (FDI) on inclusive growth and employment. The first chapter examines the conditions under which FDI can effectively lead to inclusive growth. By using a fixed effects regression with annual data for 67 countries from 1990 to 2015, we find that FDI has a positive effect on inclusive growth when there is a sufficiently large manufacturing sector and infrastructure base in the host country. We also indirectly find that FDI has a positive effect on inclusive growth when the host country has a large service sector. These not very optimistic results emphasize the critical importance of the host country's absorptive capacity. A smaller technological or knowledge gap with the foreign firms is required for FDI to lead to more linkages and spillovers, and ultimately job creation for the poor.

The second chapter looks at the effect of manufacturing FDI on manufacturing employment in Sub-Saharan African countries, by using annual data for 16 manufacturing industry sectors in 15 SSA countries from 2003 to 2018. In the first analysis, we find that manufacturing FDI has a positive effect on manufacturing employment at the industry sector level. In the second analysis, we look at how the effect of manufacturing FDI on manufacturing employment differs by groups of industry sectors. The results show that the effect of manufacturing FDI on employment creation

varies by industry sector groups; automotive related industries create the most, followed by business machines/electronics related industries, and lastly metals/minerals related industries. The result reflects both direct and indirect employment effects via spillovers and forward and backward linkages.

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A Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree
of
Doctor of Philosophy
in the
Andrew Young School of Policy Studies
of
Georgia State University

GEORGIA STATE UNIVERSITY
2022

ACCEPTANCE

This dissertation was prepared under the direction of the candidate's Dissertation Committee. It has been approved and accepted by all members of that committee, and it has been accepted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Economics in the Andrew Young School of Policy Studies of Georgia State University.

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August, 2022

ACKNOWLEDGEMENTS

I am truly grateful to complete this dissertation that study topics that I am passionate about and wish to expand upon in future endeavors. First, I thank and praise God for all His guidance, amazing love, and grace along this journey.

I want to express my utmost gratitude to Dr. Jorge Martinez-Vazquez; he has been the most helpful, supportive, inspirational, and kind advisor I could ever ask for. His wisdom, knowledge, heart, and academic fervor is admirable; it has been one of the biggest blessings of my PhD journey to be advised by him, and I have learned and benefited so much from his leadership and guidance. I truly thank my committee: Dr. Andrew Feltenstein's feedback and advice based on his rich knowledge and experience from across the world has provided invaluable insight and perspective that expanded my view beyond research to think deeply about real world applications and historical precedents. Dr. Sally Wallace has provided extremely helpful input that is policy-oriented and important for practical application, and her comments have helped improve details of the paper overall. I greatly appreciate how her questions have helped me think critically about practical policy implications. Dr. Paul Smoke has been greatly supportive despite the distance, and provided important insights from development policy related issues to details of the model and variables, which have enriched the completion of the research.

I also sincerely thank Dr. Thomas Mroz; his help and guidance was vital in the initial development of the first chapter, especially in building the model. I also couldn't have made through the program without my cohort, especially during the first two years, as they were almost like private tutors to someone who did not come from an economics background. I am also grateful to other amazing friends that have been great emotional and spiritual support throughout the years, thank you all! Lastly, I thank my amazing family for their unconditional support and love all the way.

I have learned so much throughout my PhD journey, that although it was so challenging at times, I would not trade it for anything else. Thank you all, I will always cherish so many beautiful memories from this exceptional school and city!

Table of Contents

List of Tables

List of Figures

Introduction

This dissertation studies the effects of foreign direct investment (FDI) on inclusive growth and employment. The first chapter examines the conditions under which FDI can effectively lead to inclusive growth. Foreign Direct Investment (FDI) is widely considered among the most effective instruments for the promotion of economic development. However, not all FDI leads to inclusive economic growth, lifting the welfare of the poorest groups. Using a fixed effects regression with annual data for 67 countries from 1990 to 2015, we find that FDI has a positive effect on inclusive growth when there is a sufficiently large manufacturing sector and infrastructure base in the host country. We also indirectly find that FDI has a positive effect on inclusive growth when the host country has a large service sector. These not very optimistic results emphasize the critical importance of the host country's absorptive capacity. A smaller technological or knowledge gap with the foreign firms is required for FDI to lead to more linkages and spillovers, and ultimately job creation for the poor. The results cast doubt on development strategies that rely on FDI as a sufficient policy for inclusive growth.

The second chapter looks at the effect of manufacturing FDI on manufacturing employment in Sub-Saharan African countries. Sub-Saharan Africa(SSA)'s labor market has long struggled—data from the past two decades show that vulnerable employment consists of more than two thirds of employment, and, closely related, that 60-80% of employment comes from the informal sector. Industry-wise, the highest share of employment is in agriculture while the least is in manufacturing, and this trend is not expected to change, since most of the new jobs created in the past two decades have been in agriculture. With the expectation of the working-age population in the region to experience a net increase of 20 million per year over the next two decades, the need for sustained employment creation becomes more critical. And much of the

hope for a solution has been placed on the role of foreign direct investment (FDI). Using annual data for 16 manufacturing industry sectors in 15 SSA countries from 2003 to 2018, we find that manufacturing FDI has a positive effect on manufacturing employment at the industry sector level. We also look at how the effect of manufacturing FDI on manufacturing employment differs by groups of industry sectors. The results show that the effect of manufacturing FDI on employment creation varies by industry sector groups; automotive related industries create the most, followed by business machines/electronics related industries, and lastly metals/minerals related industries. The result reflects both direct and indirect employment effects via spillovers and forward and backward linkages. The paper implies that SSA countries would improve their labor market by attracting manufacturing FDI, which should also contribute to their industrial diversification/structural transformation.

Chapter 1

When Does Foreign Direct Investment Lead to Inclusive Growth?

1.1 Introduction

Foreign direct investment (FDI) is known to positively affect a host country's economy, by creating knowledge, productivity, and technology spillovers and forward and backward linkages with local economic agents that lead to employment growth and local economic growth (Rodriguez-Clare, 1996; Markusen & Venables, 1997; Javorcik, 2004; Ping & Saggi, 2007). Previous studies have shown that the extent of these benefits largely differs based on the nature, density, and depth of the linkages created with local firms, all of which depend on the absorptive capacity of the host country. In turn, additional studies have shown that a country's absorptive capacity increases with the following factors: a small technological gap, the quality of the financial system, the quality of institutions, and higher levels of GDP per capita and education (Hermes & Lensink, 2003; Alfaro et al., 2004; Buchanan et al., 2012; Nunnenkamp and Spatz, 2003).

While these studies have estimated the extent to which FDI can benefit a host country's economic growth based on the host country's economic conditions or characteristics, to date there have been no studies specifically researching the question of how this dynamic may affect inclusive growth, that is, growth benefiting the lowest income groups in society. The main goal of this paper is to fill this gap. We use panel data for 67 countries between 1990-2015 to identify the economic conditions under which FDI leads to inclusive growth. Our results show that FDI has a positive effect on inclusive growth when there are high levels of manufacturing and infrastructure in the host country, and also indirectly show that there are positive effects when there are high levels of the service sector. These not very optimistic results emphasize the critical importance of the host country's absorptive capacity. A smaller technological or knowledge gap with the foreign firms is required for FDI to lead to more linkages and spillovers, and ultimately more job creation for the poor. Our empirical results are robust to different measures of GDP per capita and adjusted gross fixed capital formation (AGFCF), to the exclusion of different control variables, dynamic panel estimation, and pairwise comparison of the marginal effect analysis. Overall, our results cast doubt on development strategies that rely on FDI as a sufficient policy for inclusive growth.

The rest of the paper is organized as follows. Section two reviews the literature on inclusive growth and the effectiveness of FDI. Section three develops the theoretical framework. Section four discusses the data and the empirical estimation approach. Section five presents the empirical results. Section six discusses the robustness checks, and section seven concludes.

1.2 Literature Review

Two strands of the economic development literature are relevant to our research question: first, that studying inclusive growth, and second, that studying the economic conditions under which FDI most benefits a host country's economy.

1.2.1 Inclusive Growth

In the 1990s, the term "inclusive growth" or "pro-poor growth"— i.e. gross domestic product growth that leads to poverty reduction (Habito, 2010) — was formally introduced by a number of studies that researched this question (Kakwani & Pernia, 2000; Ali & Son, 2007; Rauniyar & Kanbur, 2010). Various macroeconomic and policy factors have been discussed as potential determinants of inclusive growth including overall government expenditure, government spending on health and education, (general) economic growth, productive employment, infrastructure, macroeconomic stability, human capital or education level, structural changes, fixed investment, trade openness, and foreign direct investment (FDI) (Benabou, 2000; Saint-Paul & Verdier, 1993; Anand et al., 2013).

The previous literature has well established that (general) growth that is broadly based is necessary for inclusive growth (for example, Ali and Zhuang 2007; Klasen 2010). Other studies have focused on how various government expenditures and fiscal policies may affect inclusive growth. For example, Benabou (2000) and Saint-Paul and Verdier (1993) suggest that fiscal policies such as health and education spending can benefit the poor and enhance growth at the same time by improving human capital. Tella and Alimi (2016) use a fixed effects model for a panel of 14 African countries from 1995 to 2012 to also show that government spending focused on health financing was the key to improving rates of inclusive growth. Complementarily, Whajah et al. (2019) use a panel of 54 African countries from 2000 to 2016 and principal component analysis (PCA) to generate a measure of inclusive growth and find that the size of government positively affects inclusive growth while public debt has a negative effect. For upper-middle and high income countries, Muinelo-Gallo and Roca-Sagalés' (2011), using an unbalanced panel of 43 countries between 1972-2006, find that increases in both government current expenditures and direct taxes reduce inequality but also negatively impact economic growth, while public investment is the only government policy that reduces inequality without harming output growth.

Several studies support the positive effect of infrastructure on inclusive growth, especially in developing countries, which are generally characterized by low stocks of public infrastructure (Easterly and Rebelo, 1993; Vellala et al., 2014)). Using a panel of 100 countries from 1960 to 2005, Calderón and Servén (2010) find that the quantity and quality of telephones, roads, and electricity have a significant positive effect on growth and inequality, and specifically that the access of the poor to infrastructure was important for the positive effects on inequality. Similar findings are reported by Estache and Fay (2007) and López (2003).

In addition, several studies have analyzed the effects of macroeconomic factors such as FDI, trade openness, inflation, and financial globalization on inclusive growth. Based on time series data for Nigeria from 1981 to 2014 and employing GDP per person employed as a measurement of inclusive growth, Oluseye and Gabriel (2017) use time series analysis to find that FDI and inflation have a positive effect on inclusive growth. In the long run, FDI still has a positive effect while government consumption, education expenditure, and inflation have a negative effect.[1] Anand et al. (2013) find that macroeconomic stability, gross fixed capital formation, education, trade openness, human capital, and FDI are the foundations for inducing inclusive growth. Similarly, Ayinde and Yinusa (2016) focus on how government spending to achieve financial widening, financial development, greater trade openness, and capital investment may be conducive to inclusive growth. Aoyagi and Ganelli (2015) using a panel of 31 countries between 1992 and 2011, find that fiscal redistribution, trade openness, and productivity positively impact inclusive growth, while inflation, GDP volatility, and unemployment have a negative effect.

A smaller number of studies have analyzed investment by sector to determine which industrial sectors' enhancement may lead to inclusive growth. For example, Ogbu (2012), observing the poverty problem in Nigeria, suggests how industrial policies focused on improving

[1] In this regard, several other studies have found that spending on higher education that is disproportionate to basic education spending can also lead to higher income inequality. See, for example, Lustig (2016) and Inchauste and Lustig (2017).

the manufacturing sector, in addition to government expenditure that is targeted at infrastructure investment and transforming the agriculture sector, may support inclusive growth. Balakrishnan et al. (2013), based on a sample of developing countries, find that besides expenditure on education and financial reform, increased employment in mining and quarrying, manufacturing, construction, and public utilities leads to increases in inclusive growth.

Finally, there is a diversity of approaches in the literature for how to measure inclusive economic growth. For example, Aoyagi and Ganelli (2015) develop a proxy for inclusive growth that is the weighted average of growth in average income and the change in an equity index accounting for income distribution. Whajah et al. (2019) use principal component analysis to generate a measure for inclusive growth based on data obtained for various indicators such as infrastructure, education, health, and unemployment. Anand et al. (2013) generate a proxy that is the weighted average of growth in average income and of the change in an equity index. Dollar & Kraay (2002) use the average income of the lowest 20% income quantile to study the effect of economic growth on poverty reduction, which was extended in their later study (Dollar, Kleineberg, & Kraay, 2016) to observe policies and institutions that are "pro-poor." In this paper, we adopt Dollar & Kraay's approach.

1.2.2 Foreign Direct Investment

Studies that have explored the effect of FDI on host country's growth have shown in general inconclusive results (Ram & Zhang, 2002; Carkovic & Levine, 2002). On the other hand, a growing number of studies have argued that this may be because FDI's effect on growth depends on the characteristics of the host country that affect the nature and/or amount of linkages and spillovers created by the foreign firms behind those investments (Borensztein et al., 1998;

Nunnenkamp, 2004; Meyer, 2004;Meyer & Sinani, 2009). According to this literature, the spillovers and linkages are maximized when there is less of a gap between the home and host country in terms of technology, knowledge, various institutions, economic development etc., which enables the host country to have sufficient absorptive capacity. From this perspective, it is important to know the conditions of the local economy that help minimize obstacles for the interaction between foreign firms and local economic agents. For example, Rodriguez-Clare (1996) investigates the economic impact of multinationals in developing countries, by developing a two-country model and studying the generation of backward and forward linkages. One result from his model is that, other things equal, the linkage effect is higher when the host country is more economically developed and thus similar to the home country. Empirically, in this regard, Blomström et al. (1992) find that FDI's impact on economic growth is positive only in higher-income developing countries, and de Mello (1997) suggests that a larger technological gap between the host and home country leads to a smaller impact of FDI on economic growth.

Regarding absorptive capacity, Girma (2005) studies its role in FDI's effect on productivity growth, by using firm-level data for British manufacturing during 1989-1999. While he finds that more absorptive capacity generally speeds up spillovers from FDI, the rate diminishes as the absorptive capacity of domestic firms increases. He also finds that there is a minimum absorptive capacity threshold level below which spillovers are negligible or even negative. In addition, Orlic et al. (2018) use firm-level data of local manufacturing firms in five European transition countries—the Czech Republic, Estonia, Hungary, Slovakia, and Slovenia—, and find evidence of backward spillovers in manufacturing and forward spillover effects of FDI in services. They also find that firms with higher levels of absorptive capacity are more likely to benefit from the forward and backward linkages. On the other hand, Girma and Görg (2007) using firm level data for electronics and engineering sectors in the UK find a U-shaped effect of absorptive capacity in mediating FDI's effect on productivity spillovers.

Amendolagine et al. (2013) studied the factors determining the backward linkages of foreign manufacturing firms in 19 Sub-Saharan African countries, highlighting the micro and macro level factors that may lead to higher interactions between foreign subsidiaries and local firms. These authors find that foreign firms that have a knowledge base that is too developed compared to the absorptive capacity of the local economy are less likely to interact with domestic economic agents. These authors also find that the local economy's institutional characteristics, such as a reliable legal system, are necessary for enhancing foreign companies' linkages with domestic firms. Similarly, Borensztein et al. (1998) examine the role of FDI in technology diffusion and economic growth in developing countries by utilizing cross-country data. While they find that FDI is a vehicle for technology transfer and thus contributes to growth, the effect of FDI on economic growth depends on the level of human capital in the host country. Further, other studies have shown that a developed financial system is important for spillovers and linkages from FDI to materialize (Hermes and Lensink, 2003; Alfaro et al., 2004). Other host country characteristics also appear to matter. Nunnenkamp and Spatz (2003) find that the relationship between FDI and growth critically depends on a local economy's characteristics, such as GDP per capita, level of education, and openness to trade. In analyzing the factors behind the backward linkages created by Japanese electronics manufacturing affiliates in 24 countries, Belderbos et al. (2001) find that good quality infrastructure and a large manufacturing sector positively affect the creation of local linkages.

On the other hand, another view in the literature argues that technological backwardness may increase spillovers, due to the large potential for improvement (Findlay 1978; Wang and

Blomström 1992). Some other researchers have suggested a combination of backwardness and absorptive capacity: Findlay (1978) argues that while greater backwardness allows for more opportunities and provides pressure to change, the disparity must not be too wide, which implies the presence of a minimum amount of absorptive capacity. Perhaps similar to this logic, empirical studies that focus on backwardness tend to be based in middle to high income countries; that is, countries that may already have a minimum amount of absorptive capacity. Castellani and Zanfei (2003) study the manufacturing sector in France, Italy, and Spain during 1992-1997, and find that higher productivity gaps tend to lead to positive effects of FDI, while absorptive capacity does not facilitate productivity spillovers from FDI. Griffith et al. (2002) observe 13,000 establishments in the United Kingdom from 1980 to 1992, and find that the presence of foreign multinationals, that makes up a large proportion of the technological frontier, positively affect productivity growth in domestic firms with technology spillover effects. Peri and Urban (2006) using firm-level data for German and Italian manufacturing firms during the 1990s also find positive technology spillover effects on domestic firms when foreign multinational enterprises have a technological advantage.

Another strand of the FDI literature examines the different types of spillover effects—vertical and horizontal—in the domestic economy. Vertical spillovers include forward spillovers and backward spillovers that occur between foreign firms and their respective domestic suppliers and customers. Foreign firms generate backward spillovers to domestic suppliers by sharing quality procedures, technical and managerial knowledge, and product design (Zanfei, 2012). Those factors facilitate knowledge transfer and technology upgrading as domestic firms are motivated to improve production technology and to qualify as eligible suppliers (Mariotti et al., 2015; Newman et al., 2015). Empirical evidence shows evidence of positive backward spillovers, in some cases conditioned by other factors, such as the ownership structure and origin of the foreign investors ((Blalock and Gertler, 2008; Javorcik and Spatareanu, 2008; 2011). Forward spillovers happen when foreign firms supply higher quality inputs and technologies to downstream domestic firms with their superior knowledge (Orlić et al., 2018), or when the foreign firms cause competition among upstream sectors that lead to higher quality and cheaper inputs to downstream firms (Markusen and Venables, 1999). The previous empirical literature has found both positive (Stojčić and Orlić, 2020; Javorcik and Spatareanu, 2008; Jordaan, 2008b) and negative (Gorodnichenko et al., 2014) forward spillover effects.

Horizonal spillovers happen among firms in the same streams of the value chain, through reverse engineering, labor mobility (Greenaway et al., 2004; Dasgupta, 2012), 'competitive disciplinary effects' (Blomström et al., 2001; Haskel et al., 2007), and 'disciplinary market' access externalities (Hamida, 2013; Crescenzi et al., 2015). The empirical evidence of horizontal spillovers varies and remains ambiguous; Stojčić and Orlić (2020) find negative intra and inter-regional horizontal spillovers, while Vujanović, Stojčić, and Hashi (2021) find contextually varying effects.

The FDI data we use in this paper —the net inflow of FDI into a host country as a percentage of GDP—do not allow us to differentiate among the type of investment at different levels in the value chain, and thus it is not possible for us to directly observe these spillover effects. However, the extensive evidence of spillover effects, especially of positive forward spillover effects, is relevant to the discussion of our findings. Specifically, forward spillover effects will increase jobs and productivity in lower levels of the value chain, which would be especially impactful to those in low-income groups. Thus, while we cannot directly observe spillover effects in the scope of this paper, if positive forward spillover effects are present—and possibly override any negative forward spillover effects—, we expect that they will facilitate FDI's positive effect on inclusive growth overall.

An additional topic that needs to be discussed in order to better understand the dynamics of spillovers from foreign firms and the absorptive capacity of local economic agents are the several dimensions of proximity. First, cognitive proximity, which can be defined as the similarity of actors perceiving, interpreting and evaluating new knowledge, is required for firms to absorb new knowledge. Firms that share the same knowledge base and expertise may learn from each other by successfully communicating and understanding the new knowledge (Boschma and Lambooy, 1999). In this regard, Boschma (2005) argues that the most effective learning may need maintaining some cognitive distance—limiting cognitive overlap—to avoid lock-in, while at the same time securing sufficient cognitive proximity for the sake of communication.

Second, organizational proximity refers to the degree to which relations are shared within or between organizations, such as the rate of autonomy and control that is exerted in organizational arrangements; for example, a joint venture would be a form of a loosely coupled network. Organizational proximity is believed to facilitate interactive learning and innovation, as it reduces uncertainty and opportunism with control mechanisms that ensure ownership rights and sufficient rewards (Boschma, 2005). However, similarly to cognitive proximity, too much organizational proximity may cause lock-in and lack of flexibility, and thus loosely coupled systems may provide a more appropriate degree of proximity to secure both control and flexibility (Nooteboom, 1999). Third, institutional proximity is related to the institutional framework at the macro-level, which include economic agents sharing the same institutional rules and also cultural habits and values (Zukin and Dimaggio, 1990). Shared values and law systems promote effective economic coordination and interactive learning as information is transmitted more easily.

These various forms of proximity have put in some question the role of geographical proximity—the spatial distance between economic actors— in interactive learning, as other strands of the literature have claimed that spatially concentrated agents benefit from knowledge externalities (Jaffe et al., 1993; Audretsch and Feldman, 1996). Usually, geographical proximity combined with cognitive proximity would be needed for interactive learning to happen (Antonelli, 2000). However, development of information and communication technologies have allowed learning to take place outside the boundaries of geographical proximity, which may make geographical proximity less relevant (Stojčić and Orlić, 2020). On the other hand, geographical proximity may work as a complement to other forms of proximity, such as social or organizational proximity, to enhance interactive learning (Hausmann, 1996).

FDI, which is defined as investment from a foreign company that acquires a long-term management interest in a local enterprise through 10 percent or more of the voting stock, allows for a combination of the discussed proximities to take place. While it first and foremost increases geographical proximity between the foreign firms and local economic agents, the various forms of FDI such as joint ventures and merger and acquisitions allow for organizational proximity to increase. Some forms of FDI, such as joint ventures, would be considered the optimal structure for interactive learning to take place, as it is a form of a loosely coupled system mentioned above. Cognitive proximity and institutional proximity would depend on the similarity between the local economic agents and foreign firms. These dynamics will determine the ultimate level of absorptive capacity and spillovers through the interactive learning that occurs. In our model, the levels of infrastructure and manufacturing in the host country aim to provide a proxy for the levels of cognitive proximity and institutional proximity.

In summary, the combination of the factors or conditions found in the previous literature affecting inclusive growth and the impact of FDI on (general) growth point to a rather strict set of conditions that may be needed for FDI to lead to inclusive economic growth. In the next section we explore theoretically what those linkages may be, which we then test empirically in the following sections.

1.3 Theoretical Framework

The review of the literature shows that the effects of FDI on a host country's economy are optimized under certain economic and industrial conditions, namely a developed industrial base and a developed infrastructure, among others. An important mechanism that is created under these conditions is the enhanced knowledge or technological compatibility between the local and foreign firms, i.e. local economic agents have sufficient absorptive capacity that will lead to more forward/backward linkages and technological and knowledge spillovers brought by FDI. In terms of proximity, FDI itself would increase organizational proximity, while the local conditions would increase cognitive and institutional proximity. The review of the literature on inclusive growth also indicates largely the same economic conditions — a developed industrial base and a developed infrastructure — for inclusive growth to take place. Therefore, we hypothesize that FDI will benefit the host country not only through (general) economic growth, but also inclusive growth when the host country has a certain level of developed industrial base and a developed infrastructure. Inclusive growth would take place through the channels of technology and knowledge transfer, enhanced productivity and work force skills, and newly generated businesses and jobs. More specifically, the hypothesis we will test is that the effect of

FDI on inclusive growth will be strongest in the cases when there is a large manufacturing sector and a developed infrastructure base, or a large service sector in the host country.

1.4 Data and Methodology

The empirical analysis covers the period 1990 to 2015, utilizing a panel of 67 countries, consisting of 31 high income, 23 upper middle income, 12 lower middle income, and 1 low income countries, all listed in Table A.1 in the Appendix. Figure A.1 in Appendix shows the distribution of the sample during the observed period. It would have been desirable to have additional low income countries in the sample, but there were limitations due to missing data.

The dependent variable, inclusive growth, is defined as the average income of the bottom 20% quantile of the income distribution. The data for computing the average income of the bottom 20% is retrieved from the World Bank's PovcalNet database, which has the data available converted into constant 2011 purchasing power parity (PPP) dollars. The average income data are from primary household survey data, where roughly half report income and the other half report consumption expenditure.

In order to test our basic hypothesis, we use a fixed effects model with the main part of the model being a three-way interaction of FDI inflows, the manufacturing level, and adjusted gross fixed capital formation (AGFCF) level in the host country.[2] Here, manufacturing is a proxy for industrial diversification and AGFCF is a proxy for infrastructure. Our interest is to find at what threshold levels of manufacturing and AGFCF would FDI have a positive effect on inclusive growth. In addition, we also indirectly look at how FDI affects inclusive growth when there is a large service sector in the host country. However, since the level of the service sector is

[2] Note that FDI is subtracted from total gross fixed capital formation (GFCF) to arrive at AGFCF. This is further discussed below.

on average generally high in all countries, the results from the separate cases we examine may also include the absorptive capacity provided by the service sector. The data for the interaction terms as well as the other controls covariates are from World Bank's World Development Indicators (WDI), except for corruption, which is from International Country Risk Guide (ICRG). Details of each indicator can be found in Table A.5 of Appendix, and Table 1.1 shows the summary statistics.

Table 1.1: Summary Statistics

	Observations	Mean	Std. Dev.	Min	Max
Ln(Avg Income of bottom 20%)	1,512	7.8353	1.1033	4.4429	10.0651
FDI	5,577	3.8887	11.5782	0.0000	451.7160
Manufacturing	5,240	13.5159	6.8242	0.0000	50.6373
Agriculture	5,715	16.5135	13.4759	0.2241	79.0424
Services	5,304	49.7030	11.8416	9.7275	88.7243
AGFCF	5,189	19.7657	7.7922	0.2132	89.0564
Ln(GDPPC)	4,575	8.8445	1.1544	5.8891	11.4913
Δ(Inflation)	5,413	1.1036	19.9528	-223.0357	1076.5350
Corruption	3,674	5.8878	3.5403	0.0000	12.0000
Trade Openness	5,534	77.3467	47.3309	0.0210	442.6200
Unemployment	2,973	8.5990	6.4900	0.0500	57.0000
Tax Revenue	3,437	17.2015	6.9412	0.0216	62.8586
Government Expense	5,108	16.1302	6.5554	0.0000	76.2221

The base estimation model is given by:

$$ln\,(Incb20\%_{i,t+1}) = \beta_0 + \beta_1 FDI_{it} + \beta_2 Agr_{it} + \beta_3 Man_{it} + \beta_4 Ser_{it} + \beta_5 AGFCF_{it} + \beta_6 FDI * Agr_{it} + \beta_7 FDI * Man_{it} + \beta_8 FDI * AGFCF_{it} + \beta_9 Man * AGFCF_{it} + \beta_{10} FDI * Man * AGFCF_{it} + X_{it}\beta + \gamma_i + \delta_t + \varepsilon_{it} \quad (1)$$

The dependent variable $ln\,(Incb20\%_{i,t+1})$ is the log of average income of the lowest 20% income quantile. As we saw in the review of the literature above, inclusive growth has been measured in different ways. Among those multiple measures we select the simple form that captures the income growth of the lowest income group in the economy. This measurement as mentioned above was used by Dollar, Kleineberg, and Kraay (2016). FDI is measured as percentage of GDP, as is manufacturing, services, and agriculture. In addition, AGFCF also as percentage of GDP is our proxy for infrastructure development. GFCF is a good representation for the level of infrastructure development, as it includes construction of roads, railways, schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings; land improvements (drainage etc.); and plant, machinery and equipment purchases. However, since FDI is included in GFCF when it results in the purchase of new assets (it is not included when it is buying shares of an existing company, used to cover a deficit, pay off a loan, or is brownfield FDI), we subtract FDI from GFCF so to use adjusted GFCF in our estimations.[3] This is a safe conservative estimate and it prevents multicollinearity and double counting issues.[4]

The other control variables added in equation (1) are those found in the previous literature to play a significant role on inclusive growth. They include, the log of GDP per capita, which controls for a country's level of economic development, total government expenditure as percentage of GDP controlling for government size, tax revenue as percentage of GDP controlling for tax effort, and percentage change in the inflation rate controlling for macroeconomic stability. In addition, unemployment is included as an important factor affecting poverty levels; and lastly, corruption and trade openness (measured as total of exports and imports as percentage of GDP) are additional macroeconomic and political factors that have been found to potentially influence inclusive growth.

[3] The adjustment can be quite significant depending on the country. For example, among EU members, Slovakia received more than one-third of GFCF via FDI between 2000 and 2007; Bulgaria received more than 50% of GFCF via FDI between 2003 and 2008; in Russia, FDI represented more than 10% GFCF after 2003(Estrin, 2017); FDI also constitutes a large share of GFCF in several African countries. The share of FDI in GFCF was at least one-third in Congo, DRC, Ghana, Madagascar, and Nigeria (World Bank 2014).

[4]. We drop the observations where AGFCF becomes negative. It must be noted also that our measurement of FDI still includes FDI for buying shares of an existing company, paying off loans, covering a deficit, or is brownfield FDI.

As discussed above, the variable of interest in our model is the three-way interaction of FDI, manufacturing, and AGFCF, which will show how FDI affects inclusive growth under different levels of manufacturing and AGFCF. As with all equations that include a three-way interaction, we also add these three variables separately, as well as the two-way interactions of FDI, manufacturing, and AGFCF. Finally, we also add the two-way interaction of $FDI * Agr$. This will account for the fact that an increase in manufacturing as percentage of GDP would generally mean a decrease in agriculture as percentage of GDP, and vice-versa. This is explained in further detail below as we look into the marginal effect analysis. In the marginal effect analysis, we will also indirectly look at the case when there is a high level of the service sector in the host country, coupled with either low or high levels of AGFCF, as further explained in the next section.

For the estimation of our model in equation (1), we use a two-way (country and time effects) fixed effects regression. Fixed effects will deal with omitted variable bias and control for cross-country heterogeneity in addition to period-specific factors. The unobserved country-specific effects may capture the differences in initial levels of efficiency, while the period-specific intercepts capture changes that happen across all countries, such as productivity. All explanatory variables are lagged one year to reflect the time needed for FDI to impact the local economy.

1.5 Empirical Results

The results of the fixed effects regression are shown in Table 1.2.

Table 1.2: Fixed Effects Regression

	Ln(Average Income of Bottom 20% Quantile) (t+1)	Standard Error
Manufacturing	0.0296**	(0.0127)
Agriculture	0.000411	(0.0136)
Services	0.00160	(0.00859)
FDI	0.0326*	(0.0166)
AGFCF	0.0363***	(0.0118)
FDI*Manufacturing	-0.000867	(0.000758)
FDI*Agriculture	-0.00376***	(0.00134)
FDI*AGFCF	-0.000791	(0.00105)
Manufacturing*AGFCF	-0.00156***	(0.000478)
FDI*Manufacturing*AGFCF	0.0000654	(0.0000441)
Ln(GDPPC)	0.946***	(0.265)
Δ(Inflation)	0.000935*	(0.000548)
Corruption	-0.00927	(0.0135)
Trade Openness	-0.000892	(0.000696)
Unemployment	-0.00372	(0.00632)
Tax Revenue	0.00941	(0.00650)
Government Expense	-0.00216	(0.00941)
Observations	528	
R-squared	0.763	
Number of countries	67	

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

Our main variable of interest is the three-way interaction term that includes FDI, the extent of manufacturing in the host country, and adjusted gross fixed capital formation (AGFCF) also in the host country. In order to interpret the results of this three-way interaction variable, we employ the marginal effect analysis (Dawson & Richter, 2006), which will show how the effect of FDI on inclusive growth is changing according to varying levels of manufacturing and AGFCF.[5] In this approach, we compute the different slopes representing the effect of FDI on inclusive growth when the moderating variables, manufacturing and AGFCF, are held constant at different combinations of high or low values. To get started with the analysis, it is helpful to

[5] Also see UCLA: Statistical Consulting Group (accessed September 15th, 2019).

reorder the model in equation (1) into those that contain FDI and those that do not as the following:

$$\ln(Incb20\%_{i,t+1}) = (\beta_1 + \beta_6 Agr_{it} + \beta_7 Man_{it} + \beta_8 AGFCF_{it} + \beta_{10} Man * AGFCF_{it})FDI_{it} + (\beta_0 + \beta_2 Agr_{it} + \beta_3 Man_{it} + \beta_4 Ser_{it} + \beta_5 AGFCF_{it} + \beta_9 Man * AGFCF_{it} + X_{it}\beta) \quad (2)$$

The first group is what will define the different slopes of FDI; by combining high or low values of manufacturing, AGFCF, and agriculture, the slope representing the effect of FDI on inclusive growth will differ. In the analysis, high values of manufacturing, AGFCF, and agriculture are defined as one standard deviation above their respective means and low values as one standard deviation below their respective means; where the mean values (recall, presented as percent of GDP) are 16.721, 18.793, and, 6.425 respectively, and the standard deviations are 5.507, 5.981, and 4.776, respectively. The six cases that the analysis will show are listed in Table 1.3.

Table 1.3: Levels of Manufacturing, Agriculture, AGFCF in Each Scenario

		Level
1	High Manufacturing	22.228
	High AGFCF	24.774
	Low Agriculture	1.649
2	High Manufacturing	22.228
	Low AGFCF	12.812
	Low Agriculture	1.649
3	Low Manufacturing	11.214
	High AGFCF	24.774
	High Agriculture	11.201
4	Low Manufacturing	11.214
	Low AGFCF	12.812
	High Agriculture	11.201
5	Low Manufacturing	11.214
	High AGFCF	24.774
	Low agriculture	1.649
6	Low Manufacturing	11.214
	Low AGFCF	12.812
	Low agriculture	1.649

In the first four cases, we look at the combinations of either high level of manufacturing and low level of agriculture—cases 1 and 2—, or low level of manufacturing and high level of agriculture—cases 3 and 4. In terms of the industrial base, cases 1 and 2 represent a country with relatively high absorptive capacity, while cases 3 and 4 represent a country with relatively low absorptive capacity. These cases are combined with either high or low levels of AGFCF, where high AGFCF means there is more absorptive capacity, while low AGFCF means there is less absorptive capacity in terms of the infrastructure base. Thus, our marginal effects analysis consists of three moderating variables — manufacturing, agriculture, AGFCF — and not two as in the general case, making it a more holistic analysis.[6]

In addition to the first four cases, we use the last two to indirectly observe the cases when there are high levels of the service sector in the host country. When we observe the composition of manufacturing, agriculture, and service sectors of the countries across the years in our sample, the service sector represents a high percentage on average in all countries: the lowest being 31%, the highest 78%, and the average 56%. Thus, it is not appropriate to use the services sector variable to observe different cases of high level of services versus low level of services in combination with other sectors, as they do not represent the main or distinctive cases in the sample. However, we observe that countries with higher level of services have lower levels of manufacturing and lower levels of agriculture, and those with lower level of services have higher levels of manufacturing and agriculture, as shown in Table A.2 in the Appendix. In fact, countries that have the service sector at the 70 to 79% level have average levels of manufacturing and agriculture that almost exactly match the low levels of manufacturing and agriculture in our marginal effect analysis. Thus, we use the cases with low level of manufacturing and low level of

[6] We do not include the service sector, as adding the manufacturing, agriculture, and service sector variables that are in percentage of GDP would introduce linear dependence among the variables.

agriculture to represent those with high level of services.

Table 1.4 and Figure 1.1 show the differing slopes in each scenario listed in Table 1.3. In the first scenario where there is a high level of manufacturing, a high level of infrastructure, and a low level of agriculture, a 1 percent increase in FDI as percentage of GDP leads to an approximately 2.4 percent increase in the average income of the bottom 20 percent. In the second scenario, where there is high manufacturing, low infrastructure, and low agriculture, a 1 percent increase in FDI as percentage of GDP leads to a 1.6 percent increase in the average income of the bottom 20 percent. In the third and fourth scenario with low manufacturing, either high or low infrastructure, and high agriculture, the effects are both approximately a 2 percent decline in the average income of the bottom 20 percent income decile. In the fifth and six scenarios, with low manufacturing and low agriculture, the effects show a 1.5% increase with high infrastructure (although not statistically significant), and 1.6% increase with low infrastructure.

Thus, the effect of FDI on inclusive growth is most positive when there are both high levels of manufacturing and infrastructure. These results strongly support the prediction that FDI will have the most positive effect on inclusive growth when the host country has a large manufacturing and infrastructure base. The results also show relatively moderate positive effects when there is high manufacturing and low infrastructure, and low manufacturing and low agriculture (this case representing high levels of the service sector). This may be explained by the degree of spillover effects and linkages created based on the different characteristics of the host country. As we reviewed in the previous literature, technological and knowledge spillovers and linkages with the local economy are maximized when there is a smaller technological or knowledge gap between the home and host country due to increased absorptive capacity. This will ultimately lead to business and job creations and benefit the lowest income groups.

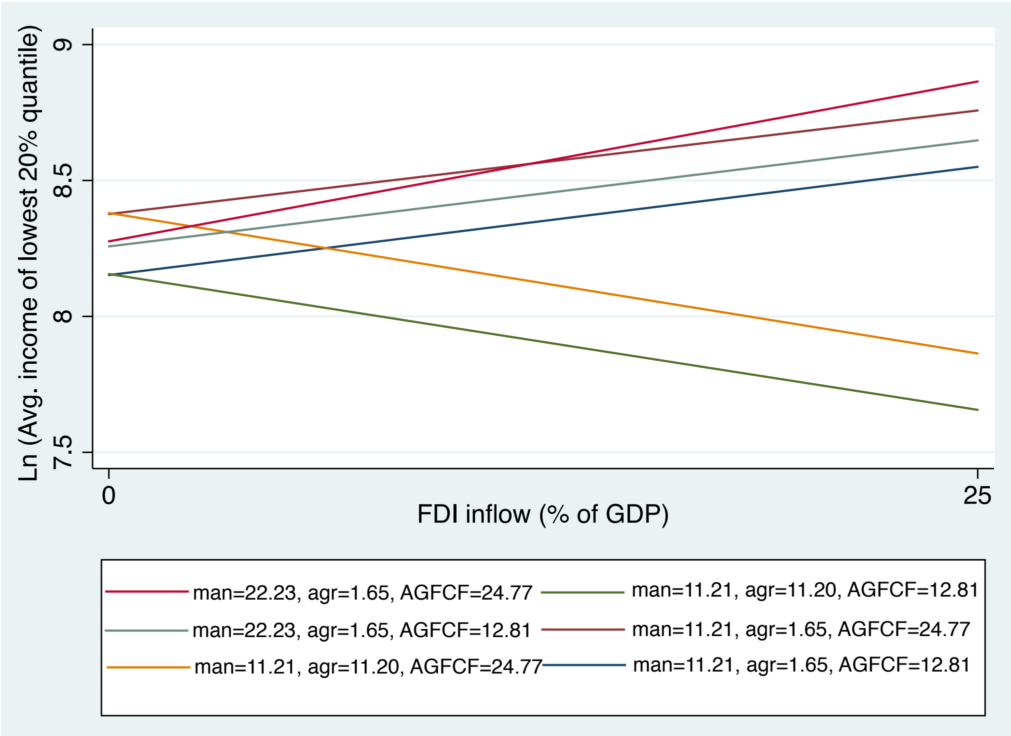
The negative effect of FDI on inclusive growth when there are low levels of manufacturing and high levels of agriculture may be explained by a couple of factors. First, as Agosin and Mayer (2000) show, higher total FDI stocks can be associated with lower subsequent growth in countries with unfavorable characteristics. This is because FDI crowds out domestic investment, due to reasons such as overall weak investment, and has less stimulation on creating forward and backward linkages. A second reason could be that countries with high levels of agriculture and low levels of manufacturing tend to attract resource-seeking FDI, which are commonly concentrated in foreign-dominated enclaves that have few linkages to the local product and labor markets. In addition, in this case, economic benefits can also be easily embezzled by corrupt local elites, and thus resource-seeking FDI in the primary sector may lead the country into some form of "Dutch Disease" (Nunnenkamp and Spatz, 2003). Thus, the benefits may not be as easily transferred to the local economy, especially to the low income groups. However, our data do not allow us to differentiate among different types of FDI, and so those possible explanations have to remain just conjectures.

Table 1.4: Average Marginal Effects of FDI on Average Income of Bottom 20%

	dy/dx	Std. Err.	P>z
1	0.0235305	0.0083552	0.005
2	0.015607	0.005705	0.006
3	-0.0206773	0.0091602	0.024
4	-0.0199871	0.0107601	0.063
5	.0152453	.0096859	0.115
6	.0159355	.0056852	0.005

*y denotes average income of bottom 20% income group; x denotes FDI.

Figure 1.1: Marginal Effect of FDI on Average Income of Bottom 20%



Regarding the results for the control variables, the log of GDP per capita has a significant and the strongest effect on inclusive growth. For a 1 percent increase in GDP per capita, the average income of the bottom 20 percent increases by 0.95 percent. When we compare the results with Table 6 where we conduct robustness check by excluding different control variables, the results are consistently strongly significant and of similar magnitudes. This confirms the results in the previous literature that (general) growth generates inclusive growth, and suggests that there is almost a one-to-one transfer of wealth to the lowest income group. Percentage change in the inflation rate shows a positive and significant effect on inclusive growth, which conflicts with several previous findings in the literature (Aoyagi and Ganelli, 2015). The result shows that there is a 9.35 percent increase in the average income of the bottom 20 percent in response to 1 percent change in the percentage change of inflation rate.[7] The results in Table 6 consistently show a positive effect with a similar magnitude; however, in some of the models it loses statistical significance. Oluseye and Gabriel (2017) found a similar result, with inflation having a positive effect on inclusive growth in the short-run but a negative effect in the long-run. While our results reflect the effect of inflation in the short run based on the one-year time lag between the independent and dependent variable, inflation, which proxies for macroeconomic stability, may have a negative effect in the longer run as in Oluseye and Gabriel (2017).

Corruption shows a negative effect, which is unexpected—higher value means less corruption in the ICRG index—but it is insignificant, and the coefficient changes to a positive effect in some of the models in Table 6. Trade openness shows a negative effect on inclusive growth but it is also not statistically significant. It consistently stays negative in the results in Table 6, and turns significant in one of the models; a 1 percent change in trade openness as a percentage of GDP leads to a 0.16% decrease in the average income of the bottom 20% in model 3. While the general notion is that international trade leads to economic progress and poverty alleviation, there are conflicting studies that show otherwise. Onakoya et al. (2019) show that trade openness negatively impacts economic growth and poverty levels when there is high dependency on imports, which deters the development of domestic production. Similarly, George (2010) provides an example of unbridled liberalization in agriculture in developing countries could lead to increased dependence on food imports and thus a rise in poverty. Some studies also show that the gains from trade may not be equitably distributed (Stewart and Berry, 2000; Yusuf et al., 2013).

[7] The percentage change in inflation rate was calculated as the following: $\frac{Inflation_t - Inflation_{t-1}}{Inflation_{t-1}}$. Since we did not multiply the data by 100, the multiplication should be applied when interpreting the coefficient.

Unemployment has the expected negative effect in the main model and all the models in Table 6 but is not statistically significant. Tax revenue, which proxies for tax effort, also has the expected positive effect in all models, but it is not significant. Government expense, which proxies for government size, shows a negative effect in the main model, and turns positive in one of the models in Table 6, but is not significant. This insignificancy result may be due to the variety of ways governments allocate their budgets, which include areas that may not necessarily lead to increasing the average income of the bottom 20%, such as national defense and security.

1.5.1 Longer-term effects

In addition to examining and verifying the effect of FDI on inclusive growth through the above analysis, we also look at the model where the independent variables are lagged by three years. This is because sometimes it can take more time for FDI to affect the local economy through employment creation, linkages and spillovers. The model is as follows:

$$ln\,(Incb20\%_{i,t+3}) = \beta_0 + \beta_1 FDI_{it} + \beta_2 Agr_{it} + \beta_3 Man_{it} + \beta_4 Ser_{it} + \beta_5 AGFCF_{it} + \beta_6 FDI * Agr_{it} + \beta_7 FDI * Man_{it} + \beta_8 FDI * AGFCF_{it} + \beta_9 Man * AGFCF_{it} + \beta_{10} FDI * Man * AGFCF_{it} + X_{it}\beta + \gamma_i + \delta_t + \varepsilon_{it}$$

Table 1.5 shows the results of the fixed effects regression.

Table 1.5: Fixed Effects Regression: Lagged Three Years

	Ln(Average Income of Bottom 20% Quantile) (t+3)	Standard Error
Manufacturing	0.0316**	(0.0157)
Agriculture	-0.00576	(0.0108)
Services	-0.00340	(0.00659)
FDI	0.0520**	(0.0240)
AGFCF	0.0395**	(0.0151)
FDI*Manufacturing	-0.00189*	(0.00109)
FDI*Agriculture	-0.00113	(0.000710)
FDI*AGFCF	-0.00395***	(0.00134)
Manufacturing*AGFCF	-0.00165**	(0.000672)
FDI*Manufacturing*AGFCF	0.000188***	(0.0000592)
Ln(GDPPC)	0.920***	(0.213)
Δ(Inflation)	0.000522	(0.000435)
Corruption	-0.00633	(0.00706)
Trade Openness	-0.000510	(0.000717)
Unemployment	0.00473	(0.00433)
Tax Revenue	0.0196***	(0.00721)
Government Expense	-0.00251	(0.00728)
Observations	494	
R-squared	0.769	
Number of countries	67	

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

The results show a similar pattern with our main results. We also conduct the marginal effect analysis with these results. Table 1.6 shows the combinations of high- and low-level values of manufacturing, AGFCF, and agriculture in each scenario, where the high levels are one standard deviation higher than the mean value, and the low levels are one standard deviation lower than the mean value.

Table 1.6: Levels of Manufacturing, Agriculture, AGFCF in Each Scenario: Lagged Three Years

		Level
1	High Manufacturing	22.725
	High AGFCF	24.712
	Low Agriculture	1.649
2	High Manufacturing	22.725
	Low AGFCF	12.829
	Low Agriculture	1.649
3	Low Manufacturing	11.469
	High AGFCF	24.712
	High Agriculture	11.531
4	Low Manufacturing	11.469
	Low AGFCF	12.829
	High Agriculture	11.531
5	Low Manufacturing	11.469
	High AGFCF	24.712
	Low agriculture	1.649
6	Low Manufacturing	11.469
	Low AGFCF	12.829
	Low agriculture	1.649

Table 1.7 shows the results of the marginal effects analysis, and Figure 1.2 shows the slopes of each case. In the first scenario where there is a high level of manufacturing, a high level of infrastructure, and a low level of agriculture, a 1 percent increase in FDI as percentage of GDP leads to an approximately 1.5 percent increase in the average income of the bottom 20 percent. In the second scenario, where there is high manufacturing, low infrastructure, and low agriculture, a 1 percent increase in FDI as percentage of GDP leads to a 1.1 percent increase in the average income of the bottom 20 percent. In the third scenario with low manufacturing, high infrastructure, and high agriculture, the effect is a 2.7 percent decline in the average income of the bottom 20 percent income decile. The fourth scenario also shows a negative effect, but it is not statistically significant. In the fifth scenario with low manufacturing, high infrastructure, and low agriculture, the effect shows a 1.6% decrease, and in the sixth scenario there's a positive effect but it is not statistically significant.

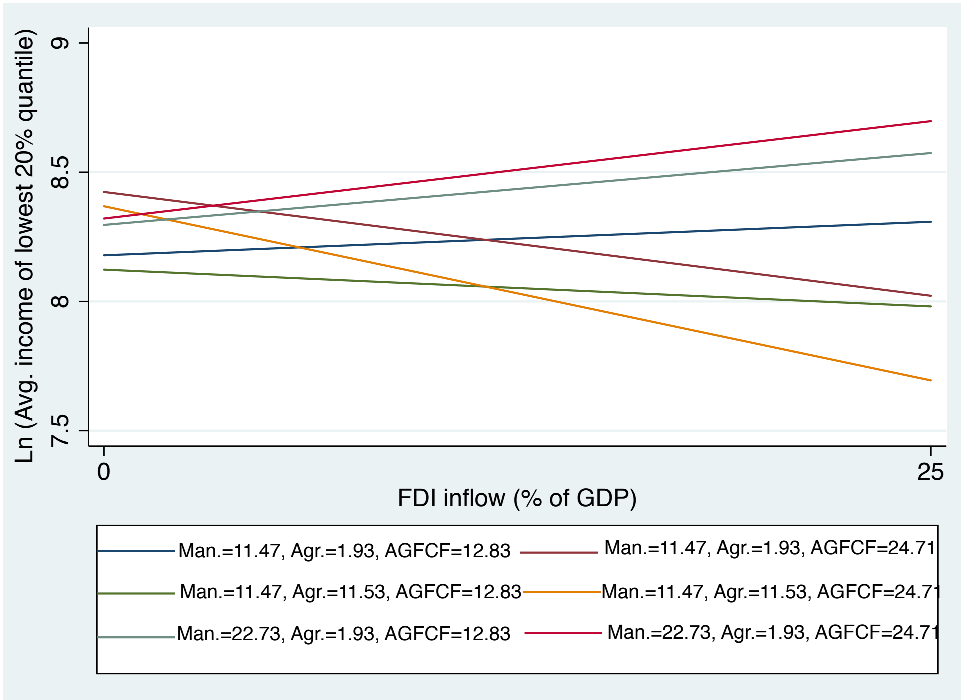
Overall, the results show that our hypothesis holds also in the longer term, although the magnitudes are smaller than in our main model; also, the results for scenarios four and six are not statistically significant, and the fifth scenario shows the opposite sign. In summary, when there is a large manufacturing and infrastructure base in the host country, FDI has the most positive effect on inclusive growth over the period of three years. These are optimistic results that strengthen the case for FDI's positive effect on inclusive growth when the host country has sufficient absorptive capacity.

Table 1.7: Average Marginal Effects of FDI on Average Income of Bottom 20%: Lagged Three Years

	dy/dx	Std. Err.	P>z
1	0.0150728	0.0073607	0.041
2	0.011122	0.0055854	0.046
3	-0.0269596	0.0086133	0.002
4	-0.0056979	0.0060037	0.343
5	-0.0160691	0.0081938	0.05
6	0.0051926	0.0054016	0.336

*y denotes average income of bottom 20% income group; x denotes FDI

Figure 1.2: Marginal Effect of FDI on Average Income of Bottom 20%: Lagged Three Years



1.6 Robustness Checks

Table A.4 in the Appendix shows the correlation matrix of some of the main variables. The low correlation of the variables counters the possibilities of high correlation that may be potentially present between some of the variables; those of FDI and Ln(GDPPC), manufacturing and Ln(GDPPC), AGFCF and Ln(GDPPC), Avg Inc Bottom 20% and FDI, Avg Inc Bottom 20% and manufacturing, and Avg Inc Bottom 20% and AGFCF are all very low. This implies a low possibility for multicollinearity issues in our model.

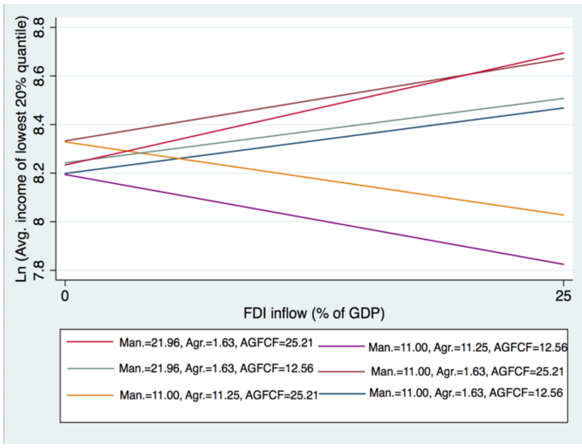
Table 1.8 shows results of a robustness check where we conduct fixed effects regression on six models that exclude one of the control variables: corruption, trade openness, unemployment, tax revenue, government expense, and inflation. While significance is reduced, all the models confirm the results of our original model by showing similar results, especially in terms of the three-way interaction, as seen in Figure 1.3.

Table 1.8: Robustness Check: Excluding Different Control Variables

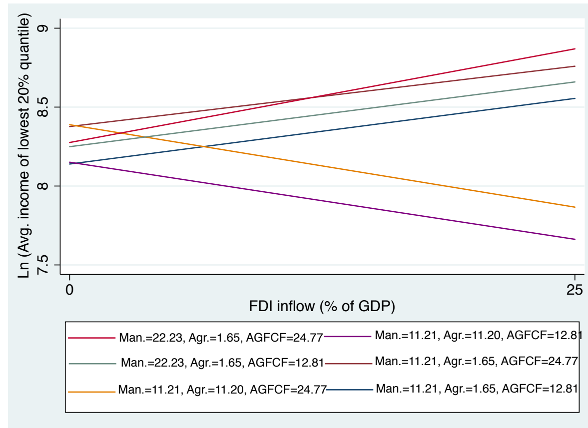
	1	2	3	4	5	6
Manu-facturing	0.016993 (0.01327)	0.030485* (0.01287)	0.002546 (0.01668)	0.009593 (0.01539)	0.032866** (0.01224)	0.023985 (0.01259)
Agriculture	-0.000452 (0.01365)	0.001209 (0.01361)	-0.011845 (0.00864)	-0.005774 (0.00949)	-0.005091 (0.01288)	-0.000012 (0.01199)
Services	0.001718 (0.00853)	0.002038 (0.00876)	-0.00976 (0.00737)	-0.004166 (0.00773)	-0.000028 (0.00870)	-0.003168 (0.00843)
FDI	0.017594 (0.01682)	0.034002* (0.01681)	0.019261 (0.01966)	0.033672 (0.01905)	0.041808** (0.01400)	0.029085 (0.01638)
AGFCF	0.021967 (0.01162)	0.037816** (0.01210)	0.013042 (0.01319)	0.026554* (0.01088)	0.037432*** (0.01078)	0.031749** (0.01190)
FDI* Manu-facturing	-0.000475 (0.00078)	-0.000863 (0.00076)	-0.000855 (0.00097)	-0.001121 (0.00095)	-0.001644** (0.00061)	-0.000819 (0.00074)
FDI* Agriculture	-0.002658* (0.00131)	-0.003787** (0.00137)	-0.002076 (0.00107)	-0.003595** (0.00134)	-0.002079 (0.00121)	-0.003741** (0.00129)
FDI* AGFCF	-0.000185 (0.00109)	-0.000851 (0.00107)	-0.000383 (0.00109)	-0.001176 (0.00106)	-0.00105 (0.00064)	-0.000681 (0.00107)
Manu-facturing* AGFCF	-0.001033* (0.00048)	-0.001601** (0.00049)	-0.000715 (0.00060)	-0.001200* (0.00050)	-0.001579** (0.00047)	-0.001422** (0.00048)
FDI* Manu-facturing* AGFCF	0.000037 (0.00005)	0.000066 (0.00004)	0.000038 (0.00005)	0.000084 (0.00005)	0.000065 (0.00004)	0.000064 (0.00004)
Ln (GDPPC)	0.950921*** (0.27153)	0.914965*** (0.25680)	0.990179*** (0.19227)	0.753311*** (0.19900)	0.922121*** (0.25620)	0.952652*** (0.27077)
Corruption		-0.012249 (0.01407)	0.003389 (0.01239)	-0.005201 (0.01444)	-0.006578 (0.01367)	0.000796 (0.01417)
Trade Openness	-0.001002 (0.00070)		-0.001582* (0.00075)	-0.000936 (0.00065)	-0.000899 (0.00079)	-0.001339 (0.00084)
Unemploy-ment	-0.00714 (0.00596)	-0.003919 (0.00630)		-0.009454 (0.00531)	-0.003396 (0.00638)	-0.004769 (0.00617)
Tax Revenue	0.009392 (0.00598)	0.009281 (0.00646)	0.002506 (0.00524)		0.010044 (0.00634)	0.009562 (0.00654)
Government Expense	-0.000117 (0.00902)	-0.003031 (0.00954)	-0.003492 (0.00845)	0.001153 (0.00608)		-0.003893 (0.00915)
Δ(Inflation)	0.001113* (0.00052)	0.000852 (0.00052)	0.000868 (0.00045)	0.000636 (0.00054)	0.001047* (0.00045)	
Observations	566	528	673	630	545	538
R-squared	0.758915	0.762001	0.731144	0.784937	0.754896	0.75934
No. countries	77	67	78	76	69	68

Figure 1.3: Robustness Check: Excluding Different Control Variables

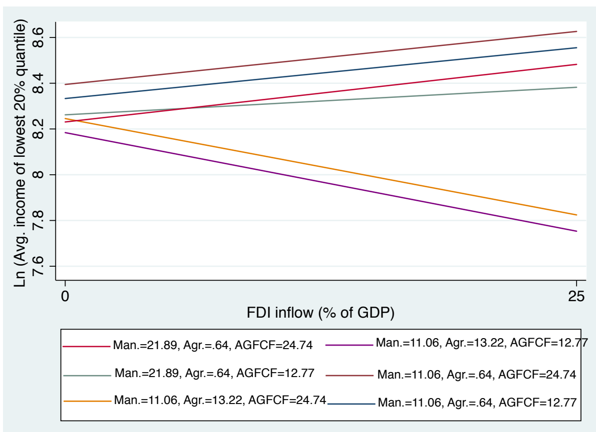
Model 1



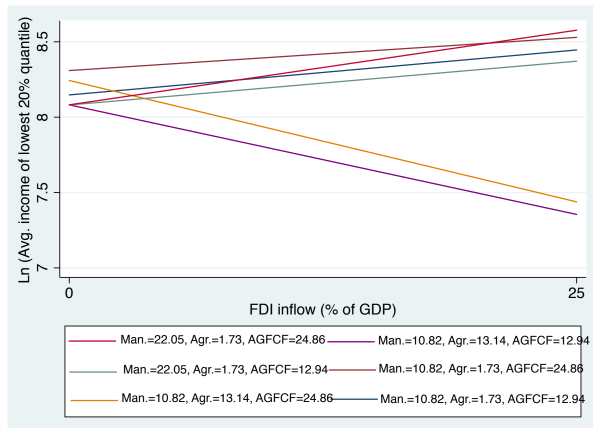
Model 2



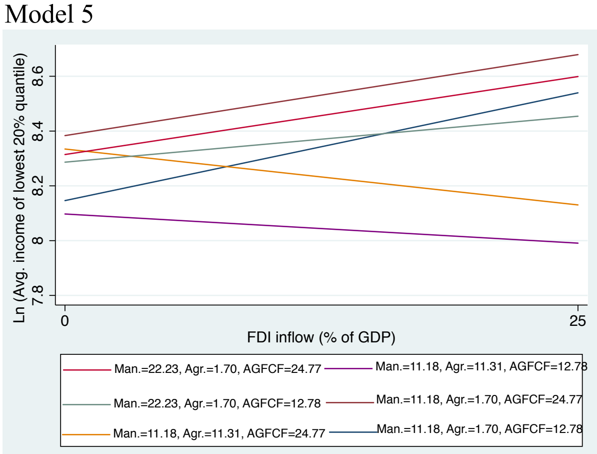
Model 3



Model 4



Model 5



Model 6

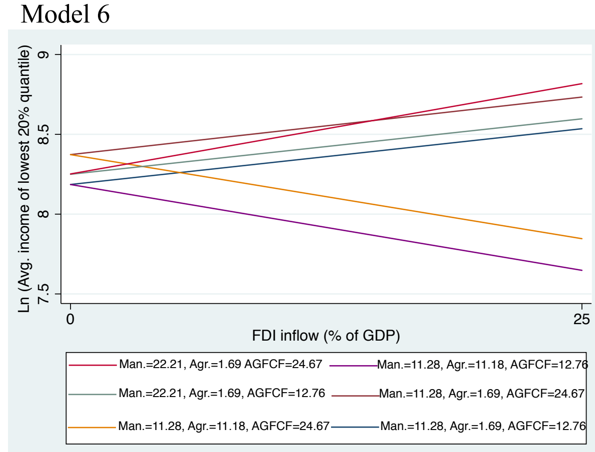


Table 1.9 shows the results of another robustness check that uses lagged GDPPC instead of GDPPC to account for potential multicollinearity issues with FDI, and the results are again similar.

Table 1.9: Robustness Check: Using Lagged GDPPC

	Ln(Average income of bottom 20% quantile) (t+1)	Standard Error
Manufacturing	0.0327**	(0.0134)
Agriculture	-0.0014	(0.0127)
Services	-0.000436	(0.00818)
FDI	0.0348*	(0.0178)
AGFCF	0.0399***	(0.0127)
FDI*Manufacturing	-0.000744	(0.00079)
FDI*Agriculture	-0.00385***	(0.00138)
FDI*AGFCF	-0.000782	(0.00111)
Manufacturing*AGFCF	-0.00157***	(0.000515)
FDI*Manufacturing*AGFCF	0.0000638	(0.0000463)
Lagged Ln(GDPPC)	0.811***	(0.238)
Δ(Inflation)	0.00102	(0.000618)
Corruption	-0.0107	(0.0131)
Trade Openness	-0.000763	(0.000687)
Unemployment	-0.00556	(0.0061)
Tax Revenue	0.009	(0.00633)
Government Expense	-0.00262	(0.0093)
Observations	527	
Number of countries	67	
R-squared	0.755	

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

We also check the robustness of the overall results by conducting dynamic panel estimation, which includes a one-year lag of the dependent variable as an explanatory variable, as in following model:

$$ln\,(Incb20\%_{i,t+1}) = \beta_0 + \beta_1 ln\,(Incb20\%_{i,t}) + \beta_2 FDI_{it} + \beta_3 Agr_{it} + \beta_4 Man_{it} + \beta_5 Ser_{it} + \beta_6 AGFCF_{it} + \beta_7 FDI * Agr_{it} + \beta_8 FDI * Man_{it} + \beta_9 FDI * AGFCF_{it} + \beta_{10} Man * AGFCF_{it} + \beta_{11} FDI * Man * AGFCF_{it} + X_{it}\beta + \gamma_i + \delta_t + \varepsilon_{it}$$

The estimation results are shown in Table 1.10 below.

Table 1.10: Robustness Check: Dynamic Panel Estimation

	Ln(Average Income of Bottom 20% Quantile) (t+1)	Standard Error
Ln(Average Income of Bottom 20% Quantile)(t)	0.659***	(0.0533)
Manufacturing	0.0211**	(0.00931)
Agriculture	-0.000687	(0.00589)
Services	0.00178	(0.00336)
FDI	0.0270**	(0.0111)
AGFCF	0.0183**	(0.00755)
FDI*Manufacturing	-0.00119**	(0.000602)
FDI*Agriculture	-0.00110	(0.000763)
FDI*AGFCF	-0.00109	(0.000670)
Manufacturing*AGFCF	-0.000743*	(0.000391)
FDI*Manufacturing*AGFCF	0.000075**	(0.000036)
Ln(GDPPC)	0.120	(0.0941)
Δ(Inflation)	0.000136	(0.000654)
Corruption	0.000920	(0.00744)
Trade Openness	-0.000403	(0.000484)
Unemployment	-0.00308	(0.00262)
Tax Revenue	0.00215	(0.00244)
Government Expense	0.00360	(0.00270)
Observations	404	
R-squared	0.994	
Number of countries	47	

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

Table 1.11 shows the marginal effect analysis, where we can see the effect of FDI on the average income of the bottom 20% in the six different cases. While the magnitudes are smaller compared to the main model, the results confirm that the effect of FDI on the average income of the bottom 20% is greatest when there are high levels of manufacturing and infrastructure (case 1), followed by case 2, where there is high manufacturing and low infrastructure. Cases 3 to 6 also show patterns consistent with the main model in terms of magnitude and signs but lack statistical significancy.

Table 1.11: Average Marginal Effects of FDI on Average Income of Bottom 20%: Dynamic Panel Estimation

		dy/dx	Std. Err.	P>z
1	High Manufacturing High AGFCF Low Agriculture	0.0119391	0.0051109	0.02
2	High Manufacturing Low AGFCF Low Agriculture	0.0057876	0.0032971	0.08
3	Low Manufacturing High AGFCF High Agriculture	-0.0035272	0.0050876	0.489
4	Low Manufacturing Low AGFCF High Agriculture	-0.0005072	0.0048728	0.917
5	Low Manufacturing High AGFCF Low agriculture	0.0054914	0.0052747	0.299
6	Low Manufacturing Low AGFCF Low agriculture	0.0085113	0.0031465	0.007

To check the robustness of the marginal effect analysis, we did a pairwise comparison of the average marginal effects; Table 1.12 shows the results of testing the differences in the simple slopes. The results show that more than half of the pairwise comparisons are strongly significant, which adds validation to the results of our marginal effect analysis.

Table 1.12: Pairwise Comparison of Average Marginal Effects

FDI	dy/dx	Std. Err.	z	P>|z|
4 vs 3	0.0006902	0.007237	0.10	0.924
1 vs 3	0.0442079	0.0140214	3.15	0.002
2 vs 3	0.0362843	0.0119615	3.03	0.002
1 vs 4	0.0435177	0.0169047	2.57	0.010
2 vs 4	0.0355942	0.0140616	2.53	0.011
2 vs 1	-0.0079235	0.0039795	-1.99	0.046
5 vs 3	.0359226	.0127765	2.81	0.005
6 vs 3	.0366128	.0110566	3.31	0.001
5 vs 4	.0352325	.0175778	2.00	0.045
6 vs 4	.0359226	.0127765	2.81	0.005
5 vs 1	-.0082852	.0085373	-0.97	0.332
6 vs 1	-.007595	.008288	-0.92	0.359
5 vs 2	-.0003617	.0085985	-0.04	0.966
6 vs 2	.0003285	.0059346	0.06	0.956
6 vs 5	.0006902	.007237	0.10	0.924

*y denotes average income of bottom 20% income group; x denotes FDI.

1.7 Conclusion

The main question researched in this paper is to identify the conditions under which FDI can lead to inclusive economic growth. By using a fixed effects regression with annual data for 67 countries from 1990 to 2015, our empirical results indicate that the effect of FDI on inclusive growth is most positive when the host country has a large manufacturing sector and a developed infrastructure base. This is shown through the marginal effect analysis, where the effect of FDI on inclusive growth becomes most positive with high levels of manufacturing and infrastructure in the host country. The marginal effect analysis also indirectly shows that FDI has a positive effect on inclusive growth when there is a large service sector in the host country. However, since the service sector represents a relatively high percentage on average in all countries in the sample across the years, we can assume that our main results could also reflect absorptive capacity created by the service sector.

From a policy viewpoint, these are not very optimistic results. Relying on FDI to reduce poverty and lift the lowest income groups in society will only work when the host country has sufficient absorptive capacity. Many of the countries most in need of inclusive growth do not have such capacity currently. Nevertheless, FDI can still indirectly contribute to these outcomes on inclusive growth by having a positive impact on general overall growth, as well as on developing the manufacturing sector and the gross capital formation of the host country. In hindsight, our results may help explain why many African countries that have had an exponential influx of FDI over the last few decades have not yet been able to fully benefit from said investment, from the perspective of inclusive growth, and are still struggling with severe poverty problems. The development of the manufacturing sector and building quality infrastructure need to be part of the policy agenda for FDI to contribute to poverty alleviation more effectively.

Further research is needed to overcome some limitations of the current study. First, it would be very desirable to overcome current data limitations so to be able to enlarge the sample of countries, especially to include more low-income countries. However, when we categorize the countries by developed vs. developing countries (by World Bank's definition), the sample includes 37 developed and 30 developing countries, which is quite balanced. Second, better disaggregated data are needed to be able to decompose different types and modalities of FDIs (mode of entry, kind of investment, sectoral spread, etc.) and so to be able to discern how the different types of FDI affect inclusive growth.

Chapter 2

The Effect of Foreign Direct Investment on Employment in Manufacturing Industry Sectors in Sub-Saharan African Countries

2.1 Introduction

Job creation in Sub-Saharan Africa (SSA) has relatively kept pace with its population growth over the recent couple of decades, adding almost 9 million new jobs per year. This has been attributable to general economic growth that was particularly evident in the 2000s due to the commodities boom. However, approximately six million of the nine million jobs created annually were self-employed, which is also defined as vulnerable employment; self-employed workers are likely to operate in the informal economy with low productivity, less likely to have formal work arrangements, lack adequate social security and working conditions, and are often characterized by inadequate earnings. Similarly, most of the new jobs were added in the agriculture and traditional services sector, with the least created in the manufacturing sector (Abdychev et al., 2018). The SSA region currently has the lowest share of employment in manufacturing in the world. The lack of employment in manufacturing is problematic as it relates to the majority of workers being in vulnerable employment, but it is also indicative of how most SSA countries have not yet experienced significant industrialization (Chen et al., 2015).

The share of manufacturing value added as % of GDP in SSA has continuously declined in the last couple of decades, from 16.3% in 1990 to 11% in 2019, although it has slightly improved more recently. The development of manufacturing is seen as a critical step in the industrialization process, especially at the beginning stage; industrialization (and structural transformation) is typically followed by growth in the share of the manufacturing sector in national income, and a significant increase in the share of employment in manufacturing

(Bagchi, 1976). Also, since industrialization is extensively recognized as having an important role in economic growth (Bagchi, 1976; Maddison, 1995), the lack of development in manufacturing in SSA has been a concern for the continent's future development, a phenomenon that Rodrick (2015) also describes as "premature deindustrialization."[8]

Our interest in studying manufacturing foreign direct investment (FDI) in SSA lies in observing these problems of vulnerable employment and lack of industrialization in the region. While manufacturing FDI inflows into SSA only represent a fraction of the world total, it is rising at a fast rate—it has increased from $6.9 billion in 2003 to $21.5 billion in 2019—, and it has the potential to stimulate SSA economies especially in reversing the trends just describe above. First, manufacturing FDI can play a catalytic role for the industrialization process (Chen et al., 2015). The Four Asian Tigers—Republic of Korea, Hong Kong, Singapore, and Taiwan—were the first countries that took advantage of globalization and FDI flows in the 1980s and diversified their industrial structures (UNCTAD, 2005). As these countries have now graduated into higher value-added manufacturing and service sectors, there is now an opportunity for latecomers such as SSA countries to benefit from manufacturing FDI, especially the labor-intensive kind (Lin, 2011). Second, manufacturing FDI can increase employment in the formal sector and alleviate the problem of vulnerable employment. Based on 2013-2014 data, manufacturing FDI created more direct jobs than FDI in any other sector in SSA, (Chen et al., 2015); in addition, manufacturing FDI can also have extensive indirect effects on employment creation through spillover effects and forward and backward linkages. Manufacturing FDI is also found to have a clear positive effect on economic growth in contrast to what has been the observed effect of total FDI (Alfaro, 2003; Wang, 2009). In summary, the economic benefits

[8] Premature deindustrialization describes the many developing nations that are becoming service dominant economies without having had a proper experience of industrialization.

manufacturing FDI can potentially bring to SSA countries are multifold.

Our two research questions based on the observations above are as following: First, what is the effect of manufacturing FDI on manufacturing employment in SSA countries, including indirect employment effects, which would lead to an increase in formal employment and structural transformation? Second, how does this effect differ by industry sector subgroups? To answer the first research question, this paper looks at the effect of greenfield manufacturing FDI on manufacturing employment at the industry sector level in SSA countries from 2003 to 2018, using fixed effects estimation that includes industry subgroup fixed effects and interactive fixed effects of country and year. For the second research question, we analyze how the effect of manufacturing FDI on manufacturing employment differs by industry subgroups, by interacting manufacturing FDI with the industry subgroups. Our results from the first analysis show that manufacturing FDI has a positive effect on manufacturing employment at the industry sector level. Results from the second analysis show that the effect of manufacturing FDI on manufacturing employment varies by industry subgroups, of which the effect includes both direct employment effects and indirect employment effects from potential forward and backward linkages and spillover effects.

The rest of the paper is organized as following. Section two reviews the literature on FDI's effect on employment, including the specific cases of manufacturing FDI in developing countries. Section three discusses the data and the empirical framework and approach. Section four discusses the empirical results. In section five we conduct robustness checks, and end with the conclusion in section six.

2.2 Literature Review

2.2.1 FDI's Effect on Employment

The effect of FDI on employment takes place through several venues. There can be a direct or indirect effect, and quantitative or qualitative effects, which could either be positive or negative. To stay focused on the main research question of this paper, we will only discuss the quantitative effects, which can include both direct and indirect effects. Primarily, new jobs can be created through establishing foreign subsidiaries or investing and expanding on existing local firms (ILO, 1984). Greenfield investment has the greatest effect on direct employment creation, while mergers and acquisitions tend to have a negligible effect in the immediate term (Dunning, 2008). Jobs can also be created indirectly through forward and backward linkages or through distributors and suppliers (Golejewska, 2002). When the foreign firms source locally, demand of upstream sectors could increase (Javorcik, 2004) and stimulate employment. Local linkages can also lead to productivity spillovers from the foreign firms to the local firms and lead to potential job creation (Aitken and Harrison, 1999; Javorcik, 2004). In the medium term, employment can also increase through stimulated demand through restructuring and improved efficiency of competing firms, while acquisition of firms that would otherwise go bankrupt will preserve existing jobs. On the other hand, job loss can also happen through the restructuring of acquired firms or liberation of protected activities (ILO, 1984). It can also happen when there is an increased efficient use of labor, as multinationals usually have intangible firm-specific assets that enhance productivity. As this is transferred to the affiliates, they need less labor per unit of output, which leads to a negative impact on employment (Holland et al., 2000; Conyon et al., 2002; Girma et al., 2002).

Due to these dynamics, past studies have shown that FDI can have a positive or negative effect on employment; however, most of the studies focused on developing countries have shown positive effects. This is because foreign and domestic capital are not perfect substitutes in developing countries, and thus an increase in FDI would result in an increase in demand for labor (Grieco, 1985). Aaron (1999) estimated that FDI in developing countries created approximately 26 million jobs directly, and 41.6 million jobs indirectly in 1997, which indicates a multiplier effect of about 1.6. Iyanda (1999) found a higher multiplier estimate in Namibia, with 2 to 4 jobs created for each worker directly employed by foreign firms. Similarly, we expect that Sub-Saharan African countries that lack job creation and formal employment would experience an increase in employment as FDI comes into fill in the gap between the supply and demand for labor.

The following studies have found a positive relationship between FDI and employment.

Coniglio, Prota, and Seric (2015) study the effect of FDI on employment and wages across 19 Sub-Saharan African countries using firm-level data from UNIDO's Africa Investor Survey 2010, and find that foreign-owned firms generate more jobs than domestic ones, though they are less skill intensive. They also find that nationality of ownership matters for job creation and wage premiums, while MNEs adopt generous wage policies in general.

Ajaga and Nunnenkamp (2008) analyze the long-term relationships between FDI and value added and employment at the state level in the U.S. using a cointegration technique and Granger causality tests for the period of 1977 to 2001. The results show that there is cointegration and also two-directional causality between FDI and the outcome variables, which holds for different measures of FDI and also states' overall economy versus the manufacturing sector alone.

Vacaflores (2011) observes the effect of FDI on employment generation in 12 Latin American countries from 1980 to 2006 using a dynamic panel model, and finds that FDI has a positive effect on employment, and that these effects are more important for less developed countries, and countries with a larger informal sector. This suggests that FDI's externalities may be maximized in countries with underutilized resources and can help the informal sector expand into formal markets.

On the other hand, some other studies have found conflicting results. Buffie (1993) looks at the impact of FDI on underemployment and capital accumulation based on a two-sector dual economy model. He finds that FDI in the high-wage manufacturing sector crowds out domestic capital and lowers employment in the long-run, while FDI in the primary export sector crowds in domestic capital and reduces underemployment. Rizvi and Nishat (2009) look at the effect of FDI on employment opportunities in Pakistan, India, and China during 1985-2008 using pooled data and Seemingly Unrelated Regression (SUR). They find that FDI does not lead to increased employment directly, and thus argue that other policy measures should be integrated to stimulate employment growth, but also caution that there may be a time lag in how FDI impacts employment through economic growth. Braunstein and Epstein (2002) find a relatively small positive impact of FDI on employment and wages, when they study FDI inflows into China from 1986 to 1999. Jude and Silaghi (2016) study the impact of FDI on employment using a dynamic labor demand model for 20 Central and Eastern European Countries from 1995 to 2012, and find results that imply "creative destruction;" there is an initial negative effect on employment due to labor saving techniques, after which there is a positive long run effect as foreign firms vertically integrate into the local economy. However, through robustness checks, the authors show that this phenomenon is only observed in EU countries.

Several studies have looked specifically at the effect of manufacturing FDI on employment in developing countries, and have found positive effects. Abor and Harvey (2008) use a simultaneous panel regression model with data of the Ghanaian manufacturing sector covering the period 1992-2002 to estimate the effects of FDI on employment and wage levels, and find that increased FDI flows generally lead to high levels of employment. They connect this to FDI's large-scale production that requires intensive labor. Nunnenkamp et al. (2007) look at the relationship of manufacturing FDI and employment in Mexico for 1994-2006 using the GMM estimator, and find a significantly positive effect, though a quantitatively modest one. Inekwe (2013) examines the links between FDI and employment in manufacturing and service sectors in Nigeria between 1990 and 2009 by using the vector error correction model (VECM), and finds that there is a positive relationship between FDI and employment in the manufacturing sector while there is a negative relationship in the service sector.

As such, while previous studies have looked at the effect of manufacturing FDI on employment, thus far, there have been no studies that look at this relationship in the context of SSA countries as a whole region (which is characterized by high structural unemployment and underemployment), or look at the effects at the industry sector level and by industrial sector groups, which include indirect effects via potential spillover effects and forward and backward linkages. While the labor-intensive sectors would generally lead to the most direct job creation (Jenkins, 2006), the indirect employment effects through spillover effects and forward and backward linkages can also be quite extensive. These are the gaps in the literature that the current paper aims to fill.

2.3 Data and Methodology

Our panel data set consists of 15 SSA countries[9] across the period 2003-2018. The summary statistics are listed in Table 2.1.

Table 2.1: Summary Statistics

Variable	Obs.	Mean	Std.	Min	Max
Manufacturing FDI	3,840	20,300,000	195,000,000	0	6,000,000,000
GDP per Capita	3,840	5,281.329	5,261.95	718.333	22,208.1
Trade	3,712	67.827	26.218	27.376	172.092
Corruption	3,632	35.480	12.692	0	65
Infrastructure	3,840	22.735	18.082	0.37	79.63
Education Exp/Total Exp	2,976	18.673	4.731	5.03	37.521

The data come from several sources. Employment in manufacturing by sector is from UNIDO Industrial Statistics Database at the 2-digit level of ISIC Revision 3 (INDSTAT2), 2020 edition. Greenfield manufacturing FDI inflows into SSA countries by sector is from fDi Markets, where the capital investment amounts are in US dollars of that time. We made several adjustments to match the sectors that were categorized in these two data sets, such as combining various sectors together, and also dropped several that weren't available in the other data set. Table 2.2 shows the final set of sectors that were matched. GDP per capita is in 2017 constant international dollars; trade openness is proxied by the total of export and import as percentage of GDP, and both are from World Development Indicators (WDI). For corruption we use the Corruption Perceptions Index (CPI) from Transparency International; this index ranks 180 countries and territories' public sector corruption by how it is perceived by experts and business people, using a scale from 0 to 100.[10] For the proxy of infrastructure, we use the Africa

[9] The 15 SSA countries are: Botswana, Burundi, Cameroon, Cape Verde, Eswatini, Ethiopia, Gambia, Ghana, Kenya, Madagascar, Malawi, Mauritius, Niger, Senegal, and South Africa.

[10] The Corruption Perceptions Index was updated in 2012 by changing the index scale to 0-100 from 0-10. Thus, the data before and after 2012 are generally not comparable. While acknowledging this limitation, when we scaled all

Infrastructure Development Index (AIDI), which also has a scale from 0 to 100 and is a weighted average of indicators for the following four components: transportation, electricity, ICT (Information and Communications Technology), and water and sanitation. Education is proxied with education expenditure as percentage of total government expenditure, which is retrieved from UNESCO (UNESCO Institute for Statistics).[11]

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the scores to 0-100, there was not a big change to the trend over the years, and hence chose to use this index for which most data were available.

[11] We acknowledge there are better indicators to proxy education attainment, such as number of students who completed secondary education, etc. However, there was a severe lack of data points for these other indicators.

Table 2.2: Matching Industry Sectors from fDi Markets and UNIDO Stat. Data Sets

fDi Markets	**UNIDO Stat.**
Automotive components & OEM	Motor vehicles, trailers, semi-trailers
Business machines & equipment	Office, accounting and computing machinery
Chemicals	Chemicals and chemical products
Coal, oil & gas	Coke,refined petroleum products,nuclear fuel
Communications & Consumer electronics	Radio,television and communication equipment
Electronic components	Electrical machinery and apparatus
Engines & turbines & Industrial equipment	Machinery and equipment n.e.c.
Food & Beverages	Food and beverages, Tobacco products
Medical devices	Medical, precision and optical instruments
Metals	Basic metals, Fabricated metal products
Ceramics & glass & minerals	Non-metallic mineral products
Non-automotive transport OEM & Space & defense & Aerospace	Other transport equipment
Paper, printing & packaging	Paper and paper products, Printing and publishing
Plastics & Rubber	Rubber and plastics products
Textiles	Textiles, Wearing apparel, fur, Leather, leather products and footwear
Wood products	Wood products (excl. furniture), Furniture; manufacturing n.e.c.

The base estimation model for our first analysis is as following:

$$\ln\left(ManEmp_{i,c,y}\right) = \beta_0 + \beta_1 \ln\left(ManFDI_{i,c,y} + 1\right) + \beta_x X_{c,y} + \gamma_{subgroup\_1} + \delta_c + \theta_y + \mu\delta_c * \theta_y + \varepsilon_{i,c,y} \quad (1)$$

The same model is tested with different industry subgroup fixed effects, and also with one that includes individual industry sector fixed effects:

$$\ln\left(ManEmp_{i,c,y}\right) = \beta_0 + \beta_1 \ln\left(ManFDI_{i,c,y} + 1\right) + \beta_x X_{c,y} + \gamma_{subgroup\_2} + \delta_c + \theta_y + \mu\delta_c * \theta_y + \varepsilon_{i,c,y} \quad (2)$$

$$\ln\left(ManEmp_{i,c,y}\right) = \beta_0 + \beta_1 \ln\left(ManFDI_{i,c,y} + 1\right) + \beta_x X_{c,y} + \gamma_{subgroup\_3} + \delta_c + \theta_y + \mu\delta_c * \theta_y + \varepsilon_{i,c,y} \quad (3)$$

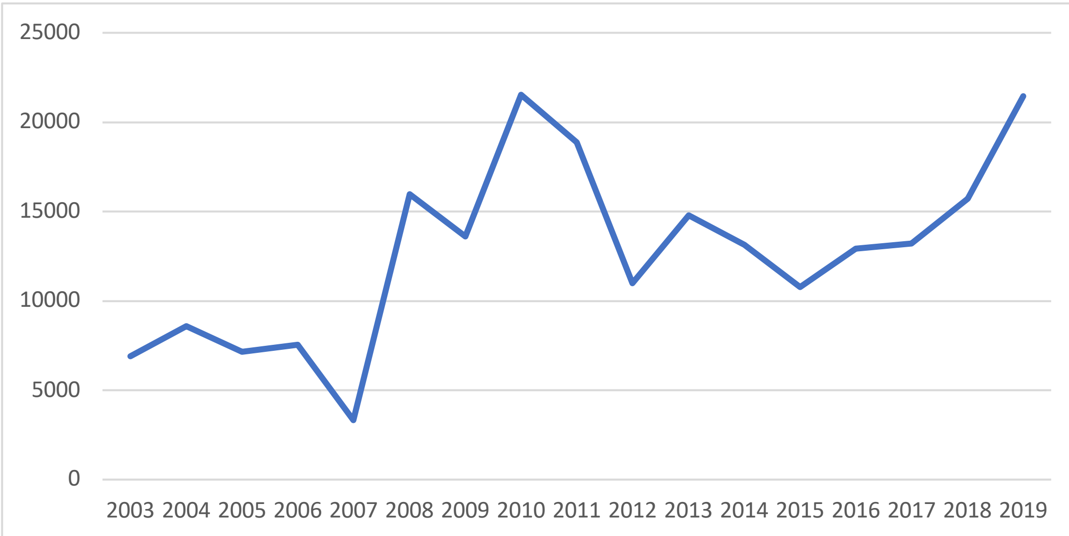
$$\ln\left(ManEmp_{i,c,y}\right) = \beta_0 + \beta_1 \ln\left(ManFDI_{i,c,y} + 1\right) + \beta_x X_{c,y} + \gamma_i + \delta_c + \theta_y + \mu\delta_c * \theta_y + \varepsilon_{i,c,y} \quad (4)$$

We use fixed effects regression that includes year, country, and industry—or subgroup of industries—fixed effects, and interactive fixed effects of country and year to look at the effect of manufacturing FDI on manufacturing employment at the industry sector level. The dependent variable $\ln(ManEmp_{i,c,y})$ is the log of employment numbers in manufacturing sector i, in country c, year y; $\ln(ManFDI_{i,c,y} + 1)$ is the log of FDI inflows of manufacturing sector i, in country c, year y. We add 1 to all the manufacturing FDI data points as a large portion of the data points of manufacturing FDI inflows are 0, due to the trend of manufacturing FDI inflows into SSA and especially because the data are disaggregated at the industry sector level. Adding 1 to all the data points allows these observations to remain after log transformation; this method is a common practice in data research, especially when the rest of the data are in units of millions, which is the case for our data set.

The interaction of country and year in both models is included to account for how macroeconomic time trends had varying effects on each country during the period 2003-2018, especially during the 2007-2008 economic crisis. The shock of the economic crisis caused abnormal spikes of FDI inflows into some of the SSA countries, as can be seen in Figure 2.1.[12]

[12] In 2008, FDI inflows to Africa peaked which was a continuation of the increasing trend from 2007, in which resource extracting FDI and manufacturing FDI both played a large part. The inflows were fueled by booming commodity prices, rising profitability of investments and policy environments conducive to FDI (UNCTAD, 2017). After the recession started in December of 2007, oil prices spiked to \$143.68 per barrel in mid 2008, which soon caused increase in other commodity prices such as wheat, gold, and other related future markets. This could have happened due to an influx of investment into commodity markets, as investors were retracting from the falling real estate and stock markets and diverting funds to oil futures (Amadeo, 2019).

Figure 2.1: Manufacturing FDI Inflows to SSA Countries (in US $ millions)



For industry sector fixed effects, we use different types of fixed effects for each model (1)~(4)—fixed effects for each sector, and fixed effects for subgroups of the sectors, for which we have three different types of categories. As listed in Table 2.3, subgroup (1) is grouped based on industrial similarities, and subgroup (2) and (3) are grouped based on similar K/L ratios. The K/L ratios were obtained from Diao et al. (2021)'s study, where they have calculated K/L ratios for Tanzanian and Ethiopian manufacturing firms by industry sector. We take the average of the Tanzanian and Ethiopian firms' K/L ratios as a proxy for the SSA countries in our sample. The K/L ratios are smallest in the 1st group, and increase in the order of the subsequent groups. More details are provided in Table B.1 and Table B.2 in Appendix.

Table 2.3: Subgroups of Industry Sectors used for Fixed Effects

	(1) Subgroup based on industrial similarity	**(2) Subgroup based on K/L ratio**	**(3) Subgroup based on K/L ratio, with "Coal, oil, & gas" separately[13]**
1	-Food & Beverages -Paper, printing & packaging -Textiles -Wood products	-Paper, printing & packaging -Plastics & Rubber -Textiles -Wood products	-Paper, printing & packaging -Plastics & Rubber -Textiles -Wood products
2	-Ceramics & glass & minerals -Chemicals -Coal, oil & gas -Metals -Plastics & Rubber	-Chemicals -Food & Beverages	-Chemicals -Food & Beverages
3	-Automotive components & OEM -Engines & turbines & Industrial equipment -Non-automotive transport OEM & Space & defense & Aerospace	-Automotive components & OEM -Engines & turbines & Industrial equipment -Non-automotive transport OEM & Space & defense & Aerospace	-Automotive components & OEM -Engines & turbines & Industrial equipment -Non-automotive transport OEM & Space & defense & Aerospace
4	-Business machines & equipment -Communications & Consumer electronics -Electronic components -Medical devices	-Business machines & equipment -Communications & Consumer electronics -Electronic components -Medical devices	-Business machines & equipment -Communications & Consumer electronics -Electronic components -Medical devices
5		-Ceramics & glass & minerals -Metals -Coal, oil & gas	-Ceramics & glass & minerals -Metals
6			-Coal, oil & gas

In our second analysis, we interact manufacturing FDI with the industry subgroups (2) and (3) in two separate models to look at how the effect of manufacturing FDI on manufacturing employment differ by industry subgroups:

$\ln(ManEmp_{i,c,y}) = \beta_0 + \beta_1 \ln(ManFDI_{i,c,y} + 1) * Subgroup\_N^{14} + \beta_x X_{c,y} + \gamma_{subgroup\_N} + \delta_c + \theta_y + \mu\delta_c * \theta_y + \varepsilon_{i,c,y}$ (5)

[13] The "Coal, oil & gas" industry was not included in Diao et al. (2021)'s paper, and thus we try two methods: we include it in the 5th subgroup in (2) based on industrial similarity, and separate it as an individual subgroup in (3).
[14] Subgroup_N refers to subgroup (2) and (3)

2.4 Empirical Results

The results for our first analysis are shown in Table 2.4.

Table 2.4: Effect of Manufacturing FDI on Manufacturing Employment

	(1) Ln(Man Emp)	(2) Ln(Man Emp)	(3) Ln(Man Emp)	(4) Ln(Man Emp)
Ln(Man FDI)	0.0389***	0.0298***	0.0266***	0.0181*
	(0.00426)	(0.00493)	(0.00526)	(0.00879)
Ln(GDPPC)	1.830***	1.663***	1.286***	0.511
	(0.272)	(0.262)	(0.324)	(0.551)
Trade Openness	0.00106	-0.00663**	-0.00610**	-0.00688*
	(0.00168)	(0.00290)	(0.00276)	(0.00390)
Corruption	0.0349***	0.0981***	0.0618**	0.00602
	(0.0949)	(0.222)	(0.248)	(0.279)
Infrastructure Index	0.0257***	-0.0320	-0.0144	0.00607
	(0.00637)	(0.0193)	(0.0186)	(0.0207)
Education Exp/Total Exp	-0.0106***	-0.0324***	-0.0259***	-0.0185**
	(0.00245)	(0.00731)	(0.00702)	(0.00787)
Observations	1,072	1,072	1,072	1,072
Number of countries	15	15	15	15
R-squared	0.562	0.545	0.571	0.668

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

Model (1), which is our base model, includes industry subgroup fixed effects that are based on industrial similarity (subgroup (1) from Table 2.3). The results mainly show the expected signs with statistically significant coefficients. In particular, a 1% increase in manufacturing FDI leads to a 0.039% increase in manufacturing employment at the industry sector level in a given year. A 1% increase in GDP per capita leads to a 1.83% increase in manufacturing employment of an industry sector, of which the magnitude may reflect the potential for a large job growth that could follow economic growth in SSA countries. One unit of less corruption—from an index of 0~100—leads to a 3.49% increase in manufacturing employment of an industry sector, which is a large magnitude and may indicate the crucial role of an uncorrupt government in SSA countries for economies to develop. Corruption in SSA countries is perceived as one of the main problems that is preventing the countries from escaping long ridden and widely spread poverty issues, and our result highlights how governmental corruption can be detrimental to job creation in particular. Our results also show that one unit of better infrastructure—from an index ranging from 0~100—leads to 2.57% increase in manufacturing employment of an industry sector. This implies how businesses and industries would likely locate and create jobs in places with a stable infrastructure base; it could also imply the convenience it provides for people who are looking for jobs. Trade openness is not significant in the first model, but shows a negative effect on employment in subsequent models, with approximately 0.6% decrease in employment when exports and imports as a % of GDP increase by one percent. While trade openness is generally known to positively affect employment, this negative effect may have been caused by an increase in imports, which can have a negative effect on employment in developing countries by eliminating jobs that could have been generated if production happened locally. Raj and Sasidharan (2015)'s study shows how import penetration had a detrimental effect on employment generation in India, while they saw little evidence of export orientation's effect on employment. This is especially pertinent to our study, as the average import to export ratio as % of GDP in the countries included in our sample is 1.66.[15]

Education expenditure as a percentage of total expenditure, which was proxied for education levels, shows a negative effect on employment; 1% increase in education expenditure as a percentage of total expenditure leads to a 1.06% decrease in employment in the first model. The results may seem contrary to the general expectation, but there are several factors that may help explain it. Majgaard and Mingat (2012) observe that the rapid expansion of higher

[15] The average ratios of each country is listed in Table B.3 of Appendix.

education in SSA with only moderate growth in formal sector employment opportunities has led to large unemployment numbers among graduates in low-income SSA countries, which suggests a skills mismatch and over-enrollment in post-basic education. The authors indicate that almost 80% of workers who attended higher education in the past currently work in the formal sector, but the younger generation with similar education educational backgrounds are now —at the time of their report—less likely to find a job in the formal sector than in the past. This implies that the problem with employment in SSA is not necessarily due to lack of education, but the unavailability of formal sector job opportunities that can absorb the increasing number of people who are graduating from higher education. Thus, our negative result may imply this mismatch of skills and job availability, and that due to the current lack in job creation, more spending on education does not necessarily lead to increase in employment. This also re-emphasizes the main implications of this paper: the critical need for foreign direct investment to create formal sector jobs and fill this gap.

Another factor that may have led to the negative coefficient for our education measure relates to the indicator that we use to proxy for education: education expenditure as percentage of total government expenditure. Majgaard and Mingat (2012) observe that low-income SSA countries allocate the largest share of government expenditure to education—compared to middle and high-income SSA countries—due to their small formal sector and consequently low tax base. This means that some of the differing magnitudes of our indicator may have merely reflected this dynamic, and not necessarily the comparable level of investment in education. Essentially, the negative coefficient for education may be reflecting the fact that low-income SSA countries that allocate the largest share of government expenditure to education generally have lower employment numbers.

Next, Model (2) which uses subgroup (2) industry fixed effects, Model (3) which uses subgroup (3) industry fixed effects, and Model (4) which uses individual sector fixed effects, all show similar results; however, the magnitudes differ, and trade openness and infrastructure change signs or turn insignificant in some of the models. The results are larger in magnitude and more statistically significant in Models (1)~(3) than in Model (4); the effect of manufacturing FDI on manufacturing employment especially shows a consistently gradual decrease in subsequent models. Models (1)~(3) are controlling unobserved time-invariant industry sector characteristics at the subgroup level, while Model (4) is controlling them at the individual sector level.[16] The larger magnitudes and significancy in Models (1)~(3) than in Model (4) reflect that subgroup industry fixed effects work better for the regression. This could be due to the nature of the data set; it includes a lot of "0" data points, because of the high level of disaggregation and the sporadic trend of manufacturing FDI inflows into SSA countries. Since this means less data points to clearly observe causal relationships, individual sector fixed effects would be excessive control, preventing us to see meaningful results, while subgroup industry fixed effects would relax this limitation.

Table 2.5.1: Effect of Manufacturing FDI on Manufacturing Employment by Industry Subgroup (2)

	Ln(Man Emp)	Standard Error
Ln(Man FDI)	-0.00753	(0.0191)
2nd group	0.576*	(0.323)
3rd group	-2.626***	(0.405)
4th group	-2.742***	(0.358)
5th group	-0.757***	(0.171)
2nd group*Ln(Man FDI)	0.00264	(0.0241)
3rd group *Ln(Man FDI)	0.0913**	(0.0340)

[16] The characteristics may include the following: different skills or education needed for the work, different technology or resources used in the industry, different business practices or culture, and different labor productivity levels.

Table 2.5.1: Effect of Manufacturing FDI on Manufacturing Employment by Industry Subgroup (2) (Continued)

4th group *Ln(Man FDI)	0.0573*	(0.0292)
5th group *Ln(Man FDI)	0.0433**	(0.0202)
Ln(GDPPC)	2.407***	(0.703)
Trade Openness	-0.0175**	(0.00616)
Corruption	0.1089***	(0.279)
Infrastructure	-0.0826***	(0.0264)
Education Exp/Total Exp	-0.0495***	(0.00913)
Observations	1,072	
Number of countries	15	
R-squared	0.563	

Table 2.5.2: Effect of Manufacturing FDI on Manufacturing Employment by Industry Subgroup (3)

	Ln(Man Emp)	Standard Error
Ln(Man FDI)	-0.0101	(0.0204)
2nd group	0.589*	(0.323)
3rd group	-2.643***	(0.401)
4th group	-2.789***	(0.368)
5th group	-0.477**	(0.179)
6th group	-1.819***	(0.459)
2nd group *Ln(Man FDI)	0.00205	(0.0241)
3rd group *Ln (Man FDI)	0.0922**	(0.0340)
4th group *Ln(Man FDI)	0.0590*	(0.0302)
5th group *Ln(Man FDI)	0.0455**	(0.0207)
6th group *Ln(Man FDI)	0.00816	(0.0377)
Ln(GDPPC)	1.392	(0.934)
Trade Openness	-0.0181**	(0.00616)
Corruption	0.0638**	(0.237)
Infrastructure	-0.0679**	(0.0242)
Education Exp/Total Exp	-0.0447***	(0.00843)
Observations	1,072	
Number of countries	15	
R-squared	0.590	

In our second analysis, we look at how the effect of manufacturing FDI on manufacturing employment differs by industry subgroups by interacting manufacturing FDI with subgroups (2) and (3). Table 2.5.1 shows the results of interacting manufacturing FDI with subgroup (2), and Table 2.5.2 shows the results of interacting with subgroup (3). In both cases, manufacturing FDI has the greatest effect on manufacturing employment when interacted with the 3rd group of industry sectors, which includes automotive/transport and industrial equipment related industries; a 1% increase in manufacturing FDI leads to a 0.084% (0.0913-0.00753) or 0.082% (0.0922-0.0101) increase in manufacturing employment for these industry sectors.[17] The next largest effect is with the 4th group of industry sectors, which includes business machines, consumer electronics, and medical devices related industries; a 1% increase in manufacturing FDI leads to a 0.05% (0.0573-0.00753) or 0.049% (0.0590-0.0101) increase in manufacturing employment. The 5th group of industry sectors comes next, which includes ceramics, metal, glass and minerals (and also coal, oil, and gas in subgroup (2)); a 1% increase in manufacturing FDI leads to a 0.04% (0.0433-0.00753) or 0.035% (0.0455-0.0101) increase in manufacturing employment. The 1st group–plastics and rubber, textiles, wood products related industries—and 2nd group—chemicals, food and beverages— of industry sectors either show a much smaller negative or positive effect but are insignificant. The control variables are mostly significant and show the same signs as in our main model, except for infrastructure that has flipped to a negative effect, for which we cannot find a probable explanation, but the interactions with the groups of industry sectors may have mixed up the effects.

In summary, the results show that automotive/transport and industrial equipment related industries create the most jobs, next is the business machines, consumer electronics, and medical devices related industries, and lastly the ceramics, metal, glass & minerals, and coal, oil, & gas

[17] By taking a derivative with manufacturing FDI, the equation becomes: -0.00753 + 0.00264*2nd group + 0.0913*3rd group + 0.0573*4th group + 0.0433*5th group, in the case of Table 2.5.1. To look at the effect of manufacturing FDI by sector, we substitute 1 and 0 appropriately into the group dummy variables. The same is applied with Table 2.5.2.

industries. In addition to direct employment creation, the results also reflect indirect employment creation through potential forward and backward linkages and technology or knowledge spillover effects that happen among industries in the same subgroups, which may also include local economic agents—since the dependent variable is the total number of manufacturing employment in an industry sector of country *c* and year *y*. Forward and backward linkages can happen, for example, among automotive components industries and OEM industries in the 3rd group, by stimulating the development of each other as part of being in different stages of the value chain. Technology or knowledge spillovers can happen among industries that use similar technology or knowledge, for example, among automotive components, automotive OEM, engines & turbines, and industrial equipment industries in the 3rd group. This applies the same in the other groups.

The 1st and 2nd groups do not show significant results, despite the fact that they have smaller K/L ratios than the rest (the K/L ratios gradually increase across the groups, with the 1st group having the smallest). This may be due to the fact that the indirect effects from spillovers and forward and backward linkages in these industries are not strong enough to show overall significant employment effects.

2.5 Robustness Check

Table 2.6, Table 2.7.1, and Table 2.7.2 show the results of using lagged Ln(GDPPC) instead of Ln(GDPPC), to account for potential multicollinearity between manufacturing FDI and GDP per capita. The results for the main effects in both the 1st and 2nd analyses are exactly the same, while there are some variations in the estimated coefficients of the control variables.

Table 2.6: Robustness Check with Lagged Ln(GDPCC)

	(1)	(2)	(3)	(4)
	Ln(Man Emp)	Ln(Man Emp)	Ln(Man Emp)	Ln(Man Emp)
Ln(Man FDI)	0.0389***	0.0298***	0.0266***	0.0181*
	(0.00426)	(0.00493)	(0.00526)	(0.00879)
Ln(GDPPC)	1.965***	1.786***	1.381***	0.548
	(0.292)	(0.281)	(0.348)	(0.592)
Trade Openness	0.00110	-0.00659**	-0.00606**	-0.00687
	(0.00169)	(0.00290)	(0.00276)	(0.00391)
Corruption	0.431***	1.055***	0.675**	0.0830
	(0.104)	(0.224)	(0.254)	(0.293)
Infrastructure Index	0.0267***	-0.0311	-0.0138	0.00633
	(0.00644)	(0.0194)	(0.0186)	(0.0208)
Education Exp/Total Exp	0.000830	-0.0220**	-0.0179**	-0.0153
	(0.00367)	(0.00802)	(0.00754)	(0.00956)
Observations	1,072	1,072	1,072	1,072
Number of countries	15	15	15	15
R-squared	0.562	0.545	0.571	0.668

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

Table 2.7.1: Robustness Check with Lagged Ln(GDPPC)

	Ln(Man Emp)	Standard Error
Ln(Man FDI)	-0.00753	(0.0191)
2nd group *Ln(Man FDI)	0.00264	(0.0241)
3rd group *Ln (Man FDI)	0.0913**	(0.0340)
4th group *Ln(Man FDI)	0.0573*	(0.0292)
5th group *Ln(Man FDI)	0.0433**	(0.0202)
Ln(GDPPC)	2.586***	(0.756)
Trade Openness	-0.0175**	(0.00616)
Corruption	1.196***	(0.299)
Infrastructure	-0.0814***	(0.0263)
Education Exp/Total Exp	-0.0345***	(0.00851)
Observations	1,072	
Number of countries	15	
R-squared	0.563	

Table 2.7.2: Robustness Check with Lagged Ln(GDPPC)

	Ln(Man Emp)	Standard Error
Ln(Man FDI)	-0.0101	(0.0204)
2nd group *Ln(Man FDI)	0.00205	(0.0241)
3rd group *Ln (Man FDI)	0.0922**	(0.0340)
4th group *Ln(Man FDI)	0.0590*	(0.0302)
5th group *Ln(Man FDI)	0.0455**	(0.0207)
6th group *Ln(Man FDI)	0.00816	(0.0377)
Ln(GDPPC)	1.496	(1.003)
Trade Openness	-0.0181**	(0.00616)
Corruption	0.700**	(0.248)
Infrastructure	-0.0671**	(0.0241)
Education Exp/Total Exp	-0.0360***	(0.0100)
Observations	1,072	
Number of countries	15	
R-squared	0.590	

Table 2.8, Table 2.9.1, and Table 2.9.2 show the results of using import as % of GDP instead of trade openness (defined as the total of import and export as % of GDP), as imports have been previously found to have a negative effect on employment and economic development of developing countries (Raj and Sasidharan, 2015; Onakoya et al., 2019). For the 1st analysis (Table 2.8), the results are mostly similar to the main results; the coefficients of manufacturing FDI and GDP per capita stay closely similar to the main result across all models. The results for corruption, infrastructure, and education also stay similar, while import has a negative effect across all models though it is insignificant. In the 2nd analysis (Table 2.9.1 and 2.9.2), the results again stay similar to the main results, while there are some variations in the magnitudes and significancy of the interaction terms—the interaction of manufacturing FDI with the 3rd group and 5th group show similar effects, while the interaction with the 4th group turns insignificant. The control variables all show similar results, while import shows a negative but insignificant effect.

Table 2.8: Robustness Check with Import

	(1) Ln(Man Emp)	(2) Ln(Man Emp)	(3) Ln(Man Emp)	(4) Ln(Man Emp)
Ln(Man FDI)	0.0365***	0.0276***	0.0244***	0.0172*
	(0.00553)	(0.00661)	(0.00695)	(0.00908)
Ln(GDPPC)	1.686***	1.757***	1.366***	0.635
	(0.272)	(0.272)	(0.333)	(0.471)
Import	-0.00576	-0.00773	-0.00731	-0.00254
	(0.00525)	(0.00507)	(0.00553)	(0.00416)
Corruption	0.271*	0.858***	0.501*	-0.0425
	(0.128)	(0.259)	(0.269)	(0.296)
Infrastructure Index	0.0248***	-0.0218	-0.00504	0.0180
	(0.00486)	(0.0188)	(0.0179)	(0.0177)
Education Exp/Total Exp	-0.0126***	-0.0318***	-0.0254***	-0.0157**
	(0.00287)	(0.00744)	(0.00743)	(0.00717)
Observations	1,086	1,086	1,086	1,086
Number of countries	15	15	15	15
R-squared	0.574	0.560	0.585	0.669

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

Table 2.9.1: Robustness Check with Import

	Ln(Man Emp)	Standard Error
Ln(Man FDI)	-0.0116	(0.0192)
2nd group *Ln(Man FDI)	0.0113	(0.0223)
3rd group *Ln (Man FDI)	0.0904**	(0.0326)
4th group *Ln(Man FDI)	0.0471	(0.0510)
5th group *Ln(Man FDI)	0.0477**	(0.0220)
Ln(GDPPC)	2.533*	(1.290)
Import	-0.00718	(0.00502)
Corruption	0.917**	(0.324)
Infrastructure	-0.0554*	(0.0269)
Education Exp/Total Exp	-0.0442***	(0.00938)
Observations	1,086	
Number of countries	15	
R-squared	0.575	

Table 2.9.2: Robustness Check with Import

	Ln(Man Emp)	Standard Error
Ln(Man FDI)	-0.0139	(0.0202)
2nd group *Ln(Man FDI)	0.0108	(0.0223)
3rd group *Ln (Man FDI)	0.0915**	(0.0331)
4th group *Ln(Man FDI)	0.0489	(0.0512)
5th group *Ln(Man FDI)	0.0478*	(0.0232)
6th group *Ln(Man FDI)	0.0167	(0.0360)
Ln(GDPPC)	1.617	(1.414)
Import	-0.00646	(0.00566)
Corruption	0.480*	(0.272)
Infrastructure	-0.0395	(0.0250)
Education Exp/Total Exp	-0.0387***	(0.00883)
Observations	1,086	
Number of countries	15	
R-squared	0.601	

2.6 Conclusion

The struggles of SSA's labor market have shown to be difficult to tackle, being a multifaceted problem, in terms of economic, political, and other societal aspects. More than ever, their economies are currently at a critical juncture, as the patterns that have led to large proportions of working poverty, informal and vulnerable employment are expected to persist, while the working-age population in the region is expected to increase 20 million per year over the next two decades. The results of our study indicate that attracting manufacturing FDI to the countries can be a key component of overcoming the difficulties.

The results from our first analysis show that manufacturing FDI has a positive and significant effect on manufacturing employment at the industry sector level in SSA countries. The results from our second analysis show that the level of manufacturing employment created by manufacturing FDI varies by industry groups; specifically, the automotive/transport and industrial equipment related industries create the most employment, followed by the business machines, consumer electronics related industries, and lastly the ceramics, metal, and glass and minerals related industries. The results also reflect indirect employment created through technology/knowledge/skill spillover effects and forward and backward linkages in the industry groups, in addition to the direct employment effects.

In conclusion, the results show that SSA countries would benefit from increased manufacturing FDI inflows for employment creation. In addition, the results provide evidence of indirect employment effects associated with spillover effects and forward and backward linkages. From a policy perspective, SSA countries could experience significant increase in employment by promoting projects and initiating policies that attract manufacturing FDI into their countries, preferably in the industry groups that are shown to create the most employment, as shown in our 2nd analysis. The positive effect of manufacturing FDI on manufacturing employment imply that it will contribute to not only increasing (formal) employment, but also industrial diversification/structural transformation that is currently critically needed in SSA countries.

The methodology and data used in this paper did not allow for us to look at the indirect employment effects through forward and backward linkages and spillovers effects that may happen with non-manufacturing industries, such as those included in the agriculture or service sectors. Future studies could incorporate data and methods that can study this, as the effects can be extensive. For example, there is a huge potential for development of the food industry in Africa, when the agriculture sector can be incorporated with appropriate manufacturing developments and innovations in the value chain.

Appendices

Appendix A. Appendix for Chapter 1

Table A.1: Countries in Final Sample

	Obs.	Manufac.	Ag.	AGFCF	FDI	GDPPC
High income		15.1416	2.4912	17.4942	5.0339	35,184.3868
Croatia	8	13.9485	4.7108	18.4219	5.2942	18,070.8250
Estonia	8	13.7396	2.8743	18.7827	8.7009	25,239.0625
Finland	4	18.0348	2.3202	16.9379	5.9235	40,993.0750
Greece	13	8.4099	3.5442	19.0054	0.8108	28,182.5308
Hungary	6	19.0143	3.8626	13.2154	8.8422	22,815.8000
Iceland	11	11.0225	5.8828	14.2655	6.9631	40,368.4545
Ireland	9	20.4700	1.1317	8.0351	16.0265	46,433.5444
Japan	1	22.0760	1.0609	23.6387	0.4791	36,697.2000
Korea, Rep.	4	26.3767	2.4797	29.7046	1.0296	28,350.4500
Latvia	11	11.3229	3.5488	22.7889	4.5096	19,379.7364
Lithuania	12	17.1894	3.6283	18.4950	2.8611	21,445.1667
Luxembourg	3	6.6066	0.3067	6.2108	13.3058	91,838.5333
Malta	3	10.8000	1.2726	9.8424	7.7757	29,806.3000
Norway	12	7.7864	1.3474	18.2472	3.1641	62,570.0917
Poland	19	16.5376	3.0824	17.2103	3.5386	18,462.0789
Portugal	13	12.1970	2.1671	16.6913	4.0479	26,600.7769
Slovak Republic	12	19.9575	3.4934	20.5655	3.9522	22,390.6917
Slovenia	11	19.7903	1.9569	22.2796	1.7274	28,093.1636
Spain	6	12.2804	2.3419	18.7576	2.3564	31,701.9000
Sweden	9	17.3192	1.3746	18.5115	3.9393	41,794.0556
United States	4	12.0483	1.0427	18.5470	1.9038	50,725.5000
Uruguay	21	14.8201	7.8573	13.1869	3.7686	14,524.0667
Austria	5	16.5439	1.2705	20.5134	2.1336	44,041.8400
Belgium	6	14.5756	0.8460	9.9342	12.4495	40,440.1667
Canada	6	13.7406	1.7024	19.2065	2.5567	38,539.8833
Chile	11	15.1321	5.2999	17.0617	6.7225	15,735.2264
Cyprus	4	5.6823	2.0956	15.7603	9.5534	35,157.0500
Czech Republic	6	22.0948	2.0895	22.5443	3.5416	28,496.7167
Denmark	4	11.4471	1.2076	17.3416	1.7942	44,351.9000
Germany	4	19.6834	0.7211	18.0431	1.6327	41,425.5250
Switzerland	5	18.7413	0.7060	18.5743	4.7474	56,044.6800
Upper middle income		16.9205	8.4696	21.1365	3.4950	11,421.1539
Dominican Republic	14	17.62175	6.37225	19.8857	3.9425	10100.0625
Guatemala	1	19.0785	10.6330	11.7417	2.5127	7,005.2100
Iran, Islamic Rep.	3	14.5708	6.5046	29.4521	1.1206	16,193.4333
Jamaica	4	9.9564	6.7757	19.7980	5.0048	8,178.0775
Jordan	4	14.8562	2.6179	18.1461	8.5903	8,107.1100
Malaysia	7	25.8437	9.7629	22.2048	3.9442	20,035.0429
Mexico	9	17.6813	4.0910	18.2267	2.3369	15,384.7778
Namibia	1	10.0249	6.6893	29.9284	3.4881	10,030.1000
Paraguay	5	18.9293	12.0553	18.0514	0.7099	8,563.5500
Peru	5	15.1569	8.2177	17.8210	3.7976	6,362.1380
Romania	16	21.4059	9.2187	20.7205	4.1560	14,805.8750
Russian Federation	13	13.6679	4.0121	17.6439	2.6894	21,797.8692
South Africa	5	14.6882	2.6912	17.3393	1.6858	11,217.6640
Sri Lanka	6	16.6952	14.3758	23.5805	1.2970	7,349.1550
Thailand	16	28.7747	9.7584	23.8656	3.3125	11,389.9238
Albania	2	4.9197	19.3822	27.1406	6.4403	8,604.4250

Table A.1: Countries in Final Sample (Continued)

Armenia	2	9.5537	18.1738	18.5113	3.8943	7,611.0900
Belarus	18	25.6506	9.2760	26.6771	2.3771	12,125.3211
Brazil	10	13.5892	4.9207	15.1846	2.9222	12,521.2200
Bulgaria	5	12.9078	4.4328	18.3493	4.3426	15,531.0000
China	7	31.4802	9.3023	41.0280	3.3025	10,214.8529
Colombia	12	13.6599	7.5921	16.5287	3.3228	10,707.3683
Costa Rica	22	17.7568	10.0436	15.5641	4.7482	10,172.3645
Lower middle income		16.7867	13.4951	20.0611	3.6086	5,598.9416
Egypt, Arab Rep.	5	16.2503	13.7513	14.9509	3.3282	8,524.8000
El Salvador	13	17.2189	6.2833	14.5098	2.2954	6,191.6438
Ghana	1	11.3670	20.2472	22.7555	6.4909	3,786.9600
Honduras	13	17.9140	12.2555	19.1613	6.2208	3,900.9877
India	1	17.0299	17.0265	31.5950	1.6350	4,451.2300
Indonesia	12	24.2565	14.7535	27.3264	1.7838	8,069.9375
Moldova	13	11.8132	12.4907	19.4965	5.5755	4,646.5654
Philippines	8	22.9049	15.0674	19.2987	1.6351	4,834.5975
Tunisia	3	16.3394	9.6020	21.2945	2.3112	8,687.9700
Ukraine	15	14.6177	9.3709	15.1931	4.0611	7,504.4720
Bangladesh	1	16.4802	17.1046	25.3266	0.8795	2,412.5000
Bolivia	4	15.2478	13.9877	9.8244	7.0869	4,175.6350
Low income		5.5667	41.1782	22.1310	1.1808	1,423.5500
Togo	1	5.5667	41.1782	22.1310	1.1808	1,423.5500
Grand Total	528	16.7205	6.4247	18.7928	4.1435	20,091.1467

Figure A.1: Sample Distribution

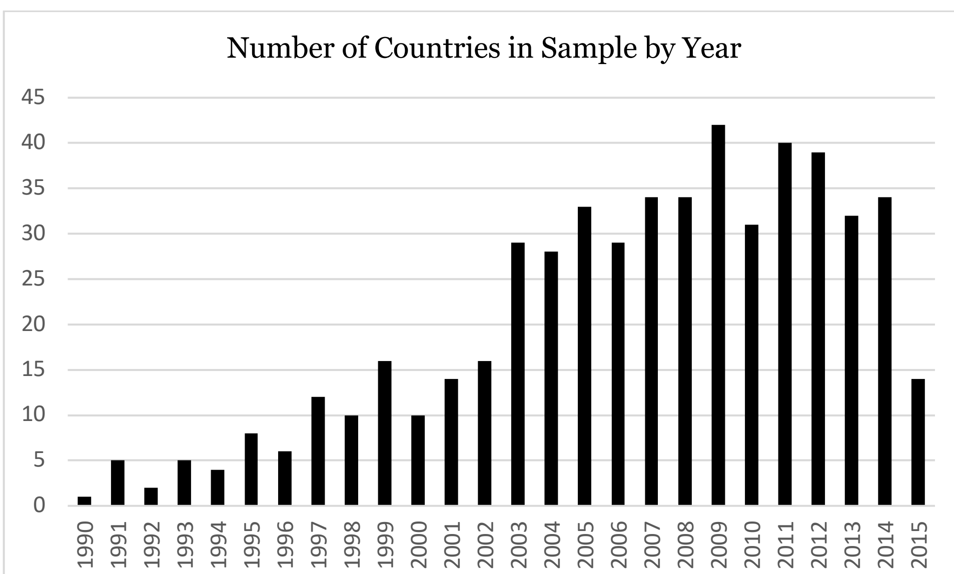


Table A.2: Percentage of Industry Sectors (% of GDP) of Countries Categorized by the Service Sector Level

Countries by Level of Services	Services	Manufacturing	Agriculture
Services 70-79%	72.83844	11.12386474	1.512693
Services 60-69%	63.66723	13.91053838	3.312829
Services 50-59%	55.43792	16.86327154	6.384443
Services 40-49%	45.51623	20.79379483	11.04659
Services 30-39%	37.9677	23.634279	16.20506

Table A.3: Percentage of Industry Sectors (% of GDP) of Countries by Income Level

	Services	Manufacturing	Agriculture
High income countries	60.3249	15.1416	2.4912
Upper middle income countries	52.4902	16.9205	8.4696
Lower middle income countries	51.9735	16.7867	13.4951
Low income countries	31.0333	5.5667	41.1782

Table A.4: Correlation Matrix

	Avg Inc Bottom 20%	FDI	Manufac.	Ag.	Ser.	Ln (GDPPC)	AGFCF	Unemp.
Avg Inc Bottom 20%	1							
FDI	0.1353	1						
Manuf.	-0.1795	-0.2239	1					
Ag.	-0.6731	-0.0962	0.1079	1				
Services	0.5019	0.1374	-0.3878	-0.6524	1			
Ln (GDPPC)	0.8681	0.1043	-0.1247	-0.8261	0.5522	1		
AGFCF	-0.0796	-0.4292	0.2915	0.0975	-0.2954	-0.0922	1	
Unemp.	-0.0716	0.0164	-0.2912	-0.0809	0.1516	-0.054	-0.2009	1

Table A.5: Description of Variables

Variable	Description
Foreign direct investment as percentage of GDP	Foreign direct investment is measured as a percentage of GDP and obtained from World Bank WDI (World Development Indicators). It is the net inflows of investment that acquires a long-term management interest (10 percent or more of the voting stock) in an enterprise operating in a country other than that of the investor. It is the total of equity capital, reinvestment of earnings, other long-term capital, and short-term capital. This indicator reflects net inflows (new investment inflows less disinvestment) from foreign investors in the reporting country and is divided by GDP.
Agriculture as percentage of GDP	Agriculture refers to ISIC divisions 1-5 that include forestry, hunting, and fishing, as well as cultivation of crops and livestock production.
Service as percentage of GDP	Services refer to ISIC divisions 50-99, which include value added in wholesale and retail trade (including hotel and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services. It also includes imputed bank service charges and import duties.
Manufacturing as percentage of GDP	Manufacturing refers to industries that belong to ISIC divisions 15-37. The measurement is in terms of value added, which is the net output of a sector after adding up all outputs and subtracting intermediate inputs. It is measured without taking deductions for depreciation of fabricated assets or depletion and degradation of natural resources.
Gross fixed capital formation as percentage of GDP	It includes land improvements (fences, ditches, drains etc.); plant, machinery, and equipment purchases; and the construction of roads, railways, schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. Net acquisitions of valuables are also considered capital formation according to the 1993 SNA.
Trade openness as percentage of GDP	This is calculated as the total of exports and imports divided by GDP. Imports of goods and services reflect the value of all goods and other market services received from the rest of the world. They include the value of merchandise, freight, insurance, transport, travel, royalties, license fees, and other services, such as communication, construction, financial, information, business, personal, and government services. They exclude compensation of employees and investment income (formerly called factor services) and transfer payments. Exports of goods and services represent the value of all goods and other market services provided to the rest of the world. The specifics are the same as above.
Tax revenue as percentage of GDP	Tax revenue refers to compulsory transfers to the central government for public purposes. Certain compulsory transfers such as fines, penalties, and most social security contributions are excluded. Refunds and corrections of erroneously collected tax revenue are treated as negative revenue.

Table A.5: Description of Variables (Continued)

General government final consumption expenditure as percentage of GDP	This indicator includes all government current expenditures for purchases of goods and services (including compensation of employees). It also includes most expenditures on national defense and security but excludes government military expenditures that are part of government capital formation.
Percentage change in inflation rate	This is calculated as the following: $\frac{Inflation_{t+1} - Inflation_t}{Inflation_t}$, and reflects the annual percentage change in inflation. Inflation here is based on the consumer price index and reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.
Log of GDP per capita in constant 2011 PPP $	GDP is converted to international dollars using purchasing power parity rates. GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products.
Unemployment as percentage of total labor force	This refers to the share of the labor force that is without work but available for and seeking employment.
Corruption	The corruption indicator is based on the perception of foreign investors of how corrupt a country is. It ranges from numbers 1 to 6, where higher numbers mean a country is less corrupt.

*Corruption is from International Country Risk Guide (ICRG), all other indicators are from World Bank's World Development Indicators (WDI).

Appendix B. Appendix for Chapter 2

Table B.1: Matching Industry Sectors from fDi Markets and Diao et al. (2021)

Industry sector categorization	fDi Markets	Diao et al. (2021)
1	Textiles	Apparel; Textiles; Leather
2	Wood products	Wood; Furniture
3	Plastics & Rubber	Rubber & plastics
4	Food & Beverages	Food products; Beverages
5	Chemicals	Chemicals
6	Paper, printing & packaging	Paper; Printing
7	Metals	Basic metals; Fabricated metal products
8	Engines & turbines & Industrial equipment; Automotive components & OEM; Non-automotive transport OEM & Space & defense & Aerospace	Vehicles
9	Communications & Consumer electronics; Electronic components; Business machines & equipment; Medical devices	Computer, electronic, & optical
10	Ceramics & glass & minerals	Non-metallic minerals

Table B.2: K/L ratio Averages from Diao et al. (2012)

Group	Industry sectors	K/L ratio
1	Textiles	17.2850
	Wood products	21.9989
	Plastics & Rubber	24.8186
	Paper, printing & packaging	26.4955
2	Chemicals	28.2835
	Food & Beverages	44.1390
3	Engines & turbines & Industrial equipment; Automotive components & OEM; Non-automotive transport OEM & Space & defense & Aerospace	52.7282
4	Communications & Consumer electronics; Electronic components; Business machines & equipment; Medical devices	64.8580
5	Metals	88.0679
	ceramics & glass & minerals	97.7826
6	Coal, oil & gas	

*Industry sector “coal, oil & gas” was not available in Diao et al.’s(2021) paper.

Table B.3. Import to Export Ratios of Countries in Sample

	Import to Export Ratio
Botswana	0.9718
Burundi	3.9526
Cameroon	1.1666
Cape Verde	1.6649
Eswatini	1.0883
Ethiopia	2.6894
Gambia	1.6140
Ghana	1.4148
Kenya	1.5651
Madagascar	1.4083
Malawi	1.5090
Mauritius	1.1913
Niger	1.9369
Senegal	1.6592
South Africa	1.0083
Total Average	1.6560

*The ratios were calculated as the average of the ratios between 2003 and 2018 in each country, calculated as $\frac{\text{Import as \% of GDP}}{\text{Export as \% of GDP}}$

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