

Effect of Different Types of Foreign Direct Investment on Economic Growth: Panel Data Analysis

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Abstract

This study examined whether different types of foreign direct investment have different effects on economic growth. Specifically, it examined if the different types of foreign direct investment could complement or could displace domestic investment in Sub-Saharan Africa vs. in rest of the world. The study utilized panel data from 142 (36 Sub-Saharan Africa and 106 others) countries over the period of 2003-2017. Possible endogeneity bias was addressed using generalized method of moment estimator. The study revealed that intensive margins of Greenfield foreign direct investment and cross-border merger and acquisition influence economic growth in rest of the world. In Sub-Saharan Africa, however, only extensive margin of Greenfield foreign direct investment is robustly influencing economic growth. The study further identified that Greenfield foreign direct investment margins might displace domestic investment while cross-border merger and acquisition margins could complement domestic investment in rest of the world. In Sub-Saharan Africa, nonetheless, the study reveals that only extensive margin of Greenfield foreign direct investment robustly complements domestic investment. Therefore, Sub-Saharan Africa countries such Ethiopia could directly promote their economic growth by attracting larger numbers of Greenfield foreign direct investment projects rather than inviting foreign direct investment with intensive investments in a few projects. Policies that augment human capital and promote domestic investment could help Sub-Saharan Africa countries to accelerate their economic growth with the help of Greenfield foreign direct investment..

Keywords: Foreign direct investment, Greenfield, intensive margin, extensive margin, endogeneity

Introduction

In 21st century, we live in a highly globalized world and globalization has become an inevitable phenomenon. The ever increasing interdependences among economies have been deepened by increase in international trade flows, international migration and international investment in the form of foreign direct investment (FDI). The interdependences among economies have been supported by enormous improvement in information and communication technology (ICT) and

advancement in transport facilities. Domestic, regional and international level reforms have also accelerated the interconnectedness among countries as documented in Garas, Lapatinas and Poullos (2016).

Literature in the field of international economics has well documented the pros and the cons of globalization. However, there are a lot of outstanding issues as how different aspects of globalization process influence economic growth. The focus of this study is on FDI-growth nexus. The reason is that global FDI flows have surpassed even international

trade flows in recent years and has become the major channel that link economies across borders. For example, Blonigen (2005) argues that multinational enterprises (MNEs) activity in the form of FDI has been growing at a faster rate than most of the other international transactions.

As per African Union Commission/OECD (2018), between 2000 and 2016, Africa has registered impressive annual economic growth averaging 4.6% well above Latin American and Caribbean (2.8%) but less than developing Asia (7.2%). It is, therefore, interesting to identify factors contributing to this impressive growth in Africa focusing on Sub-Saharan Africa (SSA). The current study intends to see the effect of FDI on economic growth since FDI flows has been surging over the last decades.

There are two types of FDI modes: Greenfield FDI and cross-border merger and acquisition. While Greenfield FDI involves construction of new facilities, cross-border merger and acquisition is combinations of two or more companies that aim to attain strategic objectives. This means that greenfield FDI involves constructing a new company in a host country from the foundation. Cross-border merger and acquisition, however, includes either acquiring an existing company entirely or purchasing certain shares of a foreign company (Chala and Lee, 2015). In addition it is interesting to examine the effects of FDI margins on economic growth. There are two types of FDI margins. The first one is an extensive margin, which refers to the number of Greenfield FDI or cross-border merger and acquisitions projects counts. The second one is an intensive margin, which refers to how much value invested per Greenfield FDI or cross-border M&A investment project.

Intuitively, there are a number of pathways through which FDI could influence economic growth in a host country. First, FDI in the form of Greenfield investment greatly contributes to a host country's economic growth since it contributes to expanding the host country's capital stock (Ghazanchyan and Stotsky, 2013). Second, cross-border merger and acquisition could affect economic growth since it often

affects total factor productivity (TFP) as documented by Ashraf et al. (2016). Thirdly, FDI may exert a positive influence on local investment, perhaps because the attraction of complementary activities could dominate the displacement of local competitors. This is an indirect effect of FDI on economic growth since local companies sometimes provide inputs utilized by multinational enterprises (MNEs) themselves. Fourth, FDI may stimulate domestic investment and encourage improvements in human capital and institutions in countries that host FDI. This is because FDI may complement domestic capital formation and MNEs often utilize better technology that requires advanced knowledge. The local firms strive to improve their efficiencies to survive competitions (Farole and Winkler, 2014).

Theoretical arguments present conditions required for FDI to have a positive effect on economic growth. For example, Benhabib and Spiegel (1994) and Nelson and Phelps (1966) contend that countries which host FDI should have a certain level of an absorptive capability as a requirement for FDI to promote their economic growth. This suggests that human capital and FDI are complementary in the process of economic growth. Another theoretical notion states that FDI may complement or displace domestic investment. Crowding-out effect could be possible since MNEs may compete for financial resources, product and/or resource markets with local companies and then displace them out. To the contrary, a possible crowding-in effect of FDI on economic growth may happen. This is because FDI may favor domestic companies to flourish by complementing them in production or enhancing their efficiencies via advanced technology spillover effects. For example, Findlay (1978) claims that FDI increases technological progress in a host country through spillover effect from latest technology, best management practices, and efficient production technique used by MNEs in countries which host FDI.

From empirical viewpoints, there are many studies, which investigate the effect of FDI on economic growth. However, FDI-growth nexus has been inconclusive. In addition, there are

limited research works that attempt to examine as how different types of FDI modes (Greenfield vs. cross-border merger and acquisition) and FDI margins (number of investment project counts) affect economic growth. The channels through which these different modes and margins of FDI affect economic growth are not well documented particularly in Sub-Saharan Africa. Studies that decompose FDI into Greenfield and cross-border merger and acquisition argue that only greenfield FDI affects economic growth (Ghazanchyan and Stotsky, 2013). These all mixed findings justify the need to undertake a comprehensive study in the area of FDI-growth nexus.

Using cross-country data for the period 1981-1999, Alfaro (2003) concludes that total FDI exerts an ambiguous effect on economic growth. The author argues that the sector in which investment is undertaken matters most. According to the author, FDI in primary sector seems to have a negative association with economic growth while FDI in manufacturing sector has a positive association with economic growth. The author further contends that the effect of FDI in service sector is ambiguous. Similarly, using a panel of 58 countries over 1980-2004, Noormamode (2008) finds that there is no clear-cut evidence on FDI-growth nexus.

Likewise, Alfaro et al. (2003) examine the role of financial markets in FDI-economic growth association. The authors find that well developed financial market allow significant gain from FDI while FDI alone has an ambiguous effect on economic growth. This contradicts with a finding by Behname (2012) which concludes that FDI has positive and statistically significant effect on economic growth in Southern Asia countries for the time period 1977-2009. Nevertheless, the study has not decomposed FDI into greenfield and cross-border border merger and acquisition. Neither the study examines the effects of the extensive vs. intensive margins.

In a related study, Alfaro et al. (2006) contend that local financial markets play an enabling role for FDI to stimulate economic growth

through backward and forward linkages. The authors further argue that local conditions such as market structure and human capital are important for the effect of FDI on economic growth confirming the theoretical notion which states that some conditions shall be satisfied for FDI to contribute to economic growth.

More interestingly, other studies disaggregate FDI into greenfield FDI and cross-border M and A. For instance, Calderón et al. (2004) argue that in both developed and developing countries, both modes of FDI lead domestic investment but not the reverse. Furthermore, the authors find that both FDI modes do not appear to precede economic growth in either developing or developed economies. However, the authors argue that FDI responds positively to economic growth. In related study, Harms and Méon (2014) find that only greenfield investment contributes to economic growth of host countries as it adds to the countries capital stock. However, the authors argue that cross-border merger and acquisition simply involves rent accumulating to previous owners and hence contributes less to economic growth of host country.

In a similar way to Calderón et al. (2004), Ashraf et al. (2016) examine the effect of greenfield investment and cross-border merger and acquisition on TFP in developed and developing countries hosting FDI. Utilizing panel data from 123 countries for the time period 2003-2011, the authors find that greenfield FDI has no statistically significant effect on TFP while cross-border M and A has positive effect on TFP. They argue that both greenfield FDI and M and As appear to be ineffective in increasing TFP in the sub-sample of developing countries. Nevertheless, merger and acquisition has a strong and positive effect on TFP in the sub-sample of developed countries.

Focusing on China, which has become top among emerging economies in terms of attracting FDI inflows, Tuan et al. (2009) investigate the association between FDI and productivity growth. By addressing endogeneity of TFP and the simultaneous relations of FDI in affecting TFP and economic

growth, the authors find that FDI exerts spillover effects and affects TFP growth of the host countries. Their finding contrasts the finding documented by Ashraf et al. (2016).

By using dynamic simultaneous-equation model, Omri et al. (2015) investigated causality links between FDI and economic growth in panel of 54 countries covering different regions of the world. The authors find bidirectional causality between FDI inflows and economic growth. In a related study, however, Abbes et al. (2015) find a different result as compared to Omri et al. (2014). By considering 65 countries, the authors find unidirectional causality running from FDI to GDP. The authors argue that the unidirectional association running from FDI to economic growth may help countries allocate resources to attract FDI inflows.

In another yet related study, using Generalized Method of Moment (GMM) estimator, Hong (2014) evaluates the effects of FDI on economic growth in China for the period 1994-2010. By utilizing data from 254 Chinese cities, the author finds that FDI exerts positive impact on economic development in China. The author further argues that FDI influences economic growth via economies of scale, level of human capital, and level of wage.

Azman-Saini et al. (2010) uses cross-country data from 91 countries over the time period 1975–2005. The study utilized a threshold regression model and finds that the positive impact of FDI on economic growth exists only after financial market development exceeds a threshold level. The authors argue that until then the effect of FDI on economic growth is non-existent.

Some studies argue that the relationship between FDI and economic growth may vary from country to country. For example, Moudatsou (2003) find that only past FDI inflows have a significant effect on economic growth in European Union (EU) countries. The author further finds that FDI has both direct and indirect (via trade reinforcement) effect on economic growth in EU member countries. The author also argues that the effect of FDI on

economic growth is conditional upon the level of human capital in developed countries hosting FDI. Likewise, Noormamode (2008) argues that the nature of FDI-growth relationships could vary based on the income level of countries.

Feeny et al. (2014) examine the effect of FDI on economic growth in the Pacific region. The authors find that higher FDI inflows are associated with higher economic growth in the region. However, the study argues that the impact of FDI on economic growth is lower in Pacific countries than it is in other countries hosting FDI. This finding implies that effect of FDI on economic growth may vary from region to region. Similarly, Nistor (2014) argues that the impact of FDI on economic growth in countries hosting FDI depends on area and region of hosting countries. The author contends that quality and quantity of FDI may also matter.

In a very recent study, Bouchouch and Ali (2019) examine short and long run relationships between FDI and economic growth using time series data for Tunisia over the time period 1980-2015. The authors find that FDI has positive effect both in the short and long run.

Focusing on SSA, Adams (2009) investigates FDI, domestic investment and economic growth for the period 1990-2003. The author finds that FDI has an initial negative effect on domestic investment and subsequent positive effect in the later periods. The author contends that FDI could crowd-out the domestic capital formation. Similarly, Ijirshar et al. (2020) utilize a dynamic panel model to investigate growth- differential effects of FDI and domestic investment. The author finds that both FDI and domestic investment are important for economic growth in the long run. The author further documents that FDI crowds-in domestic investment in Africa.

This study aims to address the above gaps in the following ways. First, the study examines whether extensive and intensive margins of greenfield FDI and cross-border merger and acquisition affect economic growth differently.

Second, the paper examines if SSA is unique pertaining to the effects of different types of FDI on economic growth is concerned. Third, the study analyses whether attaining certain thresholds of human and/or physical capital are indeed a requirement for FDI to influence economic growth in SSA. Finally, the study tests whether the different types of FDI modes and margins crowds-out or crowds-in domestic investment in the process of economic growth in rest of the world vs. SSA..

Estimation strategy, the data, and procedures of data interpretation

Following Mankiw *et al.* (1992); Barro and Sala-i-Martin (1995), the standard neoclassical-growth model could be derived from Cobb-Douglas production function given by:

$$Y(t) = K(t)^\alpha H(t)^\beta \{A(t)L(t)\}^{1-\alpha-\beta} \dots\dots(1)$$

Where $Y(t), K(t), H(t)$ and $L(t)$ denote respectively GDP, physical capital; human capital and labour at time t ; α and β are partial elasticities of output with respect to capital and labour respectively. $A(t)$ denotes the level of technology or efficiency. Here, the production function is assumed to exhibit constant returns to scale. Taking the natural logarithm of both sides of equation (1), we get the bench mark growth equation. By introducing cross-section dimension (i) and times series dimension (t), we obtain panel data model specification:

$$Y_{it} = \emptyset + \alpha \ln K_{it} + \beta \ln H_{it} + (1 - \alpha - \beta)(\ln A_{it} + \ln L_{it}) + \varepsilon_{it} \dots\dots\dots (2)$$

Where ε_{it} is an error term such that $\varepsilon_{it} \sim N(0, \sigma^2)$ and \emptyset is constant term. Augmenting equation (2) and following Edwardo *et al.* (1998), the model to be estimated take the following form:

$$\ln GDP_{it} = \beta_0 + \beta_1 \ln FDI_{it} + \beta_2 HC_{it} + \beta_3 \ln(HC_{it} * \ln FDI_{it}) + \beta_4 \ln(\ln DIV_{it} * \ln FDI_{it}) + \beta_5 \ln Z_{it} + \mu_t + \gamma_i + \varepsilon_{it} \dots\dots\dots (3)$$

Where GDP_{it} is of GDP of country i in year t; FDI_{it} denotes foreign direct investment in the form of greenfield FDI or cross-border merger and acquisition of country i in year t. FDI_{it} also denotes intensive margin or extensive margin of greenfield FDI or cross-border merger and acquisition alternatively. HC_{it} stands for human capital (year of schooling) of country i in year t; DVI_{it} denotes domestic investment for country i in year t; Z_{it} denotes other control variables often included in growth equations such as government size; freedom to internationally trade, sound money, legal system, property right, openness of county i in year t. μ_t represents time-fixed effect that captures country characteristics that do not vary cross-sectionally but vary overtime. Incorporating time fixed effect accounts for global business cycle in the form of booms and recessions that may affect economic growth in host countries. γ_i denotes regional heterogeneities which do not vary overtime but vary from regions to regions.

The data utilized in this research are compiled from different sources such as World Bank Data base; United Nations Conference on Trade and Development; Pen World Table 9.1)

The techniques and data analysis procedure utilized in the current is based on our model specification and as how the variables, that is, the dependent and independent variables enter the model. As shown in equations (1), we started from Cobb-Douglass production function. In equation (2), we have transformed the model into double logarithms in order to linearize the coefficients. Consequently, we interpret the coefficients as elasticities. In equation (3), we have augmented the model by incorporating different modes (greenfield and cross-border merger and acquisition) and margins of the two modes of foreign direct investment. In addition, we have interacted

domestic investment with modes and margins of foreign direct investment to test whether foreign direct investment crowds-in or crowds-out domestic investment in the process of economic growth. Likewise, we have interacted human capital with the modes and margins of foreign direct investment to examine the role of host countries' human capital in economic growth-foreign direct investment nexus.

To address the objectives of the study, this section focuses on examining the effects of different types of FDI modes and margins on economic growth. In addition, the study is interested to analyze whether FDI displaces or complements domestic investment. The study farther aims to test whether countries in SSA Africa are different from the rest of the world in FDI-growth nexus.

Results and discussion

Table 1: Margins and Modes of FDI and Economic Growth: RoW vs. Sub-Saharan Africa Using Fixed Effects Estimator

Dependent variable: GDP_{it}^{\wedge}	Rest of the World				Sub-Saharan African Countries			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 6	Model 6
Greenfield intensive $_{it}^{\wedge}$	0.014* (0.008)				0.022* (0.013)			
Greenfield extensive $_{it}^{\wedge}$		0.012 (0.013)				0.041* (0.022)		
M&A intensive $_{it}$			0.016*** (0.004)				0.012 (0.012)	
M&A extensive $_{it}^{\wedge}$				0.017 (0.010)				0.009 (0.021)
Human capital $_{it}$	0.198** (0.077)	0.174** (0.076)	0.183** (0.081)	0.145* (0.077)	-0.023 (0.244)	0.038 (0.235)	-0.380 (0.371)	0.050 (0.246)
Property Right $_{it}^{\wedge}$	0.261*** (0.022)	0.256*** (0.022)	0.261*** (0.024)	0.256*** (0.022)	0.168*** (0.050)	0.158*** (0.049)	0.258*** (0.070)	0.165*** (0.050)
Sound money $_{it}$	0.014 (0.009)	0.018** (0.009)	0.018* (0.010)	0.019** (0.009)	-0.026 (0.019)	-0.032* (0.018)	-0.043 (0.033)	-0.036* (0.019)
Freedom to globally trade $_{it}$	0.018 (0.014)	0.014 (0.014)	0.024 (0.017)	0.018 (0.014)	0.040 (0.032)	0.035 (0.031)	0.068 (0.044)	0.046 (0.033)
Size of government $_{it}$	-0.008 (0.013)	-0.008 (0.013)	0.002 (0.014)	-0.009 (0.013)	0.045 (0.030)	0.034 (0.029)	0.027 (0.041)	0.039 (0.031)
Legal system $_{it}$	0.027* (0.016)	0.021 (0.016)	0.025 (0.017)	0.017 (0.016)	0.122** (0.048)	0.133*** (0.046)	0.102 (0.064)	0.134*** (0.048)
Openness $_{it}$	-0.428*** (0.043)	-0.430*** (0.042)	-0.434*** (0.046)	-0.435*** (0.043)	-0.627*** (0.144)	-0.624*** (0.140)	-0.625*** (0.209)	-0.618*** (0.145)
Constat	21.989*** (0.341)	22.111*** (0.336)	22.059*** (0.371)	22.214*** (0.342)	21.043*** (0.726)	21.103*** (0.682)	21.402*** (1.132)	21.010*** (0.715)
Year Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1150	1165	963	1146	175	190	118	184
R-sq	0.795	0.794	0.793	0.793	0.851	0.850	0.855	0.849
rmse	0.162	0.162	0.159	0.161	0.137	0.136	0.139	0.139

Note : 1. Standard errors in parentheses

2. Significant variables are denoted by ***, ** and * at 1%, 5% and 10% respectively

3. \wedge denotes that the variables are in their natural logarithmic form

First, the paper examines if FDI modes and margins have a direct effect on economic growth. The empirical results on the direct effects of different types of FDI modes and margins on economic growth are presented in Table 1. For comparison purpose, countries are grouped into two sub-samples, namely, RoW vs. SSA. As summarized in Table 1 under Models 1 and 3, intensive margins of both greenfield FDI and cross-border M and A enter the models with positive and statistically significant coefficient at 10% and 1% respectively. Specifically, 1% increase in intensive margin of greenfield FDI is associated with 0.014% change in economic growth rest of the world. Likewise, 1% increase in the intensive margin of cross-border M and A leads to 0.016% change in RoW. The results are consistent with a finding by Luu (2016) which argues that both greenfield FDI and cross-border M&A have positive effect on economic growth in emerging countries. However, the author has not distinguished extensive margins from intensive margins. This implies that intensive margins of greenfield investment and cross-border M&A are more important in influencing economic growth than their extensive margins in rest of the world.

The positive effect of greenfield FDI on economic growth is also consistent with a finding by Hong (2014). As per the author, economies of scale, human capital; infrastructure and wage level are pathways through which FDI promotes economic growth in China. The author, however, argues that FDI may likely displace domestic capital formation.

When the sub-sample of countries are limited to SSA, both extensive and intensive margins of greenfield FDI enter the models with statistically significant and positive coefficients. Explicitly, 1% increase in intensive and extensive margins of greenfield FDI is associated with 0.022% and 0.041% change in economic growth. The finding is intuitively appealing since greenfield investments undertaken by MNEs often bring in latest managerial knowledge and advanced technology which often spillover to local companies thereby promoting economic growth in countries hosting FDI. Besides, it

specifically adds to host countries' capital stock. This empirical result supports the finding by Harms and Méon (2014) though authors have not considered extensive margin of greenfield FDI but focused just on aggregated value of greenfield FDI.

The finding that extensive margin of greenfield FDI has positive association with an economic growth process in SSA also sounds well (See Tables 2, 3 and 4). This is because having larger number of investment projects could be considered as diversification that increases the probability of project success in developing regions such as SSA which are characterized by a lots of country risks. This is in line with the argument advanced by Keller and Yeaple (2009b) which contend that substantial technology spillovers from FDI occurs only when the diversification of multinational affiliates is accounted for in their FDI activities.

Furthermore, larger numbers of project counts cover larger areas increase the chance to fairly distribute benefits generated by FDI. This in turn could contribute to reduce income inequality which often paves way for sustainable economic growth. The positive association between greenfield FDI in SSA once again reinforces the finding by Luu (2016); Harms and Méon (2014) though the authors have not distinguished extensive and intensive margins as discussed earlier.

The direct effect of greenfield FDI on economic growth in SSA is consistent with our expectations This is because countries in SSA often lack complementarities such as high level of human capital and domestic investment often considered as requirements for countries to benefit from FDI inflows. Thus, countries in SSA could directly accelerate their economic growth with the help of greenfield FDI even if they do not have the required human capital and domestic investment at the inception. The possible reason for this direct effect could be because soon after MNEs start constructing new facilities, worker starts acquiring the required human capital hoping that you can get job in this business. By the time the construction of the facilities is completed, the

labourers have already acquired the needed human capital. This helps the MNEs to operate efficiently without any delay. Studies such as Luu (2016); Alfaro et al. (2006) argue that certain threshold of human capital is required for countries to benefit from FDI. However, the current study finds that such a threshold of human capital may not be required when FDI is

in the form of greenfield FDI particularly when it comes with large number of project counts. A study by Feeny et al. (2014) also supports the finding that FDI contributes to economic growth. Nevertheless, similar to the other studies discussed above, these authors have not decomposed FDI into its different modes and margins.

Table 2: Margins and Modes of FDI and Economic Through Human Capital - Fixed Effects Estimator Result

Dependent variable: GDP _{it} [^]	Rest of the World				Sub-Saharan African Countries			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 6	Model 6
Greenfield intensive _{it} [^] *Human Capital	0.007** (0.003)				0.010 (0.007)			
Greenfield extensive _{it} [^] *Human Capital		-0.002 (0.005)				0.024** (0.012)		
M&A intensive _{it} [^] *Human Capital			0.006*** (0.002)				0.003 (0.006)	
M&A extensive _{it} [^] *Human Capital _{it}				0.002 (0.004)				0.003 (0.010)
Property Right _{it} [^]	0.257*** (0.022)	0.260*** (0.022)	0.259*** (0.024)	0.258*** (0.022)	0.172*** (0.049)	0.162*** (0.048)	0.262*** (0.070)	0.165*** (0.049)
Sound money _{it}	0.015 (0.009)	0.019** (0.009)	0.020** (0.010)	0.019** (0.009)	-0.025 (0.018)	-0.029 (0.017)	-0.027 (0.029)	-0.037** (0.018)
Freedom to globally trade _{it}	0.018 (0.014)	0.016 (0.014)	0.026 (0.017)	0.019 (0.014)	0.041 (0.030)	0.042 (0.028)	0.085** (0.041)	0.045 (0.031)
Size of government _{it}	-0.007 (0.013)	-0.006 (0.013)	0.002 (0.014)	-0.008 (0.013)	0.046 (0.030)	0.037 (0.029)	0.039 (0.040)	0.039 (0.030)
Legal system _{it}	0.020 (0.016)	0.014 (0.015)	0.018 (0.017)	0.013 (0.015)	0.122** (0.048)	0.130*** (0.045)	0.083 (0.062)	0.135*** (0.047)
Openness _{it}	-0.448*** (0.042)	-0.454*** (0.042)	-0.454*** (0.045)	-0.447*** (0.042)	-0.629*** (0.143)	-0.619*** (0.139)	-0.645*** (0.207)	-0.613*** (0.144)
Constat	22.577*** (0.249)	22.634*** (0.247)	22.606*** (0.278)	22.622*** (0.250)	20.974*** (0.472)	21.057*** (0.444)	20.491*** (0.651)	21.110*** (0.458)
Year Fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1150	1165	963	1146	175	190	118	184
R-sq	0.794	0.793	0.792	0.792	0.850	0.851	0.851	0.849
rmse	0.162	0.162	0.160	0.162	0.137	0.136	0.140	0.139

Note : 1. Standard errors in parentheses

2. Significant variables are denoted by ***, ** and * at 1%, 5% and 10% respectively

3. ^ denotes that the variables are in their natural logarithmic form

As discussed in related literature review section, there are a number of studies which argue that the effect of FDI on economic growth depends on the absorptive capacity of countries hosting FDI. To investigate whether different modes and margins of FDI really work via human capital in the process of

economic growth, the interaction between different types of FDI and host country human capital are included into the regressions as presented in Table 2.

Table 3: Margins and Modes of FDI and Economic Through Domestic Investment Using Fixed Effect Estimator Result

Dependent variable: GDP [^] _{it}	Rest of the World				Sub-Saharan African Countries			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
Greenfield intensive [^] *Domestic investment _{it} [^]	0.001*** (0.000)				0.001*** (0.001)			
Greenfield extensive*Domestic investment _{it}		0.002*** (0.001)				0.002** (0.001)		
M&A intensive [^] *Domestic investment _{it}			0.001*** (0.000)				0.001 (0.000)	
M&A extensive [^] *Domestic investment _{it} [^]				0.001** (0.000)				0.001 (0.001)
Human capital _{it}	0.191** (0.076)	0.182** (0.076)	0.182** (0.081)	0.136* (0.077)	-0.146 (0.224)	-0.101 (0.216)	-0.558 (0.359)	-0.095 (0.227)
Property right [^] _{it}	0.256*** (0.022)	0.243*** (0.022)	0.259*** (0.024)	0.252*** (0.022)	0.180*** (0.045)	0.174*** (0.044)	0.260*** (0.065)	0.179*** (0.045)
Sound money _{it}	0.014 (0.009)	0.017* (0.009)	0.018* (0.010)	0.018* (0.009)	-0.039** (0.017)	-0.043*** (0.016)	-0.061* (0.031)	-0.052*** (0.017)
Freedom to globally trade _{it}	0.016 (0.014)	0.015 (0.014)	0.024 (0.017)	0.018 (0.014)	0.064** (0.029)	0.060** (0.028)	0.086** (0.042)	0.077** (0.030)
Size of government _{it}	-0.008 (0.013)	-0.009 (0.013)	0.002 (0.014)	-0.009 (0.013)	0.016 (0.028)	0.005 (0.027)	-0.008 (0.039)	0.008 (0.029)
Legal system _{it}	0.024 (0.016)	0.022 (0.016)	0.025 (0.017)	0.016 (0.016)	0.088* (0.045)	0.095** (0.043)	0.122* (0.062)	0.100** (0.045)
Openness _{it}	-0.425*** (0.042)	-0.427*** (0.042)	-0.434*** (0.046)	-0.438*** (0.043)	-0.666*** (0.134)	-0.651*** (0.130)	-0.706*** (0.202)	-0.653*** (0.136)
Constant	22.011*** (0.339)	22.112*** (0.335)	22.079*** (0.371)	22.270*** (0.342)	21.556*** (0.658)	21.615*** (0.619)	21.918*** (1.060)	21.545*** (0.650)
Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1150	1165	963	1146	167	182	112	176
R-sq	0.797	0.796	0.794	0.794	0.851	0.853	0.855	0.852
rmse	0.161	0.161	0.159	0.161	0.122	0.122	0.127	0.125

Note : 1. Standard errors in parentheses

2. Significant variables are denoted by ***, ** and * at 1%, 5% and 10% respectively

3. ^ denotes that the variables are in their natural logarithmic form

Interestingly, in RoW, the empirical results remain quite similar to what was reported in Table 1. As can be seen from Table 2, intensive margins of greenfield FDI and cross-border M&A interacted with human capital enter the models with positive and statistically significant coefficient. This suggests intensive margins of both greenfield FDI and cross-border M&A could affect economic growth either directly as reported in Table 1 or indirectly as reported in Table 2 via human capital in RoW. Specifically, 1% increase intensive margin greenfield FDI and cross-

border M&A are associated with 0.007% and 0.006% economic growth respectively in this sub-sample of countries. This in turn implies that increase in human capital in the form of years of schooling could help countries to benefit from FDI in the process of economic growth. We say that human capital strengthens countries ability to benefit from FDI in their efforts to promote their economic growth. This empirical result aligns with the finding of Noormamode (2008).

For sub-sample of SSA, only extensive margin Greenfield FDI is found to be positively associated economic growth. Specifically, 1% increase extensive margins of greenfield FDI is associated with 0.024% change in economic

growth indirectly via human capital in SSA. These findings support arguments advanced Nelson and Phelps (1966); Benhabib and Spiegel (1994).

Table 4: Margins and Modes of FDI and Economic Through Domestic Investment - GMM Estimator Result (Rpbustness Check)

Dependent variable: $GDP_{(it)}$	Rest of the World				Sub-Saharan African Countries			
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
$GDP_{it(t-1)}$	0.115*** (0.010)	0.070*** (0.010)	0.062*** (0.004)	0.085*** (0.012)	0.332*** (0.117)	0.163 (0.103)	0.299 (0.197)	0.358 (0.218)
$GDP_{it(t-2)}$	-0.165*** (0.007)	-0.178*** (0.007)	-0.256*** (0.004)	-0.184*** (0.005)	-0.309** (0.139)	-0.032 (0.080)	-0.099 (0.208)	-0.136** (0.065)
Greenfield intensive [^] *Domestic capital _{it} [^]	-0.009*** (0.001)				0.003 (0.008)			
Greenfield extensive [^] * Domestic capital _{it} [^]		-0.040*** (0.003)				0.032** (0.014)		
M&A Intensive [^] *Domestic capital _{it} [^]			0.004*** (0.001)				0.001 (0.007)	
M&A Extensive [^] * Domestic capital _{it} [^]				0.027*** (0.001)				0.019** (0.008)
Human capital _{it}	-3.938*** (0.317)	-4.151*** (0.352)	-4.952*** (0.243)	-4.040*** (0.229)	-8.600** (4.231)	-5.592 (4.397)	-2.571 (2.717)	5.885 (4.311)
Property right [^] _{it}	0.150 (0.169)	1.754*** (0.185)	1.369*** (0.190)	1.171*** (0.086)	-1.045 (1.129)	0.227 (0.987)	-0.057 (0.539)	-1.479** (0.713)
Sound money _{it}	0.036 (0.090)	0.502*** (0.126)	0.605*** (0.061)	0.195*** (0.073)	1.048 (1.567)	-0.106 (0.718)	0.040 (2.548)	-1.524 (1.013)
Freedom to globally trade _{it}	-0.327*** (0.115)	0.082 (0.137)	0.494*** (0.113)	-0.614*** (0.092)	0.872 (1.259)	-1.222** (0.535)	-0.815 (2.063)	-0.106 (0.722)
Size of government _{it}	1.207*** (0.162)	1.098*** (0.075)	0.890*** (0.056)	1.053*** (0.121)	1.308 (2.109)	0.792 (0.772)	1.567 (0.977)	-0.802 (1.439)
Legal system _{it}	-0.157 (0.113)	-0.302 (0.226)	-0.097 (0.135)	-0.020 (0.071)	0.872 (2.111)	0.267 (0.971)	-0.202 (2.133)	-0.086 (0.400)
Openness _{it}	4.713*** (0.378)	7.293*** (0.400)	3.860*** (0.216)	3.713*** (0.336)	8.829** (4.141)	3.836 (3.336)	-0.912 (2.702)	4.969 (4.354)
Constant	3.896 (2.580)	-15.291*** (2.511)	13.910*** (2.456)	-6.329*** (0.988)	-5.559 (12.653)	9.777 (9.365)	5.101 (11.242)	16.884* (9.397)
Number	1010	1021	846	1006	155	166	106	160

Note : 1. Standard errors in parentheses

2. Significant variables are denoted by ***, ** and * at 1%, 5% and 10% respectively

3. ^ denotes that the variables are in their natural logarithmic form

Following the discussion presented in the introduction section of the current study, it is also interesting to examine whether FDI modes and margins complements /or substitutes domestic investment in economic growth process. For this purpose, the different types of FDI are interacted with domestic investment. As reported in Table 3, regression results show

that both in FDI modes and margins enter the first four models i.e., Model 1 to Model 4, with positive and statistically significant coefficient in the sub-sample of the RoW. This could imply that FDI in the form of greenfield FDI and cross-border M&A intensive and extensive margins do not displace domestic investment in economic growth process. This finding

supports a finding by De Mello (1999) which contends that the extent to which FDI affects economic growth depends on the degree of complementarity and substitution between FDI and domestic investment. Nonetheless, as these results may suffer from endogeneity bias, it is important to check the robustness by another estimator which accounts for a possible endogeneity (see Table 4).

Again when only sub-sample of SSA is included, only Greenfield FDI margins enter the models with positive and statistically significant coefficient at (refer to Model 5 and 6 in Table 3). This once again reinforces results presented in the preceding tables. This shows that Greenfield FDI complements domestic investment in the process of economic growth. The complementarity between FDI modes and margins in RoW and SSA in the process of economic growth contradict the finding by Hong (2014) which argues that FDI may displace domestic investment in China.

As a robustness check, regression that account for endogeneity bias using system Generalized Method of Moments (GMM) estimator is run. Variables that affect economic growth could also affect the different types of FDI directly thereby causing endogeneity bias. As per Wooldridge (2010) the sources of endogeneity bias could be because of selection bias/or omitted variables; simultaneity (reverse causality), and/or measurement errors.

As reported in Table 4, the GMM estimator results confirm that SSA is unique in FDI-economic growth nexus. Interestingly, intensive and extensive margins of Greenfield investment still influence economic growth positively after addressing endogeneity bias. This could imply that the presence of human capital magnifies the positive influence of Greenfield FDI on economic growth in SSA reinforcing the results presented in the previous tables.

Likewise, in the sub-sample of RoW, the extensive and intensive margins of greenfield FDI and cross-border M&A enter the models with positive coefficients when interacted with human capital. This supports findings by

Edwardo et al. (1998); Nelson and Phelps (1966) and Benhabib and Spiegel (1994). This may imply that the effect of FDI on economic growth is generally indirect and requires certain level of human capital to affect economic growth in the RoW.

To check the robustness of the result reported in Table 2, GMM estimator result is estimated. Accordingly, quite similar results are obtained as presented in Table 5. The results show that extensive margin of greenfield FDI still remains statistically significant in the sub-sample of SSA. In addition, extensive margin of cross-border M&A becomes statistically significant. This may show that for FDI in the form of cross-border M&A to affect economic growth, promoting domestic investment is required in SSA. Again, the results show that extensive margins of both FDI modes do complement domestic capital formation in SSA supporting the finding by Ijirshar et al. (2020) though the authors have not considered the different modes and margins of FDI.

In the sub-sample of RoW, the interaction between greenfield FDI intensive and extensive with domestic investment enter the model with negative coefficients. This may show that FDI in the form of greenfield investment could displace domestic investment in the RoW. This empirical result is in line with Hong (2014) which argues that greenfield FDI may displace domestic capital formation in China. Nevertheless, both intensive and extensive margins of cross-border M&A enter the models with positive coefficients. This means that cross-border M&A complements domestic capital formation in the process of economic growth in RoW. This once again supports studies by De Mello (1999); Nelson and Phelps (1966) and Benhabib and Spiegel (1994).

Conclusion

The study revealed that intensive margins of greenfield FDI and cross-border M & A directly influence economic growth in RoW. In SSA, however, only extensive margin of greenfield FDI robustly and directly affects economic growth. The presence of improved human capital strengthens the effect of intensive

margins of both FDI modes on economic growth in RoW and greenfield FDI extensive margin in SSA. However, cross-border M&A extensive margin influences economic growth only indirectly via domestic investment in SSA. Whereas, intensive and extensive margins cross-border M&A could complement domestic investment in RoW, only greenfield FDI margins strongly complement domestic investment in SSA. Nevertheless, greenfield FDI might displace domestic investment in RoW. Therefore, SSA countries could benefit more from FDI in the form of larger number of greenfield FDI than inviting few greenfield investments which intensively invest in few project. Policies that enhance human capital and promote domestic investment are strategic to amplify the effect of FDI on economic growth both in the RoW and in SSA.

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