

Emerging Economies' versus Advanced Countries' Investment Impact in Africa

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Abstract

This paper provides evidence on the labor productivity growth and employment impacts of foreign direct investment in selected countries in Africa over the years 2001–2012. It uses data from five emerging economies (Brazil, Russia, India, China, and South Africa) and advanced countries (Canada, France, Germany, Italy, Japan, the United Kingdom, and the United States of

America). The estimation, using system generalized method of moments, shows that foreign direct investment from emerging economies and advanced countries has increased labor productivity growth and employment in Africa, when human capital and governance are controlled for. However, the level of impact varies based on the origin of investment.

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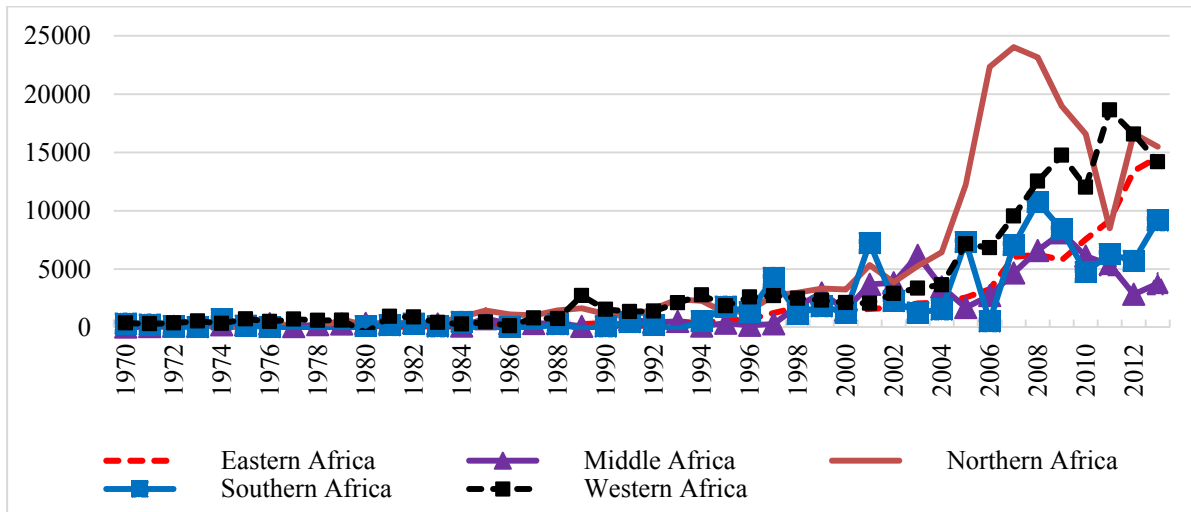
1. Introduction

Over the past three decades, foreign direct investment (FDI)¹ to Africa has increased by approximately 1,325 percent, from \$4 billion in 1980 to around \$ 57 billion in 2013 (Figure 1). A large proportion of these investments have been from the European Union (EU). However, after the 2008 world financial crises, emerging economies consisting of Brazil, Russia, India, China, and South Africa (BRICS) have become a significant source of FDI to Africa. For example, the United Nations Conference on Trade and Development (UNCTAD, 2013) estimated that in 2010, 41 percent of foreign capital flows to Africa came from the EU, 23 percent from North America, 25 percent from BRICS, and 59 percent from advanced countries—in particular, advanced (group 7, G7) countries (Canada, France, Germany, Italy, Japan, United Kingdom, and the United States of America).

Since the crisis, FDI from G7 countries (particularly from UK and France) to Africa has been declining, and the BRICS' FDI share (mainly China and India) has been increasing (UNCTAD, 2015). For example, between 2007 and 2012, FDI stock from BRICS to African countries increased by 204 percent and that from G7 countries by only 11 percent. This is in contrast to the 2001-2006 period where G7 FDI stock in Africa increased by 90 percent while that of BRICS declined by 26 percent. More recently, the shock to the Chinese market has had a negative impact on FDI flows to Africa (Klasa, 2015), highlighting the increasing importance of these flows for Africa. Given that FDI is the most dominant form of private capital for the region, reversal in these flows could have detrimental effects on Africa's financing needs, investment, and growth.

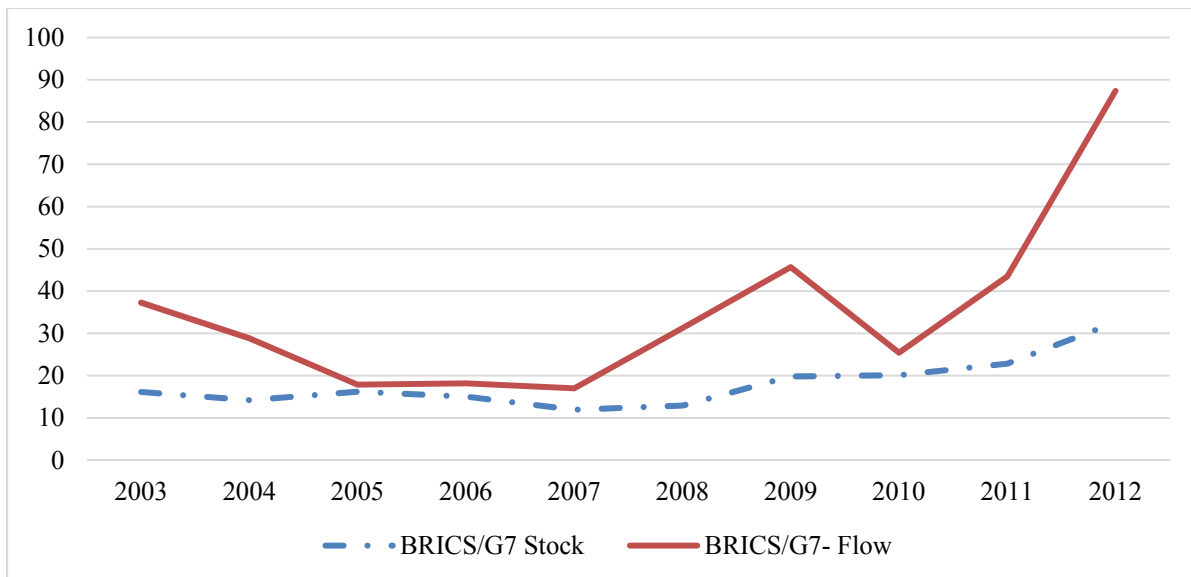
¹ In this paper, foreign direct investment, direct investment, and investment are used interchangeably.

Figure 1a: FDI inflows to Africa in millions of current USD over 1970-2013



Source: Authors' computation based on UNCTAD (2016)

Figure 1b: BRICS' versus G7' FDI inflows to Africa over 2003-2012 (in percent)



Source: Authors' computation based on UNCTAD (2016)

What is the likely impact of the continued surge of BRICS' direct investment in Africa? Is this surge supportive of labor productivity growth and employment? Interest in and debate on these questions stem from the increased global influence of BRICS in recent years, including from their direct investment in Africa. The BRICS' increased investment in Africa has led to increased competition for the continent's natural resources and burgeoning consumer demand, enabling Africa to increase and diversify its trade and improve its terms of trade (Clus-Rossouw, Viviers and Loots, 2015; Mlachila and Takebe 2011). Increasing labor costs in BRICS (as their economies become more industrialized), also present an opportunity for Africa to attract FDI that promotes employment generating growth and economic diversification. In fact a number of case studies document the growing trend of BRICS' firms moving to establish themselves in Africa for various reasons, namely to: position themselves to take advantage of the burgeoning consumer demand; reduce production costs related to exporting raw material from Africa to their home countries; take advantage of Africa's regional and international trade agreements (especially with the European Union and United States); and mitigate higher labor costs in their home countries (Pigato and Tang 2015; Shen 2015; Chakrabarti and Ghosh 2013; Warmerdam and van Dijk 2013). All these reasons are consistent with Dunning's (2001) eclectic paradigm of why firms engage in international production.² These higher levels of investments would ideally lead to higher employment and labor productivity.

There are, however, challenges and critiques labeled against emerging economies (BRICS) regarding lax attention to governance, labor standards and safety issues. These institutional

² Specifically, the eclectic paradigm cites three broad reasons: (i) ownership advantages which enable these firms to compete in a foreign location because they possess certain 'competitive' or 'monopolistic' advantages that can compensate for the additional costs associated with setting up and operating abroad; (ii) internalization or the transferring of its ownership advantage within the firm across borders or direct investment abroad, rather than licensing or franchising to a third party; (iii) location considerations that may include local factors endowment and availability, geographical factors or legislation related to the production and licensing of technology, patent system, tax and exchange rate policies that multinational enterprises may wish to either avoid or exploit.

factors have been found to have real long-run effects on macroeconomic fundamentals (Acemoglu, Johnson, and Robinson 2005; Acemoglu and Robinson 2013; North 1990). As such, if overlooked, the resulting negative consequences may undermine any positive impact of BRICS' direct investment on labor productivity and employment in Africa. In other instances, it is feared that local firms could be disadvantaged by imports from BRICS (which may benefit consumers, but result in undesirable consequences for Africa's manufacturing sector, job creation, and economic growth), particularly when intermediate inputs and factors of production are not locally sourced (Pigato and Tang 2015).

This paper contributes to the nascent empirical literature on the effect of emerging economies' direct investment on labor productivity growth and employment in low-income countries. First, it takes Africa as a case study where there has been a dearth of evidence-based rigorous studies on the topic despite the huge potential for FDI to generate significant growth benefits. Second, it examines the differences in labor productivity growth and employment effects between BRICS' and the G7's direct investment. A handful of empirical studies have attempted to conduct a comparative analysis of emerging versus advanced countries' direct investment effects in Africa. One such study is Kabelwa (2004), which shows that technology transfer from South African companies to Tanzania has a greater impact on productivity compared to that from OECD companies. Third, this paper contributes to the broader empirical literature on the increasing impact of BRICS trade and investment on developing countries.

The rest of the paper is organized as follows: section 2 provides a review of the related literature, and section 3 specifies the regression model. Section 4 describes the data used and stylized facts about FDI in Africa. Section 5 is devoted to the analysis of estimated results, and the final section concludes.

2. Has Africa benefited from foreign direct investment?

There is considerable literature on the economic impacts of FDI on the host country, including; growth effects, technology spillover effects, backward and forward linkage effects, trade effects, and competition effects (Kim, Lee, and Lee 2015). Through FDI, domestic firms get access to new knowledge, production systems, managerial skills, and technology, all of which have the potential to increase productivity in the host country. The presence of foreign firms also creates backward and forward linkage opportunities where domestic firms can develop beneficial networks with foreign-owned firms. Backward linkages not only provide domestic firms' access to human, technology, and material resources but also tend to improve competitiveness of these firms. Domestic firms can learn from foreign-invested firms by observation or by establishing business relations with the latter or through labor turnover as domestic employees move from foreign to domestic firms. An increase in FDI can induce more investments in human capital, which in turn enhances the catch-up potential of the recipient country (Liu, 2008).

Much of the existing evidence, however, focuses on how FDI contributes to the host country's economic growth, with various studies yielding different results (ranging from positive, negative, to inconclusive). For example, Borensztein et al. (1998), Li and Liu (2005), and Bengoa and Sanchez-Robles (2003) found that FDI boosts economic growth; Khose, Prasad and Terrones (2009), Akinlo (2004), Saltz (1992) on the contrary found negative effects; and Khose, Prasad and Terrones (2009) and de Mello (1997) obtained mixed results. These variations in results could be attributed to differences in the sampling periods, country coverage, whether or not FDI is disaggregated by sector, the nature of control variables, and estimation methods.

On the South-South FDI-growth enhancing effects, Busse, Erdogan, and Muhlen (2016) and Fu and Buckley (2015) have concluded that Chinese FDI has an impressive impact on growth in Africa. Similarly, Weisbrod and Whalley (2011) who evaluated the impact of Chinese FDI on 13 big economies in Africa found that FDI contributed about 0.5 percent to GDP growth over the period 1990-2008. Fu and Buckley (2015) also arrived at a similar conclusion in which for every 10 percent increase in the share of Chinese FDI in total inward FDI to Africa, GDP per capita increased by 0.09 percent. Given that Chinese direct investment share in total inward FDI to Africa increased from 1.85 percent in 2004 to 6.85 at its peak in 2007, this suggests a contribution of 0.045 percent to per capita income growth in Africa over 2004-2007.

Sectoral growth effects of BRICS' investment in Africa is another area that has attracted scholars' interest. Studies that have explored this route include Mlachila and Takebe (2011), Chakrabartin and Ghosh (2014), Pigato and Tang (2015), and Shen (2013). They provide evidence of BRICS' direct investment contributing to rapid growth of the oil sector in South Sudan, and helping to strengthen the country's balance of payments (Mlachila and Takebe, 2011). Other sectors that have benefited from BRICS' direct investment include manufacturing and services sectors (Chakrabartin and Ghosh 2014; Pigato and Tang 2015; Shen 2015). For example, BRICS have concentrated in agro-processing and garment manufacturing in Ghana (Waldkirch 2010), and have contributed to increasing value added in both upstream and downstream industries such as refineries in Nigeria and copper-wires processing in Zambia. They have helped rehabilitate railway lines in Angola, Democratic Republic of Congo, Zambia, Liberia and Guinea, which are necessary in facilitating trade within and across these countries. All these activities have both direct and indirect (via spillovers) effects on growth, employment creation, and labor productivity in these countries.

Another strand of FDI literature is on the relationship between FDI and employment in the host country, where evidence suggests that inward FDI creates jobs, particularly through Greenfield investments (Javorcik 2015). A recent study by Coniglio, Prota and Seric (2015) uses UNIDOs' Africa Investor Survey (which is representative at the firm level) to show that FDI, especially multinational enterprises (MNEs) from the South, have on average contributed 14.2 and 10.6 percent more employment than domestic firms and North MNEs, respectively. More importantly, Chinese firms were found to have the largest labor demand followed by those from South Africa and the Middle East and North Africa (MENA) region. Further, the study showed that Chinese and South African firms tended to require less-skill intensive workers; while local firms that were in joint partnership MNEs were associated with a higher skilled workforce.

Notwithstanding the positive employment effects of FDI at the individual firm level, indications from the literature are that FDI could lead to crowding-out effects on less competitive domestic firms, eventually resulting in a net reduction in employment for the economy. Attracting FDI that is capital-intensive could also impact employment negatively in labor surplus economies such as those in Africa. A reduction in employment could also occur depending on whether FDI takes the form of acquisitions or mergers, even if this leads to greater efficiency (through streamlining the workforce) in the long-run.

3. Model specification

In our quest to examine the labor productivity growth effects of emerging economies' (BRICS') versus advanced (G7) countries' direct investment in Africa, we adopt a neoclassical growth model (Solow 1956; 1957) as specified in equation 1 below:

$$\begin{aligned}
 \ln p_{it} = & \beta_0 \ln y_{it-1} + \beta_1 \ln BRICS^s I_{it} + \beta_2 \ln G7^s I_{it} + \beta_3 \ln Open_{it} + \beta_4 Gov_{it} + \beta_5 \ln Edu_{it} \\
 & + \eta_t + \nu_i + \varepsilon_{it}
 \end{aligned}
 \tag{1}$$

Where, lp_{it} is the annual growth rate of output per person employed in country i in year t , and ln is the natural logarithm operator. Country-specific and time fixed effects are denoted by v_i and η_t , respectively. Direct investment from *BRICS*' and *G7* countries' are the main variables of our interest.

The growth literature (Barro 1991; Levine and Renelt 1992; Sala-i-Martin et al. 2004) guides us in selecting the core set of labor productivity growth determinants, however the estimated model variables are constrained by data availability. The initial level of output per worker (y_{it-1}) is included to test for the presence of β -convergence. Control variables include: *Open*, or openness which is measured as the share of trade volume in GDP; governance (*Gov*), which is proxied by the Polity2 index; and human capital development (*Edu*) captured by gross primary school enrollment.

Further, we investigate effects of *BRICS*' versus *G7* countries' direct investment on employment in selected African countries using equation 2:

$$Emp_{it} = \beta_0 \ln y_{it-1} + \beta_1 \ln BRICS^s I_{it} + \beta_2 \ln G7^s I_{it} + \beta_3 \ln Open_{it} + \beta_4 Gov_{it} + \beta_5 \ln Edu_{it} + \beta_6 \ln Tel_{it} + \eta_t + v_i + \varepsilon_{it} \quad (2)$$

Where, *Emp* is employment to population ratio of people aged 15 years and older, y_{it-1} is growth rate of output (controlling for cyclical employment effects) in country i at time $t-1$, *Tel* is the percentage of the population with access to fixed line telephone, which is used as a proxy for the impact of infrastructure development. The remaining control variables are as defined in equation 1.

The models in equations 1 and 2 exhibit a number of methodological issues. Endogeneity bias may arise due to the potential endogeneity of labor productivity growth and employment determinants such as trade, human capital, FDI, and governance variables. On the other hand, it

is possible, for example, that low productivity growth may attract less investment and similarly higher investment may lead to higher productivity growth; or both investment and productivity growth may be jointly determined by a third variable. In such instances, the model will suffer from reverse causality and simultaneity bias. Other biases that may affect the consistency of the estimates include the heterogeneity (omitted variable) bias and measurement error (in the independent variables).

To minimize the above effects, we adopt the system generalized method of moments (SGMM) approach of Arellano and Bover (1995) and Blundell and Bond (1998). SGMM controls for endogeneity bias, measurement bias, unobserved country fixed effects, and other potentially omitted variables. Relative to difference GMM, SGMM is robust to weak instrument bias. It uses suitable lagged levels and lagged first differences of the regressors as instruments. Furthermore, we include time dummies to capture universal time-related shocks from errors (Roodman 2009).

4. Hypotheses on BRICS' versus G7 countries' FDI in Africa

The rise in BRICS' direct investment to Africa has led to increasing debate over the differential effects of BRICS' versus G7 countries' FDI. In our quest to empirically establish the economic impact of BRICS' versus G7 countries' direct investment in Africa we formulate the hypotheses below:

First, BRICS investment is more likely to bring technologies that are better aligned to local factor proportions and are readily adaptable to local conditions in Africa, thereby yielding greater spillover effects. This could be attributed to the fact that some of the emerging markets' firms are still in the process of moving up the technology ladder relative to their developed countries' counterparts. Thus, to the extent that emerging economies' multinationals have greater

familiarity with technology and business practices suitable for developing-countries' markets, they may enjoy some advantages over firms from developed countries when investing in other developing countries. Moreover, to the extent that a country's absorptive capacity is greater with a smaller technological gap between foreign and domestic firms, it implies that the smaller South-South (BRICS-Africa) technological gap compared to that of the North-South (G7-Africa) may be an advantage for Africa's absorption of BRICS' technology (Durham 2004). For example, Goldstein (2003) notes that South African telecommunications company MTN was able to tap into its in-house expertise to launch service packages in other African countries that were better aligned to local demand than its competitor from Britain. Nunnenkamp and Spatz (2004) find that technology transfer is facilitated by a smaller technology gap. Furthermore, Takii (2011), Pfeiffer, Gorg and Perez-Villar (2010), Gorodnichenko, Svejnar and Terrel (2007) show that the labor-intensive nature of emerging economies' FDI results in greater productivity and employment compared to that from developed countries.

The second hypothesis holds that investment from emerging economies (BRICS) is more poised to move into small and risky markets relative to that from developed (G7) countries. Managing economic and political risks is an area where emerging countries' multi-nationals may have relative advantage due to the experience in dealing with such constraints in their home countries. There is also evidence that developing countries' firms may be more willing to assume the risks of post-conflict and other politically difficult situations (Shen 2015). It is important to note that these hypotheses do not necessarily imply that South-South investment is more beneficial than North-South investment.

5. Data and stylized facts on FDI in Africa

5.1. Data

The analysis is done on a sample of 16³ African countries over the period 2001-2012. Primary school enrollment⁴ (defined as the total enrollment in primary education, regardless of age, expressed as a percentage of the population at the official primary education age), trade openness (exports plus imports as a share of GDP), fixed line telephone subscription (per 100 people), and labor productivity (output per employed individuals, generated based on 2005 constant prices) are accessed from World Bank's World Development Indicators (2016). Bilateral FDI stock of BRICS and G7 countries are from UNCTAD statistics (2016). BRICS' and G7 countries' direct investment stock to an African country i at time t , is calculated as the sum of FDI from individual BRICS and G7 countries at time t . Since the UNCTAD data does not contain sector level bilateral FDI flows, data on Greenfield investments are used to examine the recent trends in sectoral investments. The Polity2 governance index, which is reported on a scale of -10 to +10, with -10 indicating strongly autocratic and +10 strongly democratic political systems, is obtained from the Polity IV Project (Marshall and Jaggers 2011). Tables A.1 and A.2 of the appendix contain respectively, the sample of countries used in this study and summary statistics for selected variables.

5.2. Stylized facts on FDI in Africa

To get a sense of the sectoral level flows, we exploit data on Greenfield FDI in Africa, which has grown by almost five-fold since 2000. It increased from US\$ 12.5 billion in 2000 to

³ The availability of data on BRICS FDI restricts us to 16 African countries.

⁴ Primary school gross enrollment ratio can exceed 100% due to the inclusion of over-aged and under-aged students because of early or late school entrance and grade repetition

US\$ 55.2 billion in 2015 and peaked at US\$ 66.4 billion in 2008 (EY 2015). The majority of this Greenfield FDI is from Western Europe and other African countries. At the country level, the United States (US) ranks first among the top 10 Greenfield investors in Africa, followed by United Kingdom (UK) and South Africa (tied at No. 2), the United Arab Emirates (UAE), France and Germany. China and India rank 7 and 8 respectively (Table 1). In terms of job creation, out of all firms that received Greenfield FDI in Africa, those that received it from UAE created the most jobs (24 percent) in 2014, followed by firms that received Greenfield FDI from the US (7.2 percent) and France (6.6 percent). Firms that received Greenfield FDI from China and India on the other hand, created 9.4 percent of jobs, with China creating 5.8 percent.

Table 1: Top Investors, Sectors and Jobs created by Greenfield FDI in Africa (2014)

Investors and jobs created				Top 10 sectors and jobs created		
Investor's rank	Investor	FDI Projects (% of Africa's total)	Jobs created (% of Africa's total FDI-related jobs)	Sector	Project share (% of Africa's total)	Jobs created (% of Africa's total FDI-related jobs)
1	United States	13.8	7.2	Technology, media, telecommunication	19.6	6.4
2	United Kingdom	7.2	3.3	Financial services	18.1	2
2	South Africa	7.2	4.3	Consumer products and retail	14.1	31.5
4	United Arabs Emirates	6.8	23.7	Real estate, hospitality and construction	8	33.6
5	France	6.7	6.6	Business services	7.5	1.6
6	Germany	4.8	2.3	Transport and logistics	6.3	3.1
7	China	4.4	5.8	Diversified industrial products	5.3	1.5
8	India	3.8	3.6	Automotive	4.1	5.7
9	Portugal	3.7	0.9	Coal, oil and natural gas	3.5	3.7
10	Spain	3.5	2.2	Chemicals	3.3	2.4

Source: fDi Markets (2015)

At the sectoral level, technology, media and telecommunication topped the list of the most attractive sectors for Greenfield FDI projects in Africa, receiving 19.6 percent of Africa's FDI

projects in 2014. This was followed by financial services (18.1 percent) and consumer products and retail (14.1 percent). The natural resource sector (coal, oil, and natural gas) ranked 9th and accounted for only 3.5 percent of all Greenfield projects in Africa in 2014. As shown in Table 1 above, consumer products and retail (33.6 percent), and real estate, hospitality and construction (33.6 percent) sectors are the biggest creators of Greenfield FDI-related jobs; yet, these sectors are ranked 3rd and 4th on the list of attractive sectors for FDI in the region (based on fDi Market surveys). The two most attractive sectors to foreign investors are technology, media, and telecommunications, and financial services created only 6.4 and 2 percent respectively, of Africa's Greenfield FDI-related jobs in 2014. Overall, US, UK, and France's direct Greenfield investments tend to be concentrated in: technology, media and telecommunication, transport and logistics, consumer products and retail, business services, and financial services sectors. Chinese FDI is also predominantly in technology, media and telecommunications sector, where approximately 33 percent of its projects in Africa were concentrated in 2014 (EY 2015).

Many analysts have tended to assume that much of FDI to Africa is in the natural resource sector. However, the preceding and recent evidence on Greenfield investments suggests that there has been a change over time. In the past, foreign investors may have been attracted to Africa solely because of its abundance of natural resources, especially in oil and ores. However, recent evidence puts rising urbanization and an expanding consumer base as some of the major determining factors for FDI to Africa. As a result, the large economies of the continent: South Africa, Nigeria, Kenya, Ghana, Egypt, Morocco and recently, Ethiopia and Mozambique have attracted the majority of the FDI, with South Africa leading the group.

UNCTAD data (covering both Greenfield and non-Greenfield FDI) shows that a large proportion of FDI is from Western Europe (which makes up the bulk of G7 countries) and at a

country level, most FDI to Africa comes from the U.S. Consequently, it is not surprising that G7 countries accounted for 72 percent of the combined BRICS's and G7's direct investment stock in Africa between 2001 and 2012 (Table 2). The majority of BRICS's direct investment went to Tanzania, followed by Zimbabwe, Angola and Botswana. In contrast, G7 countries' direct investment was predominantly in Angola, Equatorial Guinea, the Republic of Congo and Tanzania. Moreover, G7 countries' direct investment tends to dominate that of the BRICS in most African countries with the exception of Zimbabwe, Ethiopia, Democratic Republic of Congo and Botswana, where the proportion of BRICS' direct investment is relatively higher than that from G7 countries.

Table 2: BRICS's and G7's average direct investment in millions of USD in selected African countries, 2001-2012

	BRICS' FDI-in-Stock	% of total BRICS' FDI	G7's FDI-in-Stock	% of total G7's FDI
Angola	402.99	10.21	5959.37	29.07
Botswana	387.45	9.82	146.24	0.71
Cameroon	26.85	0.68	967.47	4.72
Chad	42.77	1.08	119.10	0.58
Congo, Rep.	93.42	2.37	2263.88	11.04
Congo, Dem. Rep.	252.09	6.39	36.11	0.18
Equatorial Guinea	66.85	1.69	2455.54	11.98
Ethiopia	172.52	4.37	96.00	0.47
Gabon	78.44	1.99	1518.35	7.41
Côte d'Ivoire	22.72	0.58	948.07	4.62
Kenya	220.73	5.59	1076.14	5.25
Liberia	98.04	2.48	480.18	2.34
Madagascar	34.79	0.88	1040.25	5.07
Tanzania	1208.23	30.62	1734.26	8.46
Uganda	304.69	7.72	1494.15	7.29
Zimbabwe	533.16	13.51	165.54	0.81
Total	3945.72	100	20500.63	100

Source: Authors' computation based on UNCTAD

Overall, a large proportion of BRICS' direct investment in Africa is from South Africa, China and India. Brazil and Russia have minimal investment activities in Africa with Brazil's presence noted only in Liberia and Angola, while investment from Russia goes to Botswana only. In fact Russia has negative investment stock in Tanzania. China, on the other hand, has investment activities in 75 percent of the 16 countries used in this study, while India and South Africa are engaged in 63 and 43 percent of the countries, respectively (Table 3).

Although this paper does not test for the investment motives of the BRICS versus G7 countries, a closer look at cross-country distributions of BRICS' direct investment in Africa shows some interesting patterns. In the case of South Africa, a large proportion of its direct investment goes to countries within its geographical proximity or to countries where it has close cultural affinities including Botswana (30 percent), Tanzania (29 percent), Uganda (21 percent) and Kenya (15 percent). This suggests that proximity to the home country plays some role in determining investment location for South Africa's multinationals. Also, all the aforementioned countries are English-speaking. These observations are consistent with findings in the FDI literature on the factors that determine FDI location, which show that efficiency seeking investors are influenced by geographical proximity to home country in order to minimize transportation costs (Demesk et al 2005).

For China and India, a combination of factors may be at play in regard to the sector and country destination of their direct investment. In the case of India, 49 percent of its investment is concentrated in Uganda (a relatively non-resource rich country), suggesting that factors such as historical or cultural ties could be at play given the historical settlement of Indians in the country; 28 percent of Indian FDI is concentrated in Gabon and maybe resource seeking; and another 22

percent is concentrated in Tanzania where it could be argued that this is supported by historical ties linked to a shared social ideology from 1960s coupled with a history of Indian settlement.

Table 3: BRICS' total direct investment (in-stock) in millions of USD in selected African countries, 2001-2012

	Brazil	Russia	India	China	South Africa	Total
Angola	2073.3			2386.4	376.2	4835.8
Botswana		0.5	75.5	3.6	4569.6	4649.3
Cameroon			20.7	301.6		322.3
Chad				513.2		513.2
Congo, Rep.				1121		1121
Congo, Dem. Rep.				3025.1		3025.1
Equatorial Guinea				802.2		802.2
Ethiopia			12.1	2058.2		2070.3
Gabon			174.6	766.7		941.3
Côte d'Ivoire			1.6	271		272.6
Kenya			41.3	1345.5	1261.9	2648.7
Liberia	580.2		35.4	532	29	1176.5
Madagascar			15	361.4	41	417.4
Tanzania		-8.6	458	515.6	13533.3	14498.3
Uganda			1182.6		2473.7	3656.3
Zimbabwe			46.5	1967.1	4384.2	6397.9
Total	2653.5	-8.1	2063.3	15970.4	26669	47348.2

Source: Authors' computations based on UNCTAD (2016)

China's FDI spans a number of countries with the biggest recipients including (as shown in Table 3): The Democratic Republic of Congo, Angola, Ethiopia, Kenya, the Republic of Congo Equatorial Guinea, Chad, and Côte d'Ivoire. Although many of these are resource rich, China's recent investments are increasingly going to the manufacturing and construction sectors (in both resource and non-resource rich countries). Shen (2015) shows that 44 percent of Chinese FDI (based on data from investment promotion agencies of 6 African countries in 2011, namely, Nigeria, Ethiopia, Zambia, Liberia, Rwanda and Ghana) flows to the manufacturing sector in

these countries, followed by 26 percent going to the services sector. Energy and mining (7.4 percent), agriculture, forestry fishing (2.6 percent), account for a total of 10 percent of all Chinese FDI projects. Chen et. al. (2015) also provides a more detailed case study of Ethiopia which shows that recent flows of Chinese FDI has been focused in the manufacturing and construction sectors.

Table 4: G7's total direct investment (in-stock) in millions of USD in selected African countries, 2001-2012

	Canada	France	Germany	Italy	Japan	United Kingdom	United States	Total
Angola		44605.0		779.7			25336.0	70720.8
Botswana	83.2	8.6		22.0			248.3	1754.8
Cameroon		9556.4	11.0	102.2			1940.0	11609.7
Chad		1425.1		4.1				1429.2
Congo, Rep.		25281.5	9.0	346.3			1530.0	27166.6
Congo, Dem. Rep.				75.3			358.0	433.3
Equatorial Guinea				277.4			29189.0	29466.4
Ethiopia				964.0			188.0	1152.0
Gabon		15147.8		196.3			2876.0	18220.2
Côte d'Ivoire		9384.2	319.5	214.1			1459.0	11376.8
Kenya		2359.0	694.3	190.1		7266.1	2404.0	12913.6
Liberia		590.7	320.3	17.2			4834.0	5762.2
Madagascar	4038.4	1736.0		515.8	2394.1	5021.1	513.7	12483.0
Tanzania	7998.9	525.5	821.1	760.1	916.4	8332.0	1457.2	20811.1
Uganda			1184.6			12966.5	3778.8	17929.8
Zimbabwe	203.5			83.4		1081.4	585.0	1953.3
Total	12324.1	110619.8	3359.8	4548.0	3310.5	34667.1	76696.9	245182.7

Source: Authors' computation based on UNCTAD (2016)

With reference to G7 countries' direct investment; France, Italy and UK tend to have a large presence in countries where they have political, cultural or social ties, especially, in their former colonies or formerly occupied territories (Table 4). For example, Italy has a large presence in Ethiopia, while France has a strong presence in Chad, the Republic of Congo, Gabon, Côte

d'Ivoire and Cameroon. Japan and Canada have very limited involvement in Africa. On the contrary, the US has investment in all 16 countries used in this study with the exception of Chad. This implies that relative to other G7 countries, the United States is an equal opportunity investor. Nonetheless, it has its favorite host countries, some of which are resource rich.

6. Estimation results

6.1. Labor productivity growth effects of BRICS' versus G7 countries' direct investment

To determine the labor productivity growth effects of BRICS' versus G7 countries' direct investment, we estimate equation 1 where both measures of FDI are included in the model. Results reported in Table 5 show that while BRICS's direct investment has productivity enhancing effects in Africa; that of G7 countries retards productivity growth. For example, with every 10 percent increase in FDI stock from BRICS, the growth in labor productivity of African countries increases by 2.4-3.0 percent annually (columns 1-4). In contrast, a 10 percent increase in FDI stock from G7 countries, decreases labor productivity by 1.5-1.6 percent (columns 1-2). Moreover, the level of human capital appears to complement the effectiveness of both BRICS's and G7 countries' FDI. In other words, when human capital is included, the level of significance of BRICS' FDI coefficient increases by between 1 and 10 percent. However, the magnitude of the impact decreases from 0.3 to 0.24. In the case of G7 countries' investment, controlling for human capital boosts the impact from negative to positive, but the effects are insignificant. The observed increase in the level of significance of the coefficient of BRICS' FDI when human capital is controlled for, suggests that human capital has played a crucial role in making FDI a significant driver of labor productivity growth in these countries.

Table 5: SGMM estimates for labor productivity growth effect of BRICS' and G7 countries' direct investment in selected African countries, 2001-2012

	(1)	(2)	(3)	(4)
Ln GDP per worker (lag)	-5.719*** (0.596)	-5.725*** (0.585)	-5.635*** (0.314)	-5.504*** (0.306)
Ln BRICS' direct investment	0.291* (0.151)	0.300* (0.154)	0.236*** (0.081)	0.236*** (0.081)
Ln G7's direct investment	-0.153** (0.073)	-0.156** (0.079)	0.007 (0.100)	0.024 (0.106)
Ln Education			6.666*** (1.392)	4.434*** (1.194)
Ln Openness				-1.258 (0.960)
Governance		0.042** (0.017)	0.037*** (0.013)	0.022** (0.009)
No. of observations	160	160	97	97
No. of countries	16	16	16	16
No. of instruments	13	14	15	16
Sargan test (Probability > χ^2)	0.228	0.223	0.274	0.308
Arellano-Bond (Probability > Z)	0.704	0.693	0.473	0.573
Time dummy	Yes	Yes	Yes	Yes

Note: All values are based on two-step SGMM. Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Arellano-Bond test that average auto-covariance in residuals of order 2 is 0 accepts H_0 : no autocorrelation

To isolate the effects of BRICS's direct investment from G7 countries', we estimate two variants of equation 1. In Table 6 we report results of the models containing only BRICS' direct investment. Similar to the results in Table 5, this investment continues to have robust effects on labor productivity growth but only when the level of human capital is controlled for. Specifically, for every 10 percent increase in direct investment stock from BRICS, labor productivity in Africa grows by 2.5-2.6 percentage points.

Table 6: SGMM estimates for labor productivity growth effect of BRICS' direct investment in selected African countries, 2001-2012

	(1)	(2)	(3)	(4)
Ln GDP per worker (lag)	-5.444*** (0.628)	-5.405*** (0.610)	-5.609*** (0.215)	-5.529*** (0.220)
Ln BRICS's direct investment	0.206 (0.155)	0.215 (0.157)	0.252*** (0.073)	0.264*** (0.075)
Ln Education			6.220*** (1.384)	4.392*** (1.121)
Ln Openness				-1.392 (0.993)
Governance		0.037** (0.018)	0.034*** (0.009)	0.021*** (0.007)
No. of observations	160	160	97	97
No. of countries	16	16	16	16
No. of instruments	12	13	14	15
Sargan test (Probability > χ^2)	0.195	0.19	0.268	0.294
Arellano-Bond (Probability > Z)	0.598	0.575	0.467	0.552
Time dummy	Yes	Yes	Yes	Yes

Note: All values are based on two-step SGMM. Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Arellano-Bond test that average auto-covariance in residuals of order 2 is 0 accepts H_0 : no autocorrelation

Table 7 presents results for a model in which G7 countries' FDI is the only measure of foreign investment impacts on labor productivity growth. In this case, FDI from G7 countries induces productivity growth substantially only when human capital and openness are controlled for. The magnitude of effect ranges between 1.5 and 1.6 percent for every 10 percent increase in FDI stock (columns 3 and 4). However, the explanatory power is lower when the measure of openness is included in the model (column 4), which is contrary to the findings in Table 6 for BRICS' FDI effects. This finding could be attributed to the possibility that both FDI and volume of trade are proxies for a country's level of openness or integration in the global economy. Consequently, in addition to their direct effect on labor productivity growth, they both capture the indirect openness effects. Moreover, a large proportion of Africa's trade is with developed

countries, which comprises G7 countries. Thus, there is a possibility that the indirect openness effects might also be working through the increased trade volume between G7 and African countries. In comparison, Africa's trade with BRICS as a group is very minimal, which explains why the explanatory power of the coefficient of BRICS' direct investment does not change with trade as reported in Table 6 (columns 3 and 4).

Table 7: SGMM estimates for labor productivity growth effect of G7 countries' direct investment in selected African countries, 2001-2012

	(1)	(2)	(3)	(4)
Ln GDP per worker (lag)	-5.045*** (0.401)	-5.014*** (0.404)	-5.117*** (0.263)	-5.019*** (0.306)
Ln G7's direct investment	0.011 (0.059)	0.017 (0.062)	0.153** (0.071)	0.158* (0.082)
Ln Education			6.658*** (1.386)	4.767*** (1.257)
Ln Openness				-1.694** (0.808)
Governance		0.0338** (0.016)	0.0229* (0.013)	0.007 (0.011)
No. of observations	160	160	97	97
No. of countries	16	16	16	16
No. of instruments	12	13	14	15
Sargan test (Probability > χ^2)	0.231	0.212	0.29	0.283
Arellano-Bond (Probability > Z)	0.728	0.722	0.583	0.675
Time dummy	Yes	Yes	Yes	Yes

Note: Reports are based on two-step SGMM. Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Arellano-Bond test that average auto-covariance in residuals of order 2 is 0 accepts H_0 : no autocorrelation

Consistent with growth literature, we observe β -convergence in all specifications reported in Tables 6, 7, and 8. Moreover, human capital development and good governance positively contribute to labor productivity growth, which is in line with related empirical studies on Africa

(Gyimah-Brempong, Paddison and Mitiku, 2005; Wamboye and Tockkov 2014). On the contrary, an increase in trade openness hampers productivity growth. These negative effects are significant in the models where G7 countries' direct investment is the only measure of FDI effects (Table 6, column 4). This could be attributed to the fact that most African countries are net importers rather than net exporters, and a large proportion of these imports are from G7 countries.

6.2. Employment effects of BRICS's versus G7 countries' direct investment

Recent study suggests that multinational enterprises (MNEs) operating in Africa that originate from emerging economies have roughly 11-14 percent more employees than domestic firms and developed countries' MNEs (Coniglio, Prota and Seric 2014). Our study evaluates BRICS versus G7 countries' direct investment impact on employment in Africa using equation 2. Results summarized in Table 8 show that, indeed, BRICS' direct investment increases the employment rate in Africa while that from G7 countries decreases it. For every 10 percent increase in FDI stock from BRICS, employment rate increases by 0.01-0.04 percent annually; and for G7 countries employment rate decreases by 0.01 percent annually. Furthermore, similar to what is observed in the growth equations; the impact of FDI from both BRICS and G7 countries is enhanced when the education level of the workforce is controlled for.

Moreover, we estimate two variants of equation 2 where the effects of BRICS' and G7 countries' FDI on the employment rate are captured in separate equations. Results for the BRICS' direct investment are reported in Table 9 while those of G7 countries, in Table 10. Consistent with the findings in Table 8, BRICS' direct investment boosts employment in Africa at a rate of 0.03 percent annually, for every 10 percent increase in FDI stock (Table 9). With regards to G7 countries' FDI, positive and significant effects are observed only when a measure of infrastructure development, proxied by fixed-line telephone subscription, is included (Table

10). Moreover, effects are 10 times smaller than those from BRICS' FDI. For example, for every 10 percent increase in FDI stock from G7 countries, employment rate increases by 0.003-0.004 percent.

Table 8: SGMM estimates for employment impact of BRICS' and G7 countries' direct investment in selected African countries, 2001-2012

	(1)	(2)	(3)	(4)	(5)
Ln GDP growth					-0.0001** (0.0001)
Ln BRICS's direct investment	0.001*** (0.0003)	0.004*** (0.001)	0.004*** (0.001)	0.003*** (0.0005)	0.004*** (0.0005)
Ln G7's direct investment	-0.0004 (0.0003)	-0.001** (0.001)	-0.001* (0.001)	-0.001* (0.001)	-0.001** (0.001)
Ln Edu		0.037*** (0.005)	0.034*** (0.005)	0.036*** (0.005)	0.030*** (0.009)
Ln Fixed-line tel.				0.001 (0.002)	0.001 (0.002)
Ln openness			0.002 (0.003)	0.001 (0.002)	0.001 (0.002)
No. of observations	160	97	97	96	96
No. of countries	16	16	16	16	16
No. of instruments	12	13	14	15	16
Sargan test (Probability > χ^2)	0.307	0.228	0.258	0.280	0.351
Arellano-Bond (Probability > Z)	0.430	0.653	0.638	0.620	0.643
Time dummy	Yes	Yes	Yes	Yes	Yes

Note: Reports are based on two-step SGMM. Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Arellano-Bond test that average auto-covariance in residuals of order 2 is 0 accepts H_0 : no autocorrelation

The importance of infrastructure development in raising absorptive capacity of FDI, and in turn leading to job creation in African countries is apparent, especially in the case of G7 countries' FDI. As stated above, accounting for infrastructure development stimulates the employment generating effects of G7 countries' FDI. In fact, in models where infrastructure

development effects are not accounted for, the coefficient of G7 countries' direct investment is either negative (Table 10, column 1) or neutral (columns 2 and 3).

Table 9: SGMM estimates for employment impact of BRICS' direct investment in selected African countries, 2001-2012

	(1)	(2)	(3)	(4)	(5)
Ln GDP growth (lag)					-0.00008*** (0.00003)
Ln BRICS's direct investment	0.0005*** (0.0002)	0.003*** (0.0003)	0.003*** (0.0003)	0.003*** (0.0002)	0.003*** (0.0003)
Ln Edu		0.032*** (0.007)	0.032*** (0.007)	0.035*** (0.005)	0.031*** (0.007)
Ln Fixed-line telephone				0.001 (0.002)	0.001 (0.001)
Ln Openness			-0.001 (0.003)	-0.001 (0.002)	-0.001 (0.003)
No. of observations	160	97	97	96	96
No. of countries	16	16	16	16	16
No. of instruments	11	12	13	14	15
Sargan test (Probability > χ^2)	0.336	0.355	0.318	0.322	0.402
Arellano-Bond (Probability > Z)	0.438	0.747	0.705	0.672	0.688
Time dummy	Yes	Yes	Yes	Yes	Yes

Note: All values are based on two-step SGMM. Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Arellano-Bond test that average auto-covariance in residuals of order 2 is 0 accepts H_0 : no autocorrelation

Table 10: SGMM estimates for employment impact of G7's direct investment in selected African countries, 2001-2012

	(1)	(2)	(3)	(4)	(5)
Ln GDP growth (lag)					-0.00005 (0.00006)
Ln G7's direct investment	-0.0002*** (0.00008)	0.0002 (0.0002)	0.0002 (0.0002)	0.0003** (0.0001)	0.0004** (0.0001)
Ln Edu		0.035*** (0.007)	0.034*** (0.007)	0.030*** (0.007)	0.035*** (0.009)
Ln Fixed-line telephone				0.003 (0.002)	0.003 (0.002)
Ln Openness			-0.002* (0.001)	-0.001 (0.0009)	-0.001 (0.001)
No. of observations	160	97	97	96	96
No. of countries	16	16	16	16	16
No. of instruments	11	12	13	14	15
Sargan test (Probability > χ^2)	0.315	0.348	0.343	0.416	0.466
Arellano-Bond (Probability > Z)	0.451	0.384	0.378	0.385	0.396
Time dummy	Yes	Yes	Yes	Yes	Yes

Note: All values are reported based on two-step SGMM. Standard errors are in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Arellano-Bond test that average auto-covariance in residuals of order 2 is 0 accepts H_0 : no autocorrelation

The above results may be due to the hypotheses outlined in section 4 but it could also be capturing the sector destination effects of FDI coming from G7 versus BRICS countries. For example, Alfaro (2003), Wang (2009), and Aizenman and Sushko (2011) find that FDI to the manufacturing sector yields higher growth effects compared to FDI to the primary sector. Therefore, if the share of BRICS FDI going to the services and manufacturing sectors, is relatively high compared to the share of G7 FDI going to these same sectors, this could potentially lead to the type of results presented in this paper. Unfortunately, the data used in this study does not allow us to examine this aspect in detail. An extension of this study could include efforts to generate data on FDI by source and sector destination to each African country. This would enable a closer examination of how the sector destination of FDI links with labor productivity and employment.

7. Conclusion

This paper has examined the labor productivity growth and employment effects of BRICS' versus G7 countries' direct investment in selected African countries over the period 2001-2012. The results show that while BRICS' FDI increases productivity growth across different model specifications, G7 countries' FDI has varying effects under different conditions. For example, in the models where G7 effects are analyzed together with BRICS' FDI and without control variables (Table 5), G7 FDI has a significant and negative impact on labor productivity growth and employment. In models that exclude BRICS' FDI (Table 6), G7 countries' direct investment exerts labor productivity growth enhancing effects, which are significant only when a measure of human capital (proxied by primary school enrollment), is included in the model. The results point to the importance of an educated workforce in Africa in augmenting the impact of BRICS' and G7 countries' direct investment on labor productivity growth.

With regard to employment, FDI from BRICS contributes to the employment rate among the African countries included in this study relatively more compared to FDI from G7 countries; this result holds across different model specifications. In contrast, the impact of G7 countries' FDI on employment varies depending on the model specification. For instance, in the models with BRICS' FDI, it reduces employment, while in those where BRICS' investment is excluded and where the impact of infrastructure development is accounted for, it enhances the employment rate in Africa. Moreover, the magnitude of the effect of BRICS' FDI on employment is 10 times higher than that of G7 countries.

An issue that African policy makers can glean from the forgoing analysis is that BRICS' FDI appears to be a substitute for G7 countries' FDI. For example, in models where BRICS' FDI is included alongside that of G7 countries, the effects of G7 countries' FDI on labor productivity

growth and employment are negative (Tables 6 and 9). In the absence of BRICS' FDI, G7 countries' direct investments have growth and employment enhancing effects when human and physical (infrastructure) capital are controlled for. In other words, for G7 countries' FDI to be effective, certain levels of human and physical capital have to be present, and it should be in sectors or projects where it does not face competition from BRICS' FDI.

Our results suggest a strategic approach to FDI policy for Africa that has both long- and short-term implications. Over the long-term, the findings point to the need to invest in human and physical capital, in addition to good governance. However, increasing the level of openness to trade has to be strategic, possibly similar to an approach adopted by some Asian countries. Over the short-term, the results highlight the importance of putting in place investment policies to attract FDI that matches local factor proportions and that sources locally available inputs.

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Appendix

Table A.1: List of selected SSA countries

Angola	Gabon
Botswana	Côte d'Ivoire
Cameroon	Kenya
Chad	Liberia
Congo	Madagascar
Congo, Dem. Rep.	Tanzania
Equatorial Guinea	Uganda
Ethiopia	Zimbabwe

Table A.2: Summary statistics of selected variables (2001-2012)

	Mean	Std. Deviation	Minimum	Maximum	N
GDP per worker growth	0.419	7.756	-52.110	34.690	192
Ln BRICS FDI	4.041	2.106	0.000	7.790	192
Ln G7 FDI	5.989	2.111	0.000	9.550	192
Fixed-line Telephone	1.404	1.777	0.000	8.310	188
Education	103.687	20.136	60.680	164.860	138
Trade	86.402	47.035	25.000	351.110	192
Employment rate	69.205	10.606	46.800	87.700	192
Governance	0.193	4.353	-5.000	8.000	192