Inequality tends to be higher in urban rather than in rural areas due in part to rural-urban migration.
FDI is an agent of global economic integration (Mah, 2003) and many developing economies have adopted FDI liberalisation policies to help facilitate its benefits. However, despite increasing investments in developing economies, poverty and income inequality persist and remain a major challenge. The relationship between FDI and income inequality is often divided into the Neoclassical and Dependency Theories. The former optimistically argues that FDI stimulates higher economic growth and, hence, lower inequality. The latter states that FDI has negative effects on economic growth and leads to higher income inequality (Firebaugh and Beck, 1994). Not many studies exist that have empirically established a link between FDI and inequality (Basu and Guariglia, 2007; Tsai, 1995; Wu and Hsu, 2012). Therefore, this study seeks to explore this relationship within the context of African countries. Given the persistent inequality in Africa, the Dependency Theory is the starting point and the current study seeks to identify the types of FDI that reduce income inequality in African countries so that policy recommendations can be made from its findings.

Neoclassical scholars have argued that FDI fosters economic growth and reduces inequality in host countries (Mundell, 1957). They theorize that, apart from filling the resources gap, FDI promotes
higher economic growth and development through technology diffusion, development of human capital and management skills and access to export markets (Tsai, 1995; Li and Liu, 2004). Dependency scholars, on the other hand, argue that economic reliance on the advanced economies - implicit to many types of FDI - may have negative social and economic impacts on developing countries and can in the long run result in increasing inequality between highly skilled and low-skilled workers (Firebaugh and Beck, 1994).

Recent studies, however, have suggested that the impact of FDI on income inequality is determined by local conditions in the host (receiving) countries, particularly in terms of absorptive capacity, human capital, technology diffusion and the quality of its institutions (Schneider and Soskice, 2009; Wu and Hsu, 2012). In this study, absorptive capacity has been measured by the quality and production of electricity, air transport, mobile phone subscriptions and international internet bandwidth. Human capital is measured by the enrolment rate in tertiary education and the percentage of internet users. The indicators associated with local innovation and levels of technology are used as a proxy for technology diffusion. Lastly, institutional quality includes public and private institutions.

Limited literature exists that links FDI and income distribution and the research available reveals mixed results, ranging from the overall reduction of inequality (Herzer and Nunnenkamp, 2013) to an insignificant impact (Sylwester, 2005) or to an overall increase (Mahutga and Bandelj, 2008). More recent studies include local factors as moderating variables between FDI and inequality (Wu and Hsu, 2012). Since these studies differ in regional focus, the factors included in their analysis and methodologies used, impede comparison. Also, most studies analyse total FDI, while impacts are likely to differ between investment sectors (Wang and Blomstrom, 1992). Moreover, only a few studies focus on Africa and this study attempts to gain a deeper understanding of the relationship between sectoral FDI and income inequality in African countries.

African countries have some of the highest income inequalities in the world, which is particularly evident for the period 2006-2014. Nonetheless, Southern Africa has shown the fastest reduction in the income inequality growth rate (-2%), followed by Eastern Africa (-1.2 %) and Western Africa (-1.1 %). The negative growth rate of the Gini coefficient implies a declining growth of inequality, which in turn may lead to absolute decline in actual inequality in the long run, since it takes a long time to reflect a change in the value of the Gini coefficient.

Conversely, Northern and Central Africa, with their lower levels of income inequality, have experienced an increase in their income inequality rate over the 2006-2014 period. Our study confirms the results from the 2016 Poverty Rising in Africa report, which states that half of the countries studied have reported a decline in inequality, while the other half have shown increases. Southern African countries are the most unequal in the world, while other African countries have inequality levels comparable to those of countries with similar levels of development (World Bank, 2016). Generally, inequality tends to be higher in urban rather than in rural areas due in part to such factors as the urbanization of poverty through rural-urban migration (The World Bank, 2010). Inequality manifests itself in the form of urban and peri-urban informal settlements (slums) and urban spatial segregation but also in perhaps less visible unemployment, lack of access to basic services or exclusion from educational and health infrastructure. Higher income inequality lowers the poverty-reducing ability of growth and leads to further segregated concentration of wealth (African Development Bank Group, 2017). Economic growth in Africa has not been inclusive, with a large number of people living in extreme poverty characterized by high levels of income inequality (UNECA, 2016).

At the country level, Ethiopia has the fastest growing economy in Africa while revealing the lowest level of income inequality (0.300), followed by Mali (0.307), Burundi (0.313), Egypt (0.314) and Namibia (0.333). The five countries with the highest average income inequality are all in the Southern Africa region:
Zambia (0.744), South Africa (0.650), Angola (0.583), Zimbabwe (0.559) and Botswana (0.510). Inequality is lower in Northern African countries than in the middle income countries of the world (UN-Habitat, 2010).

Similarly, despite its relatively high level of economic development, South Africa maintains a highly unequal society, which can be mainly attributed to its current political predicament and its long history of oppression and apartheid (World Bank, 2016). Zimbabwe, one of the most unequal countries in Africa, has shown the largest decline in income inequality, followed by Namibia. The map also illustrates the network of hi-tech FDI between countries of the world, which will be shown (further in the chapter) to significantly reduce income inequality when mediated through absorptive capacity and other factors. As seen on the map, the main recipients of global hi-tech FDI in this period have been South Africa, Morocco, Kenya, Zambia and Tunisia.

The analysis of sectoral FDI (Online Appendix, Part B, 1.7) shows an increase in FDI in the period 2006-2008, followed by a decline that was most likely caused by the global financial crisis. Online Appendix 1.7 (Part B) shows that manufacturing was the leading sector in terms of inward FDI, largely concentrated in Egypt, Nigeria, Libya, Tunisia, South Africa, Morocco, Algeria and Ghana. Resources was the second largest FDI sector, with countries such as Angola, Nigeria, Egypt, South Africa and Uganda the major recipients of this type of FDI. The services sector is the third largest with a large share of FDI concentrated in Nigeria, Morocco, Egypt, South Africa and Tunisia respectively. Lastly, the hi-tech sector proved to be the smallest sector in terms of FDI attraction and is concentrated in only a few countries, i.e. Egypt, South Africa, Algeria, Morocco, Nigeria and Kenya. These are amongst the more developed economies in Africa and receive large shares of FDI across all sectors. Though South Africa receives high volumes of FDI, it is also evident in the case study on Johannesburg in Part C of.
this report, that these investments are concentrated in a few select locations within the city, reinforcing spatial segregation and high income inequality.

**The relationship between FDI and income inequality**

Our research revealed the interesting finding that FDI leads to an increase in income inequality in host countries but, when controlled for other local factors such as absorptive capacity, human capital, the level of technology and the quality of institutions, FDI reduces income inequality (see Table 1.1). This clearly demonstrates that the impact of FDI on host counties is determined by their local conditions. In addition, if a country increases its human capital levels (measured by proxy of tertiary education), it can be expected that income inequality will decrease. This makes sense because the more people benefit from higher education, the more likely they are to access better jobs and incomes, stimulate economic spill overs and subsequently decrease inequality. Education improves both urban productivity and the capacity to innovate which, in turn, delivers higher growth. Therefore, the level of education not only improves incomes of individuals but also has a long-term effect on the local economy.

The findings also indicate that a higher level of technology and innovation (although with a lesser degree of significance) is likely to spur income inequality, because advanced technology tends to replace workers and reduce employment. However, although insignificant in this model, an interaction between total FDI and local technology would reduce income inequality (seen by the negative sign) through knowledge transfer. Furthermore, the interaction between FDI and technology reveals stronger results in the case of different sectors of FDI.

These initial findings indicate that if a host country has improved its levels of local technology then foreign technology in terms of FDI diffusion is more readily absorbed. This, in turn, can give rise to new related
economic activities and economic diversification in the host country. This strengthens the local economy by increasing productivity and generating jobs and, by extension, reduces income inequality.

It is important to realize that FDI also has an indirect relationship with income inequality, mediated by the socio-economic conditions of the host country. For instance, the Tala mobile credit app operating in Kenya and Tanzania provides customized financial services and disburses loans directly to a customer’s mobile phone. The majority of its customers are small- and micro-entrepreneurs requiring small loans to finance their businesses.

Our study also confirmed that a better institutional environment is likely to reduce income inequality as it protects investors and labourers and creates a more conducive business environment. On the other hand, if institutions favour protection of foreign capital and technology, inequality can increase through obstructed technology diffusion, making it more difficult for the host country to absorb and utilize foreign technology. This finding aligns with the argument of Morgan (2016) that modern institutions tend to facilitate the protection of investors rather than workers.

Our research also found that a higher share of trade in GDP is likely to lead to higher income inequality, as greater dependency on trade increases competition between foreign and domestic firms.
Increased competition may decrease the productivity of local firms and consequently reduce employment. Our results show limited inter-regional differences in the relationship between FDI and income inequality in Africa. Only Western Africa has a stronger impact of FDI reducing income inequality. But results are mixed, possibly due to the huge variations within this region, where amongst the eleven West African countries only Cape Verde, Côte d’Ivoire, Nigeria, and Sierra Leone saw relative declines in income inequality.

Western Africa is the third largest recipient of FDI amongst the five African regions. Nigeria is in second position after Egypt in terms of receiving total FDI. Nigeria is characterized by high absorptive capacity, human capital, technology levels, a good institutional environment and high FDI attraction. It receives a high value of hi-tech FDI, which is associated with lower inequality.

On the other hand, there are low-end FDI receivers. For instance, Sierra Leone, has much less absorptive capacity, human capital and technology, although it has good quality institutions. Cape Verde and Côte d’Ivoire have average absorptive capacity but better human capital and institutional quality, which has enabled them to reduce their income inequality. In the study on foreign investments in Côte d’Ivoire (see Part C), it was found that these investments generate significant

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Source: Kaur, Wall and Fransen 2017, based on fDi Markets and various additional data sources

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employment, increase social welfare, and promote environmental protection, while partnerships with local businesses are conducive to the transfer of competences and technical know-how. It was further shown that appropriate institutional frameworks put in place in Côte d’Ivoire were supportive. Challenges remain for administrative procedures (licenses, permits etc.), legal business matters, corruption incidence, lack of open governance, banning of certain industrial entrants, unfair competition, market monopolies, tax harassment and lack of investment promotion activities.

High-tech FDI and inequality

This study reveals that hi-tech FDI most significantly and positively affects income inequality although its impact depends on the absorptive capacity, human capital and technology level in the recipient country. Hi-tech comprises ICT (design development & testing, education and training, manufacturing, sales marketing and support), chemicals, aerospace and pharmaceuticals. It is still a relatively small sector in Africa but generates great value for foreign investors. After manufacturing, it is the second-most important FDI sector in terms of direct employment generation, i.e. five jobs per million USD invested.

Interaction between hi-tech FDI and a country’s absorptive capacity is important because increased absorptive capacity enables a wider distribution of foreign investments and technologies in local economies (creating more diversification) and can lead to a more equal society. In Africa, internet and mobile data play important roles in the diffusion of knowledge to small businesses, including informal markets. For instance, ICT and mobile phone ownership enable access to business networks and education, financial services and real-time market information. This is of particular importance to empowering female entrepreneurs. The African Economic Outlook report (2017) states that technology-based FDI creates positive spill overs and promotes local entrepreneurship through the application of new technology to traditional services. Such technology-inspired innovations include financial services and mobile payments that make many day-to-day financial transactions cheaper and convenient. Some foreign and African firms are working with start-ups and technology platforms to promote a new generation of hi-tech entrepreneurs (African Development Bank Group, 2017; UNECA, 2017b).

Lastly, collaboration between universities and industry for research and development (R&D) facilitates innovation, improves technology levels and boosts host countries’ new technology absorption. Some countries are now increasing their technology absorption capacities, such as Kenya through its Support to Technical Vocational Education and Training Project (USD41 million) which aims to boost the capacities of the faculties of engineering and applied sciences in 33 Technical Training Institutes (TTIs). Another example is Zambia’s Skills Development and Entrepreneurship Project, which specifically targets women and youth for skills and entrepreneurship development. Eritrea, Sudan and Togo have initiated similar programmes to promote skills and entrepreneurship towards more employment and equality (African Development Bank, 2015).

Furthermore, FDI is likely to increase income inequality in countries with higher human capital because it widens the income gap between multinationals and local firms, due to different salary scales, skills and education levels (Lin et al., 2013). Similarly, hi-tech FDI into countries with higher levels of local technology will increase income inequality in the host country because countries with high levels of technology and innovation tend to attract hi-tech FDI in knowledge-based activities, which generates only a small number of jobs for highly skilled workers. This further widens the income gap between skilled and unskilled workers leading to higher income inequality. The quality of institutions also influences the actual impact of hi-tech FDI on income inequality. Higher quality institutions tend to reduce income inequality by protecting national intellectual property rights, improving the investment environment and encouraging stronger auditing. These attributes promote higher productivity, protect workers from exploitation and reduce corruption. They also encourage fair justice and the ethical behaviour of firms. On the other hand, the inflow of hi-tech FDI into countries with improved institutions can also result in
higher income inequality if these institutions overly favor protecting foreign capital and their technologies because that hinders technology diffusion and maintains the technology gap between foreign and host country firms. This clearly poses a threat to local firms as they have to compete with foreign firms.

Northern African countries (e.g. Algeria, Egypt and Morocco) and the Republic of South Africa have received the greatest value of hi-tech FDI since they have superior absorptive capacity, human capital, technology, innovation and quality of institutions. There is a concentration of hi-tech FDI in the Nile River corridor (Cairo) and the Gauteng Province corridor (Johannesburg) which strongly correlates with the location of manufacturing FDI there. That is not surprising since hi-tech FDI in Africa is mainly geared towards manufacturing and innovation hubs (see Part A, Chapter 1). All these factors contribute to lower income inequality, except for South Africa (Online Appendix, Part B, 1.5) where societal polarization and segmentation in combination with its apartheid history, continues to stimulate high levels of income inequality.

**Manufacturing FDI and inequality**

Between 2006 and 2014, the manufacturing sector received the largest share of inward FDI. Our study indicates that manufacturing FDI significantly reduces income inequality (Table 1.1). It also generates
the largest number of jobs i.e. six jobs per million USD invested. Manufacturing further has a great potential for backward and forward linkages with other sectors, particularly agriculture and hi-tech. An increase in FDI alongside backward and forward linkages has the potential to improve macro-economic conditions through structural transformation and economic diversification. These tend to generate new economic activities and employment opportunities for low-skilled workers, which in turn leads to lower income inequality.

According to the OECD’s African Economic Outlook (2017), the more diversified African economies have performed better than the less diversified ones. Many African economies have become more diversified and resilient, particularly to external commodity shocks, when compared to a decade ago. The share of industrial and service sectors has shown a considerable increase in economic growth, mainly driven by the IT and telecommunications revolution (African Development Bank Group, 2017). Moving to an export-oriented economy requires a shift in industrial structure, and the manufacturing sector can play a significant role in restructuring African economies and promoting industrialization. In particular developing the agricultural sector and agro-based manufacturing will improve value chains and employ large numbers of low-skilled workers and, thereby lower income inequality (African Development Bank Group, 2017; UNECA, 2017b). Declines in the share of the agriculture labour force, accompanied by small increases in manufacturing and services, indicate that a structural transformation is now taking place in Africa (African Development Bank Group, 2017).

As with hi-tech, absorptive capacity is also crucial to manufacturing and its role in reducing income inequality because this sector requires well-developed physical infrastructure, ranging from roads and railways to a sufficient supply and quality of electricity. In addition, a good ICT infrastructure (mobile telephones and internet connectivity) facilitates communication, provides improved access to information, helps in marketing, creates networks and helps establish business relations, which are all important for the growth and productivity of the manufacturing sector. For instance, Pedigree, based in Tanzania, develops custom software for mobile finance apps. It facilitated the establishment of a movement which helps corporations and governments protect their brands (against fake and harmful products) and safeguards regulatory systems. It also increases human safety by protecting medicines and agricultural pesticides and seeds (African Development Bank Group, 2017).

Countries with higher levels of technology attract FDI in advanced manufacturing activities, which are technology driven and require fewer workers in specific and skilled jobs. Under these conditions, manufacturing FDI increases income inequality. Similarly, the inflow of manufacturing FDI in countries with better quality institutions and increasing populations also leads to higher income inequality, as explained earlier. From a regional perspective, manufacturing FDI contributes most to lowering income inequality in Western Africa. However, the top destinations for manufacturing FDI are Egypt, Libya, Nigeria, South Africa and Tunisia (Online Appendix, Part B, 1.6). These countries have experienced a decline in income inequality because of favourable factors i.e. a strong local economy, high values of inward FDI, and high levels of absorptive capacity, human capital, technology, and conducive institutional environments. The interaction of these factors results in a better macroeconomic environment which, arguably improves income distribution by generating employment and reducing poverty, which in turn results in lower income inequality.

**Resources and services FDI and inequality**

In Africa, the resources sector is the second-largest recipient of FDI, accounting for 34% of total FDI. The relationship between resources FDI and income inequality is not statistically significant (Table 1.1). A similar finding has been reported in Part A of this report that FDI into the resources sector is statistically insignificant and has a negative impact on the per capita GNI in African countries. One of the major reasons is that it only generates two direct jobs per USD million of FDI, compared to five and six jobs per million in the hi-tech and manufacturing sectors, respectively (Online Appendix, Part B, 1.2). FDI into the resources sector in Africa is extractive in nature and mainly associated with the export of raw material rather than local value addition. The findings show that an increase in human capital provides skilled workers to the services sector. However, the interaction between services FDI and tertiary education tends to
increase income inequality because the services sector requires skilled workers with a relatively higher level of education, thereby generating only two direct jobs per USD million of FDI.

Policy and research recommendations

Since the impact of FDI on income inequality is mediated by absorptive capacity, policies should focus on improving that capacity. According to FDI literature, the quality of a country’s human capital, institutions and infrastructure are factors in attracting and reaping the benefits of FDI. Therefore, it is important for African countries to invest in these fields. Countries should also further develop their ICT infrastructure, as this is the backbone of the hi-tech sector and increases productivity.

It would be useful if more research was done on the mediating effects of absorptive capacity. This study has focused on country-level analysis, while city-level analysis would be more appropriate. However, city-level data is generally very sparse and typically incomparable since it is not standardized. Advanced data collection at a city and country level would greatly aid research. Regional, national and municipal policies should be employed to ensure the development of adequate data. More detailed analysis based on new data would offer higher depth to the findings and consequent policy recommendations.

African countries should specifically target hi-tech and manufacturing FDI, as these have the most potential for reducing income inequality. Growth in the hi-tech sector may also lead to higher levels of technology and innovation, give rise to new economic activities and promote growth in other sectors. Boosting the growth of the manufacturing sector, as the largest recipient of FDI, has the potential of restructuring African economies and boosting local economies through backward-forward linkages with local firms.

Growth of the manufacturing sector is crucial for countries. It is critical for integration into the world economy, it plays a significant role in structural transformation and industrialization, and manufacturing can provide strong backward linkages and generate significant numbers of jobs within various sectors. The agricultural sector, for instance, through agro-businesses and food processing can generate large employment opportunities for low- and no-skill workers. Similarly, the manufacturing sector’s linkages with the real estate, finance and retail sectors can generate employment growth in the services sector.

Unsurprisingly, human capital significantly reduces the odds of income inequality and African countries should focus on education and skill development to achieve higher levels of skills among their labour pools. A large share of Africa’s population is young and unemployed. Education in combination with FDI is the primary tool for long-term youth unemployment reduction and raising the level of local technology. Therefore, countries should invest in higher education, R&D and innovation to diversify their economies and increase their productivity.

Improved auditing and reporting standards will reduce ambivalence and strengthen the mediating role of institutions. This is particularly important where state social democratic parties and trade unions are replaced by market-oriented institutions such as financial markets and multinational firms. Significant illicit financial leakages such as bribery and corruption are also a serious concern but better institutions and greater transparency can help alleviate this problem.

The factors that determine the effect of FDI on income inequality vary across sectors, which has important implications for research and policy. As shown, FDI into hi-tech and manufacturing leads to lower income inequality if host countries have a higher absorptive capacity, whereas FDI into resources and services sectors does not appear to reduce income inequality in the presence of higher absorptive capacity. A better understanding of these findings deserves more research.
Nine out of ten African workers are part of the informal economy
© Sjors737
Over the past decade, the flow of FDI towards African countries has created economic growth opportunities and has positively affected inclusive development. This study explores whether FDI has been effective in creating employment in Africa based on data for 2003-2014. The study examines to what extent different aspects of overall FDI (greenfield FDI, FDI stock and FDI flows) and different sectors of FDI affect overall employment and sectoral employment (agriculture, services and manufacturing) in Africa.

In recent decades, FDI, as one of the key drivers of globalization, has triggered an increasing number of countries to adopt liberalization policies and stimulate free trade. Although many advanced economies perceive globalization as a threat due to its adverse impacts on traditional jobs and their relocation to other parts of the world, most developing economies see it as a contributor to employment generation and poverty reduction (Jenkins, 2006). However, the debate on the impact of FDI on employment in Africa remains inconclusive.

Africa is home to some of the fastest growing economies in the world (Dicken, 2011; ILO, 2016). With the decrease in foreign aid, FDI is now one of Africa’s key determinants to fill the resource gap, generate growth and alleviate poverty (Asiedu, 2004). Whereas Africa was predominantly engaged in agriculture in the past, globalization and urbanization have started to structurally transform many of its countries’ economies (The World Bank, 2013; Szirmai, 2013). However, notwithstanding economic growth and positive structural change, most African countries experience low wage levels, high unemployment rates and significant...
dependency on the informal sector. Therefore, it is interesting to explore whether FDI significantly affects overall and different sectors of employment.

In past studies, FDI is said to generate employment in two ways: direct employment within multinational enterprises (MNEs) and indirect employment through backward and forward linkages of MNEs in host countries (Asiedu, 2004). Other studies argue that, although Africa’s growth rate is currently higher than the world average, this is not transformative as it is neither generating enough jobs nor creating adequate infrastructure (UNCTAD, 2014). Consequently, Africa is extremely dependent on informal economic development (Chen, 2012) and, in its low-income countries, the informal economy is responsible for about 50% of national output, about 60% of employment and 90% of new jobs (Benjamin et al., 2015).

A large proportion of workers are engaged in informal activities particularly in the resources sector and small-scale manufacturing units, as well as low-skilled jobs in the services sector. High levels of informality are undesirable, not only because they undermine human dignity through low wages and poor working conditions, but also because of the loss of fiscal revenue and the promotion of unfair competition. Having said that, without informality as a survival strategy, a lot of Africans would be even worse off. The creation of employment in the formal sector in large numbers is of the utmost importance to Africa and FDI is considered as a vehicle for this.

Quantity of employment
The total number of employed Africans has been rising steadily but so have overall populations. In absolute numbers, Nigeria accounts for the highest number of employed, followed in descending order by Ethiopia, the DR of Congo, Egypt and Tanzania. However, most African countries are characterized by low employment-to-population ratios. Countries such as Ethiopia, the DR of Congo and Tanzania fare well in total employment and also sport higher employment-to-population ratios, while Nigeria and Egypt are among the countries with low ratios (see Online Appendix, Part B, 2.15).

In terms of direct employment created by greenfield FDI, this study reveals that the highest number of investment-generated jobs has been in Egypt, followed by Morocco, South Africa, Nigeria and Tunisia. The lowest values are found in Mauritania, Guinea, Benin, Central African Republic, Eritrea and Somalia. In terms of sectoral employment, Part A of this report shows that the hi-tech sector, which is the smallest sector in terms of FDI attraction, has the fastest growing FDI-generated employment, followed by manufacturing.

Quality of employment
The International Labour Organization (ILO) suggests several indicators to measure the quality of employment, which have been used in this study. These include the proportion of unremunerated workers or contributing family workers in total employment (employment vulnerability rate); labour productivity growth; and female labour force participation rate. Country-level analysis shows that Equatorial Guinea had the highest employment quality index in 2014, followed by Botswana, Gabon, Mauritius, Namibia, Rwanda and South Africa. Egypt, Somalia, and Sudan perform poorly in terms of the quality of employment. Countries with a higher value of inward FDI are not better performers in terms of the quality of employment, except for South Africa (see Online Appendix, Part B, 2.15). This is especially true for the Northern African countries Egypt, Libya and Tunisia, as well as for Mozambique, which are the largest recipients of FDI. In addition, a large part of the labour force in Africa is employed in the informal sector, characterized by low skills and low pay in unhealthy working conditions. Nine out of 10 workers in Africa, particularly youth and women, are informal workers (UNECA, 2016).

Africa’s employment composition by sector reveals that agriculture is still the dominant sector, followed by services and manufacturing (see Online Appendix Part B, 2.14). Over the 2003-2014 period, the sectoral composition of employment remained unchanged for manufacturing at 11%, the share of agriculture declined from 58% to 53%, while the services sector rose from 31% to 36%. The number of jobs created by
greenfield FDI in Africa varies across sectors. From the regional perspective, greenfield FDI created relatively more jobs in Central Africa, followed by Eastern and Southern Africa and Northern and Western Africa.

The Impact of FDI on Total Employment in Africa

The first part of our analysis explored the impacts of three aspects of FDI - greenfield FDI, FDI flows and FDI stock - on total employment and on the main employment sectors in Africa (see Table 2.1). The first column shows greenfield FDI. That is, investments into new projects, and excludes mergers and acquisitions. The second column shows the degree to which total FDI (the net inflow of all forms of FDI) impacts differently on total employment. The third column explores FDI stock (cumulative historical FDI) to indicate its impact on total employment. These different forms of FDI are included in the statistical models as a robustness check. Table 2.1 reveals that total greenfield FDI does not have a significant impact on total employment when controlled by other indicators e.g. trade openness. A possible reason is that in the case of greenfield FDI the firms neither create enough employment spillover nor transfer adequate technology and skills to employees in host countries. In the case of Africa, a large share of greenfield FDI is targeted at the resources sector, which is strongly associated with the extractive industries. FDI in these industries, does not generally lead to significant employment creation and technology transfer (Asiedu, 2006a).

The Human Development Index (HDI), which is comprised of GDP, life expectancy and education, has a positive and very significant effect on increasing employment levels and shows that increased levels of wealth, longevity and learning contribute to increasing levels of employment. Higher GDP positively affects employment in several ways, because it also serves as a determinant of FDI which, in turn, influences positively the number of collaborative ties between foreign firms and local suppliers and therefore employment generation in host countries (Amendolagine et al., 2013). In addition, education proved to be a significant factor contributing to higher employment. As indicated in the case study on Kigali in Part C, Rwanda has improved its FDI investment through administrative and institutional reforms but foreign investors still experience a lack of human resources there (Mutebi, 2018). On the other hand, the size of the working population (age 15 to 64), does not appear to have any significant impact on employment, although the sign is positive. Trade openness, a measure of how open a country is to global trade, also has a positive and indeed a very significant impact on total employment because openness enables local firms to increase their exports. When the export productivity of local firms increases, the demand for labour goes up. In addition, trade openness amplifies inward FDI through which the number of direct and indirect jobs increases.

The percentage of mobile phone subscribers also strongly influences employment. It means that the more a society is able to communicate through mobile technology, the more job opportunities are enabled. Mobile phones enable access to business information and communication, which is important in African countries, including for managing small-scale businesses in the informal sector, since access to the internet is often limited.

The next indicator in Table 2.1 is an “interaction variable”, used here to control for the impact of trade upon communication. The interaction significantly affects the model and shows that the more open to trade a country is, the more this also influences the country’s ability to communicate. The last variable, i.e. the International Country Risk Guide, has a very significant but negative impact on total employment in African countries. This guide

<table>
<thead>
<tr>
<th>Variables</th>
<th>Total Employment (Greenfield FDI)</th>
<th>Total Employment (FDI Inflows)</th>
<th>Total Employment (FDI Stock)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greenfield FDI</td>
<td>0+</td>
<td>0+</td>
<td>0+</td>
</tr>
<tr>
<td>FDI inflows</td>
<td>++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>FDI stock</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Human Development Index</td>
<td>++</td>
<td>0+</td>
<td>0+</td>
</tr>
<tr>
<td>Working population (15-64)</td>
<td>0+</td>
<td>0+</td>
<td>0+</td>
</tr>
<tr>
<td>Trade openness</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Percentage of mobile phone subscribers</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Trade openness and percentage of mobile phone subscribers</td>
<td>+++</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>International Country Risk Guide</td>
<td>***</td>
<td>***</td>
<td>***</td>
</tr>
</tbody>
</table>

Source: Wall Mehta and Kaur, 2016, based on data from different sources

+++ Very significant and positive relation
++ More significant and positive relation
+ Significant and positive relation
--- Not significant but positive relation
0+ Not significant but positive relation
0- Not significant but negative relation

--- --- ---
The State of African Cities

includes a Political Risk Index that consists of 12 components measuring various dimensions of the political and business risk environment in African countries. Our finding implies that the higher the risks, the more this will have a negative effect on the total employment generated because instable political and business environments hinder the growth of both local and foreign firms and deter investment into these countries. In terms of political and social stability, Rwanda has shown significant improvement and it has become one of the more politically stable and safe countries for FDI (Mutebi, 2018).

Column 2 of Table 2.1 shows the same analysis for total FDI inflows. FDI inflows prove to be highly significant in boosting total employment levels in African countries. This is arguably because these include greenfield, brownfield and M&A FDI inflows. It is in this case the more reliable investment indicator to use because arguably M&A FDI leads to more technology diffusion in host countries, through networks between foreign-owned companies and local firms. This increases the productivity of local firms, generates more employment and consequently improves the overall economy (Liu and Zou, 2008).

The third model (column 3 of Table 2.1) is similar to the previous two, but here FDI stock is used. Because FDI stock concerns total FDI inflows

Mobile phones enable access to business information and communication, which is important in African countries, including for managing small-scale businesses in the informal sector, since access to the internet is often limited.
aggregated over the years, it appears to have the largest impact of the three FDI categories and, as is to be expected, the control variables show similar outcomes. Figure 2.1 shows the countries that have benefitted most from FDI inflows and the leading countries with the largest number of jobs generated by investment. FDI stock has created the largest number of jobs in South Africa, Nigeria, Egypt and Morocco (see Online Appendix Part B, 2.11).

The impact of FDI on employment in agriculture
In Online Appendix Part B, 2.5, the same procedure is followed as in Table 1, but now for reviewing the impact of the three forms of FDI upon agricultural employment in African countries. From the findings, it is evident that all three models—greenfield FDI, FDI inflows and FDI stock—do not have a significant effect upon agricultural employment. This is arguably because agriculture in Africa: a) is primarily rural and subsistence in nature; b) is not high-skilled; and c) has a weak relationship with the manufacturing and service sectors. Multinational enterprises (MNEs) are possibly not investing intensively in this sector, or their investments are hi-tech driven and are extractive in nature and therefore do not contribute to agricultural employment. In terms of food-industry related FDI, it is arguable that these investments do not boost employment because: a) MNEs focus on exporting agricultural products to markets outside Africa; b) such investments do not use labour-intensive technology; and c) they do not stimulate local farmers’ productivity and employment (see also the Food Security chapter in this section of the report). Due to the lack of new and additional jobs in the agriculture sector, unemployed rural people tend to migrate towards towns and cities in search of jobs, often in the low-productivity informal sector or just add to the cohorts of urban unemployed, leading to higher informality and urban poverty. The other previously discussed indicators continue to have the same impact on contributing to agricultural employment.
Inflation was also added to this model to see if it bears any significance, but this did not prove to be so.

The impact of FDI on employment in manufacturing can be seen in Online Appendix Part B, 2.6. It is evident in the three columns (Employment in Manufacturing) that greenfield FDI (column 2) has a significant effect on manufacturing employment although weaker than FDI flows (column 3) and stock (column 4). The first model also shows that the Human Development Index (HDI) has a very significant and positive relation to manufacturing employment particularly in Algeria, Egypt, Morocco and South Africa. As explained earlier, the HDI comprises GDP and education, which are important for job creation in the manufacturing sector. Mahdi et al. (2008) have shown in their case study on Cairo (Part C of this report) that Egypt is successful because it provides a large cohort of cheap and educated workers, along with superior infrastructure and ease of doing business, making it attractive for FDI.

The volume of manufacturing FDI into Africa is the highest of all investment sectors and the statistical results show that manufacturing FDI has successfully increased employment in African countries.

Map 2.1 shows that countries with higher values of manufacturing FDI are among the top-five recipients of manufacturing FDI and that they also have larger employment in the manufacturing sector (see Online Appendix Part B, 2.12) for hi-tech FDI into Africa which can help the structural transformation in African cities and lead to higher productivity and employment generation in all sectors of the economy. This can also lead to technology diffusion for further growth and spill over into the local manufacturing sector (local producers and suppliers), which in turn can stimulate further downstream productivity of smaller firms within the informal sector, thereby broadening the economic base of African countries.

The results also show that the level of mobile phone subscribers positively impacts employment in manufacturing, for reasons explained previously. Trade openness clearly does not affect jobs in manufacturing, arguably because African-produced
goods are more likely to be locally consumed than traded internationally. Again, the results show that inflation has no direct significant relationship with employment in Africa. Nonetheless, it is clear that it has a negative impact. The *International Country Risk Guide* is also not important in this context.

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**The impact of FDI on employment in services**

Looking at Online Appendix Part B, 2.7, we found that FDI also positively affects the African services employment sector. In model 1 (column 2) we see that greenfield FDI does not affect employment in this sector. However, in the case of FDI flows and FDI stock we see very significant and positive effects on increasing employment in services. Services sector employment in Africa is of increasing importance, not only in terms of growth, but also for employment. Klasa (2015) points out that financial services has been a leading FDI sector from 2006 onwards. Today, foreign investors are keener on the services sector in countries like Ethiopia, Kenya, Nigeria and South Africa. Trade openness positively influences this sector and the more a country trades globally, the more it requires services to facilitate the associated processes.

The same applies to the levels of mobile phone subscriptions, which significantly affect services employment. This is explained by the fact that the more countries are able to communicate through IT, the more they are able to trade with other countries. This is also seen in the mobile phone subscribers and trade openness variable, which is strongly significant. The *International Country Risk Guide* is only significant to greenfield FDI. However, all models show that its sign is negative, meaning that risk is likely to have an unfavourable impact upon employment in services. We see that the working population (age 15 to 65) does have significance, which means that an increase in the working population will lead to an increase in employment in the services sector. Inflation, although a negative influence, does not prove to be significant within this sector.

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**The impact of sectoral FDI on different employment sectors**

**The impact on employment in agriculture**

This section disentangles total greenfield FDI into four sub-sectors: hi-tech, manufacturing, services and resources. These are tested on the different employment sectors, as in Part A of this report. Firstly, it is clear that these different forms of FDI have no significant effect upon employment in agriculture (Online Appendix Part B, 2.8). As argued in the Food Security chapter in this part of the report, FDI in the agriculture sector is extractive by nature and focused on exporting raw materials. This confirms that African agricultural production and employment are not really associated with high-tech FDI, services FDI, manufacturing FDI and resources FDI. (The latter is primarily associated with mineral and fuel production.) In addition, a large share of Africa’s agricultural FDI goes into agricultural land acquisition, which negatively impacts on local economies, due to the social, economic and political conflicts often associated with such land acquisitions. Agricultural investment in Africa has become a resource-seeking production and export venture, which displaces local farmers and creates unemployment in this sector (Asiedu, 2015).

**Agricultural investment in Africa has become a resource-seeking production and export venture, which displaces local farmers and creates unemployment in this sector**

The Human Development Index positively matters to employment in agriculture as well. This implies that the more GDP, longevity and education increase, the higher the demand for non-staple food and, therefore, the higher the employment in this sector. Inflation appears to negatively affect this sector because the higher the product prices, the lower the demand and reduced need for employees to produce in this sector. We also see that international country risk negatively impacts employment in this sector. The more risky countries are, the less food production there is, and the less need for employment. Mobile communication has a positive significance in this sector. Population too has a positive effect on employment in agriculture. In other words, the larger a country’s population is, the higher the food demand and related employment.

**The impact on employment in manufacturing**

Where different sectors of greenfield FDI have no relation to agricultural employment, there is
High-tech and manufacturing FDI have created the highest number of jobs in Nigeria.

significance for employment in manufacturing (Online Appendix Part B, 2.9). In the first model (Column 2), we see that hi-tech FDI positively influences employment in manufacturing. It means that there is a likely transfer of multinational technology to local manufacturing processes. Manufacturing is one of the largest sectors in Africa, which gives it great potential for backward and forward linkages with the primary and resource sectors, as well as the tertiary sector, in particular hi-tech manufacturing. Hi-tech is a broad sector, in which manufacturing is the largest subsector and receives large amounts of FDI. Indeed, most of the jobs in the hi-tech sector are created within its manufacturing sub-sectors. The major industries in hi-tech-related manufacturing are chemicals, aerospace and pharmaceuticals. It is particularly the chemical industry which receives large investments and creates large numbers of jobs. Here too, the controls of population and trade openness impact similarly as in previous studies. In the case of manufacturing FDI, we see an even more significant and positive impact upon the ability to increase local employment. Manufacturing and hi-tech FDI have created the highest number of jobs in Egypt, Nigeria and South Africa, followed by Algeria and Morocco (Online Appendix Part B, 2.12 and Online Appendix Part B, 2.13).

Interestingly, services FDI has no effect on manufacturing FDI. It could mean that, in Africa, services FDI is very particular to itself and not influential to manufacturing. That is verified in the next section (Online Appendix Part B, 2.10) where, indeed, it is shown and indeed, it is clear that services FDI does influence local services employment. This model shows that inflation, population, trade openness and communications all contribute to explaining employment in manufacturing. The last model shows that resource FDI does not contribute to local employment in manufacturing. This reflects the “resource curse”, sometimes called the “paradox of plenty”, and refers to the paradox that countries
with natural resource abundance, particularly non-renewable resources like minerals and fuels, are inclined to have lower economic growth and worse employment outcomes than countries with fewer natural resources (Amusa et al., 2016).

The impact on employment in services
In the analysis of services sector employment (Online Appendix Part B, 2.10), hi-tech FDI has a strong and significant effect upon local employment in services. Besides that, trade openness and IT communications also play an important role in creating employment in this sector. The same pattern is reflected in manufacturing FDI, which also has a positive significant effect. In this model, we again see that trade openness and population size also play an important role. The only FDI sector which does not show a significant relationship with local services employment is the resources FDI sector, which can be explained by the resource curse.

Conclusions and recommendations
Formulate policies to attract the right kind of FDI
During the last 15 years, Africa has shown impressive growth but it has not generated enough jobs, since this growth was predominantly concentrated in the extractive industries. To overcome jobless growth, Africa needs structural transformation which involves a shift of labour to more productive sectors, a more diversified economy and more productive and broad-based growth (African Development Bank Group, 2017).

Since manufacturing is the most important FDI sector for generating employment in African countries, the research findings indicate that African countries should focus on attracting more manufacturing FDI to promote industrial growth and employment. Manufacturing FDI can play an important role in structural transformation and economic diversification, which are both highly desirable since about 90% of the African population is engaged in either agriculture or services (Szirmai et al., 2013).
The agriculture sector in Africa has high potential for increasing productivity and value-chain addition while playing a crucial role in youth unemployment alleviation. This requires modernization and transformation of the agriculture sector through investment in skills development, access to finance, extension services and assured markets for local products (African Development Bank Group, 2017).

In the light of the above, it is critical for Africa to enact policies that attract manufacturing FDI, with a special focus on labour-intensive light manufacturing. To achieve that, African countries should improve their infrastructure, particularly their communications infrastructure for knowledge sharing. Improving road and rail integration with other countries in the respective African regions is important for the transportation of raw materials and final products and for expanding both the domestic and international markets of products (Wall et al., 2017). Regional integration can also play an important role in attracting manufacturing FDI if similar policies are put in place across countries.

Countries should improve their level of technology and innovation to get better access to foreign technologies. Generating more services FDI will also generate significant numbers of jobs, as shown in Asia. In addition, this sector also benefits from manufacturing FDI and hi-tech FDI. The services sector is considered to be a key growth driver of the future economic environment, either as a “leading complement” or a “lagging complement” or a “substitute” of manufacturing (Leipziger & Yusuf, 2013 pp. 2-3). Governments should emphasize regional policies that foster collaboration and linkages with foreign firms to benefit from foreign investments and knowledge for regional integration.

**Countries should improve their level of technology and innovation to get better access to foreign technologies. Generating more services FDI will also generate significant numbers of jobs, as shown in Asia.**

### Strengthening the agriculture sector

Since agricultural FDI does not create sufficient new and additional jobs in African countries, a two-pronged strategy could be adopted to create more employment in this sector. Firstly, the entire sector should modernize, adopting increased commercial but inclusive farming, following sustainable agricultural practices, and making agricultural produce worthy of export. Secondly, local agro-based industries and agri-business, as well as collaboration with MNEs should be strived for. This will create a link between the agriculture and manufacturing sectors and across corporate scales. Besides taking care of food security in their own countries, policies should promote excess food production for export, following the examples of Malaysia and Thailand that have successfully given an impetus to their industrial sector through agro-based activities (Kjöllerström and Dallto, 2005). African countries could also learn from Vietnam, which implemented agricultural reforms i.e. Doi Moi that triggered the change from a centrally planned to a market-oriented economy. These reforms focused on agricultural extension, land reform and deregulation that resulted in increased agricultural productivity and turned Vietnam into one of the largest exporters of rice, coffee, tea, pepper, cashew nuts, rubber and seafood (The World Development Report, 2013).

### Enhancing absorptive capacity

Our study shows that overall greenfield FDI does not have a significant impact on employment in Africa, although different sectors of FDI do. The currently low absorptive capacity of African countries is a likely reason for the weak overall results (Narula, 2003; Szirmai et al., 2013). Unemployed rural youths migrate to towns and cities to seek work and frequently end up in the informal sector working for low wages. This calls for investment not only in human capital but also in physical and technological infrastructure. During the past few years, mobile telephone networks have spread quickly in Africa. This study found that mobile connectivity has a high significance for and positive impact on employment generation because mobile infrastructure provides opportunities for the faster spread of information and innovation. For instance, M-Pesa, a mobile payment service, has played an important role in facilitating banking transactions and trade in Kenya. Therefore, policies and programmes to further stimulate mobile connectivity would be desirable. Additionally, policy initiatives to develop human capital through continuous education and skill development would also be very beneficial.
Do Sub-Saharan Cities with Lower Labour Costs Attract Greater FDI Inflows?

By Addisu Lashitew and Ronald Wall
Attracting FDI has become a standard component of the economic policy toolkit, both in developing and advanced economies (Görg and Strobl, 2005; Corzet et al, 2004). In developing economies, FDI is expected to contribute to economic development by filling in the gap between domestic savings and investment requirements (Anyanwu, 2012). This is expected to contribute to economic growth by expanding productive potential, by creating employment opportunities, and through the transfer of technological and managerial know-how from foreign to domestic firms. Since multinational corporations (MNCs) produce, own, and control most of the world’s advanced technology, some of their know-how can spill over to domestic firms through formal means such as technology licensing or informally through employee transfers and other forms of spill over (Görg and Strobl, 2005). Countries in Africa and elsewhere, therefore, pursue diverse policies to attract multinationals to invest in their countries. A wide array of policies including tax incentives and favourable regulatory provisions are
often provided to attract multinationals (Görg and Strobl, 2005). More importantly, developing economies aspire to exploit their locational advantages that make them attractive to efficiency-seeking multinationals (Dunning, 2009). Labour costs in many African countries are relatively low since a large share of the population works in the informal sector and/or is underemployed. Leveraging these low labour costs is an important imperative in FDI policy making in low-wage economies.

However, there is limited actual evidence on the extent to which labour costs drive FDI inflows to African economies. Indeed, few researchers have explored the paradox that African countries receive a low amount of foreign direct investment despite having, for the most part, very low labour costs (Okafor et al., 2015). Moreover, evidence on labour costs and other determinants of FDI inflows that is currently available is to a large extent based on aggregate national data which is likely to compromise the robustness of the conclusions (Herzer et al., 2008; Alfaro et al., 2008; Anyanwu, 2012; Okafor et al., 2015). There is also evidence of scarcity on the relationships between labour costs and FDI inflows into developing economies (Anyanwu, 2012). This study aspires to contribute new insights using a rich dataset of FDI inflows (as used throughout this report) and labour costs measured at the city level.

While the magnitude of the impact of labour costs is relatively small compared to such determinants as host market size and distance, it has nonetheless a statistically significant effect on FDI inflows (Bellak et al., 2008).

An associated, large body of literature has investigated the effect of FDI inflows on the wage rate of the host country and, if that is the case, whether this spills over to domestic firms (Görg and Strobl, 2005; Hale and Long, 2011; Libsey and Sjohom, 2004). Indeed, such studies found that multinationals pay higher wages than domestic firms, but the extent of spill-overs is debatable (Görg and Strobl, 2005).

However, there exists no evidence of the actual extent to which FDI inflows into African countries and cities is driven by labour cost differences.

Studies in economic geography consider, amongst other things, the spatial dimensions of FDI inflows. For example, Blanc-Brude et al (2014) argue that locational advantages include not only the very attributes of the locality such as agglomeration factors, but also its proximity to other preferred locations. A feature of agglomeration that is less closely studied is the differences that may occur between capital cities and other locations. Although studies from specific countries e.g. Jordaan (2008) for Mexico City, show that capital cities receive the lion’s share of national FDI inflows, there is scant evidence on this topic at the international level. Therefore, the research presented in this chapter seeks to investigate the extent to which the FDI inflows into African capital cities remain higher after controlling for other city characteristics, including wage differences.

**Data sources and measurement**

The data source for city-level FDI is the same Financial Times (FT) FDi Markets database used for the other sections of this report. Two alternative measures of FDI were also used: a) the value of FDI inflows at the city level; and b) the city’s share of FDI inflows in the national total. For our analysis, we combine the city-level FDI data with a dataset that contained measures of labour costs and productivity for these cities. Stratification ensured representative coverage for the formal private sector across different geographical locations within each country and allowed for the calculation of location-specific representative labour costs on the basis of the amount of annual wages paid by firms. To calculate city-level labour costs, the annual unit labour costs at firm level were calculated by dividing total labour compensation by the number of employees. For the
indicative labour cost of a city, the median wage rate of all the firms located within that city was used. The same procedure was followed to calculate labour productivity, imputed as annual sales per worker. The use of median rather than average values across firms is likely to provide more representative measures of labour costs since median values are not influenced by extremely high and low wage rates, which are likely to be contaminated by measurement errors. Imputing labour costs and productivity from firm-level data has also been used by previous research on FDI inflows (cf. Bevan et al, 2004).

Finally, two types of imputations were conducted to fill in missing data for labour costs and productivity. The wage-rate data from the World Bank’s Enterprises Survey (WBES) did not include certain cities for which the FT database provided FDI data. To get approximate values of labour cost and productivity for these cities, the values of other cities located within the same administrative region (and sometimes within close geographic distance) were taken. The second type of imputation was conducted to create the panel dataset needed for estimating Model 2 (Online Appendix 3.6). Since the WBES was not conducted on an annual basis, our data for wages and productivity across cities was not balanced, but missed many values. When wage-rate data was available for two non-consecutive years but there was no data in the intervening years, the missing values were interpolated using the observed (linear) growth rate between the two values. In some cases, missing wage and productivity data were extrapolated using annual GDP growth rates, which are a reasonable proxy for the wage growth rate. Since constructing this panel dataset involved more assumptions than the cross-sectional dataset, our baseline analysis is based on the cross-sectional analysis.

### Descriptive results

#### FDI inflows

Table 3.1 provides descriptive statistics of the key variables. The average FDI inflow in the 265 African cities and towns covered is about USD40 million,
whereas the median value is a notably smaller USD8.7 million. The city with the highest amount of FDI inflows is Johannesburg with USD944 million, followed by Lagos, Cape Town and Nairobi, which attracted FDI inflows of USD658 million, USD460 million and USD427 million respectively.

The geographic distribution of FDI into Sub-Saharan cities is shown in Figure 3.1 (blue nodes) and covers the period of 2006-2016 (see also Figures 5, 6 and 7 for FDI distribution at continental, regional and urban scales). Most recipient cities are located on the coast or within a major economic corridor e.g. Gauteng-Maputo, Abidjan-Lagos and Victoria Lake-Mombasa. The grey linkages represent FDI flows from global source cities (green nodes), clearly showing how globally connected or relatively disconnected these cities are. The flow of FDI into capital cities as a share of the total national inflow is typically high to very high, in some cases more than one third of the total. The cities with the greatest proportional share of national FDI inflows are N’Djamena, Abidjan, Dakar, Cotonou and Nairobi.

**Statistical results**

Table 1 serves as a simplified presentation of the statistical results of Model 1 and are more scientifically represented in Appendix 3.5. This model uses average values of FDI inflows and labour costs across years, which allows for a larger number of cities (265 cities in 38 countries). The first row of Table 3.1 reveals that labour costs, measured using the log of the indicative wage rate, are not significant in any of the analyses. As shown in the correlation matrix in Online Appendix 3.4, wage rate also does not have a significant relationship with FDI. The data, therefore, provide consistent evidence that differences in wages are not significantly associated with FDI inflow to African cities. When we turn to productivity differences, however, there is a significant negative impact on the level of FDI inflows, although this does not appear if the share of FDI is considered, rather than its actual value.

The negative coefficient of productivity is also difficult to interpret, since we would expect that, given the low labour costs, cities with greater productivity should attract more FDI inflows. Nonetheless, the insignificance of productivity found in the last regressions suggests that there may be other factors influencing the scale of FDI (such as city size) rather than productivity. Interestingly, the capital city variable remains positive and significant in all regressions. Being a capital city appears to have a notable effect on FDI inflows.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Dependent Variable: Log of FDI</th>
<th>Dependent Variable: Cities’ Share of FDI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wages (log)</td>
<td>0+ 0+ 0+</td>
<td>0+ 0+ 0+</td>
</tr>
<tr>
<td>Productivity (log)</td>
<td>-- -- --</td>
<td>-- -- --</td>
</tr>
<tr>
<td>Capital city dummy</td>
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</tr>
<tr>
<td>Doing business rank</td>
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</tr>
<tr>
<td>GDP growth</td>
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<td>+ + + + +</td>
</tr>
<tr>
<td>GDP per capita (log)</td>
<td>0+ 0+ 0+</td>
<td>0+ 0+ 0+</td>
</tr>
<tr>
<td>Total GDP (log)</td>
<td>+++ +++ +++</td>
<td>-- -- --</td>
</tr>
<tr>
<td>Eastern Africa</td>
<td>--- --- ---</td>
<td>0- 0- 0-</td>
</tr>
<tr>
<td>Northern Africa</td>
<td>0- 0- 0-</td>
<td>0- 0- 0-</td>
</tr>
<tr>
<td>Southern Africa</td>
<td>0- 0+ 0-</td>
<td>0- 0- 0-</td>
</tr>
<tr>
<td>Western Africa</td>
<td>-- -- --</td>
<td>0- 0- 0-</td>
</tr>
</tbody>
</table>

Source: Lashitew and Wall, 2017, based on fDi Markets and various sources of data

+++ Very significant and positive relation
++ More significant and positive relation
+ Significant and positive relation
0+ Not significant but positive relation
- Significant and negative relation
0- Not significant but negative relation
-- More significant and negative relation
--- Very significant and negative relation
Do Sub-Saharan Cities with Lower Labour Costs Attract Greater FDI Inflows?

inflows over and above labour cost and productivity differences. Being a non-capital city means that there is on average less chance of attracting FDI. Therefore, for these cities other urban factors like technological capacity, efficient ports, infrastructure, or education levels will need to be strongly improved to offset the disadvantage.

Control variables

Turning to the control variables in Table 3.1, the coefficients of the ease-of-doing-business indicator proved not significant in any of the regressions. Nevertheless, in the case study of Kigali in this report, ease of doing business has been posited as one of the important factors for FDI attraction, because administrative and institutional reforms have made the city much safer for foreign investment (Mutebi, 2018). What we learn from this is that in general across many African cities, the ease of doing business is not developed enough to reveal any significant effect on FDI. However, there will always be exceptions, such as the case of Kigali.

GDP growth and (the log of) total GDP have positive and significant effects on the level of FDI inflows. Since both variables are measured at the national level, this shows that cities in larger and growing economies tend to attract more FDI.
Table 3.2. Statistical results for investment in African cities (panel model)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Dependent Variable: Log of FDI</th>
<th>Dependent Variable: Cities’ Share of FDI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wages (in log)</td>
<td>0-</td>
<td>0-</td>
</tr>
<tr>
<td>Lag wages (in log)</td>
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<td>0-</td>
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<tr>
<td>Capital city dummy</td>
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<tr>
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<tr>
<td>Lag productivity (in log)</td>
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<tr>
<td>Doing business rank</td>
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<td>GDP growth</td>
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<tr>
<td>GDP per capita (in log)</td>
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<tr>
<td>Total GDP (in log)</td>
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<tr>
<td>Eastern Africa</td>
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<tr>
<td>Southern Africa</td>
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<tr>
<td>Western Africa</td>
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<td>0-</td>
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</tbody>
</table>

Source: Lashitew and Wall, 2017, based on fDi Markets and various sources of data

+++ Very significant and positive relation  ++ More significant and positive relation  + Significant and positive relation  +++ Very significant and negative relation  -- More significant and negative relation  - Significant and negative relation  0+ Not significant but positive relation  0- Not significant but negative relation

Rapid urbanisation and agglomeration factors have played an important role in attracting FDI to Abuja, Nigeria © Joshua Wanyama
(with an average of USD100 million vs. USD30 million), and more than six times higher in terms of the share in national FDI (14.4% vs 2.3%). Since capital cities are likely to have greater productivity than other cities, regression analysis tested if the difference remains significant after accounting for wage and productivity differences.

**Conclusions**

This section provides new evidence on the relationships between FDI inflows and labour costs using new disaggregated data of FDI inflows into African cities. Applying cross-sectional and longitudinal data analysis techniques to whether African cities with lower labour costs attract greater FDI inflows does not provide any evidence that FDI inflows to African cities are driven by wage differences. It means that this is generally not considered an important operational cost for MNEs operating in Africa.

Differences in productivity also do not appear to have a notable impact. Rather, the analysis showed that capital cities receive significantly higher FDI inflows after controlling for labour cost and productivity differences. These results are strongly significant and remain robust in all specifications. FDI inflow to African cities therefore appears to be driven not so much by costs of labour, as by the forces of urbanization and agglomeration around capital cities. Cairo, Abuja, Nairobi and Johannesburg (Gauteng Province) are examples of such cities where rapid urbanization and urban agglomeration factors play an important role in attracting FDI, as is further explained in the case studies of Part C of this report. There could be multiple reasons for this. Capital cities tend to be larger in size and provide greater market access. They are often better administered and typically home to a relatively better-skilled labour force. Moreover, capital cities could be attractive due to their rich business ecosystems (Corzet et al, 2004) or better access to information that reduces information asymmetries (He, 2002). They are also often the key creative and cultural centres.

Therefore, African policy makers should realize the need to continue investing in their capital cities while, in parallel and over a longer time frame, laying the foundation for the creation of a complementary and both spatially and demographically balanced national urban system, through the facilitation of...
integrated and strategic management, finance and governance capacity-building. This does not imply ever-larger and more primate national capitals where negative externalities undermine agglomeration advantages. In a conducive system of cities, the capital and other large cities facilitate urbanization economies; secondary towns serve as complementary industrial nodes and absorbers of new urban populations; and small towns provide rural-urban linkages while facilitating internal scales of economy (The World Bank, 2010; UNECA, 2017b).

The current analysis has certain limitations which need to be addressed by future research, including but not limited to: a) city-specific factors other than labour costs and productivity; b) the effects of city size and governance quality on FDI inflows; c) how the determinants of FDI inflows differ between greenfield investment and mergers and acquisitions; and d) how FDI into primary

African policy makers should realize the need to continue investing in their capital cities while, in parallel and over a longer time frame, laying the foundation for the creation of a complementary and both spatially and demographically balanced national urban system, through the facilitation of integrated and strategic management, finance and governance capacity-building and extractive industries differs from those in secondary activities. Future research could also use even further disaggregated data to shed light on the impact of labour costs on specific types of FDI inflow. It would also be useful to explore the extent to which agglomeration economies offset labour costs and firm inefficiency disadvantages of Africa. However, none of this can be carried out without the development of high-quality, comparative and standardized data. Therefore, one of the key recommendations for African policy makers is the development of state of the art domestic databases that can facilitate continent-wide databases.
Tungsten mining in Rwanda for the electronics industry. The challenge is to ensure that the exploitation of resources leads to a fair national distribution of wealth.

© Harold Bonacquist

Determinants of Foreign Direct Investment into Africa’s Knowledge-based Industries

By Ronald Wall, Dorcas Nyamai and Colin McAweeney
Historically, FDI into Africa has neither lifted African populations out of poverty nor has it addressed the growing gap between the more innovative and technologically lagging countries (Liefner, 2009). Economies that rely on a single or a few sectors of economic activity are very vulnerable to price shocks in those sectors. To help address the lack of economic diversification and technological gaps, this study explores the relationship between location factors and the attraction of knowledge-based FDI (KFDI). In turn, it is expected that KFDI in Africa would help to better diversify products and services, generate innovation, and allow for socio-economic inclusion. To these ends, the objective of this research is to identify the locational factors that help attract KFDI to African countries and cities.

It is clear that a digitalized transformation has permeated daily life around the world. This has affected the ways in which people work, consume and spend their leisure time, which are drastically different from how these had evolved up to a century ago. Digitalization has sped up globalization and made the world a much smaller place, where products and ideas are transferred and adopted at a staggering and sometimes even crippling pace (Dickens, 2011).

Historically and geographically, the knowledge economy is mostly located in advanced economies. However, this is no longer an exclusive given, as developing economies increasingly strive to also compete in this arena. In recent decades, Asian countries such as China, Korea, Malaysia and...
Singapore, as well as South American countries like Costa Rica, Argentina, Chile and Puerto Rico (OECD 2012), have transitioned from agrarian and primary industries to knowledge-based economies. These economies have leapfrogged previous industrialization trajectories, showing that development and growth are not necessarily linear and path-dependent processes (Redding, 2001). However, the current development structure in many African countries looks very different from these Asian and Latin American countries.

The abundance of cheap labour and natural resources, combined with shortfalls in government funding and regulation, have exposed developing economies to exploitation, especially in the extraction and mining sectors (UNCTAD, 1997). The resultant exploitation of resources without fair national distribution of wealth is, as described in Collier and Goderis (2008), the “Resource Curse” theory. In line with this theory, there is evidence that the extraction economies in Africa, since 2000, have neither promoted inclusive wealth distribution nor social equality, even though national GDPs have grown significantly faster than the global average. Against the common notion of natural endowment advantages, the resource-rich countries in Africa have not done any better than the resource-poor economies in lifting their populations out of poverty. Rather, several of these well-endowed countries, like Angola, Gabon or the Republic of Congo are experiencing extreme poverty (Chuhan-Pole et al., 2012). This is also evident in the study on income inequality and FDI, in this part of the report.

A positive consequence of globalization is the growing market for FDI. Investments from advanced to developing economies can play a very important role when governments do not have the financial resources for long-term infrastructure projects (Collier, 2014), including the development of knowledge-based economies in Africa. The so-called ‘East Asian Miracle’ of rapid economic growth was largely due to a big increase in FDI flows into these developing economies coupled with a consistent distribution of wealth. Starting in the mid-1980s, the East Asian region’s economy saw an incredible twelve-fold increase in FDI (Urata, 2001). This brought foreign capital, technology and knowledge to these emerging economies and enabled them to compete globally (Hill, 2009; S. Kurtishi-Kastrati, 2013). It was due to these unique FDI benefits and wealth distribution that East Asia was able to catch up with developed economies (Stiglitz, 2001).

Although several developing economies worldwide are becoming increasingly technologically driven, most African countries have not yet caught up, and the relative lack of technological readiness in these countries is said to add to growing income inequality between Africa and the other major regions of the world (Liefner, 2009). Although knowledge-based industries exist in Africa, they are weak and need support from policy makers. This includes policy for promoting and facilitating the necessary pre-conditions to attract FDI in this sector. However, there is a lack of knowledge of what exactly would attract KFDI into Africa. Filling this gap is the key purpose of this study by testing the effect of global competitiveness upon FDI inflows, at three aggregation levels, namely the aggregate Global Competitiveness Index (GCI), the more specific categories of this index (factor-driven inputs, efficiency enhancers and innovation factors), as well as the underlying GCI 12 pillars. Extra (dummy) variables of different African regions have been included in the models to identify possible regional variations, while national population sizes have been included to control for size effects. The model concerns a panel of 36 countries over the period 2006 to 2014 with analyses at two different aggregation scales, i.e. country and city.

**Sectoral distribution of KFDI in Africa**

Compared to other major global regions, Africa only received a modest amount of KFDI between 2006 and 2014 (see Figure 4.1) with significant variation in its distribution across the continent. The map clearly shows that Southern African countries, particularly South Africa and Zambia, received higher values of
KFDI when compared to other African countries (size of the blue nodes and density of the grey investment linkages). They are followed, in descending order by Nigeria, the Republic of Congo and Egypt. The major investors in KFDI into African countries are the USA, China, India, Brazil and Australia (green nodes), followed by several European countries. The shades of red on the map represent the average level of technological readiness of African countries. Again, a handful of Southern and Northern African countries such as South Africa, Namibia, Morocco, Tunisia, Egypt and Senegal possess the highest level of technological readiness, revealing a correlation between technological readiness and KFDI attraction. In reference to this, *The State of African Cities Report 2008* shows the relationship between road infrastructure development and the emergence of IT Parks. For instance, a hi-tech park called ‘Smart Villages’ has been developed between Cairo and Alexandria to attract FDI and drive the development of Egypt. Similarly, a hi-tech zone at El Ghazala in Greater Tunis is located on the corridor between Tunis and Bizerte and attracted international ICT firms (UN-Habitat, 2008). This supports the arguments in Part C of this report on infrastructure and investment that road network accessibility and regional integration will enable African countries to attract more FDI (Wall, Elesa and Alade, 2018).

The disproportionate distribution of KFDI into the communications sector is likely due to the growing Western and Eastern African middle classes that have disposable income that creates new markets for communication products and services.

**Distribution of KFDI at the African regional level**

In terms of the KFDI trend at the regional level, Online Appendix 4.6 shows that Western, Southern and Eastern Africa experienced significant increases in KFDI between 2006 and 2014. KFDI in Northern Africa grew between 2006 and 2010 but declined thereafter. Central Africa received only a modest amount of KFDI in this period. The sectoral composition of KFDI at the regional scale presents a similar picture to the whole of Africa with little
The disproportionate distribution of KFDI into the communications sector is likely due to the growing Western and Eastern African middle classes that have disposable income that creates new markets for communication products and services. Also, there appears to be a market for private projects in lieu of some governments’ inability to supply public communication infrastructure in the desired quantities. Southern and Northern Africa received the largest shares of KFDI in the renewable energy sector, possibly because countries in these regions are relatively more developed, which could imply a degree of market saturation and hence limited potential for communication projects. In turn, this is likely to have increased their potential to shift towards more sophisticated types of KFDI e.g. renewable energy.

### Findings

Firstly, the determinants of KFDI into African countries were explored (see Table 4.1). Model 1 (column 2) shows that the Global Competitiveness Index (GCI), when controlled for population size, is highly significant for KFDI attraction. This implies that the more a country improves its overall competitiveness, the more knowledge investment it will be able to attract, regardless of the size of the population. It is clear from Figure 4.2 that countries leading in GCI, such as Egypt, Kenya, Morocco, Nigeria and South Africa also receive higher amounts of KFDI in comparison to other African countries. Population size itself also proves to be highly significant for KFDI. Together, these two variables explain 40% of the attraction of KFDI into Africa.

In column three of Table 4.1, the three major components of GCI are unfolded and tested on KFDI, while again controlling for population. From this, we see that basic requirements which is comprised of unskilled labour, natural resources, appropriate infrastructure, good health and primary education, do not serve as significant determinants for attracting KFDI. This suggests that countries that are at the basic requirements stage of development, are not likely to attract KFDI. Similarly, countries strong in the efficiency enhancers stage of development are also less likely to attract KFDI. This comprises factors such as basic education, efficient labour markets, and market size. However, what does attract KFDI are innovation and sophistication factors i.e. business sophistication and technological innovation, with countries that have achieved this stage of development able to attract KFDI. This suggests that countries that are at the basic requirements stage of development, are not likely to attract KFDI. Similarly, countries strong in the efficiency enhancers stage of development are also less likely to attract KFDI. This comprises factors such as basic education, efficient labour markets, and market size. However, what does attract KFDI are innovation and sophistication factors i.e. business sophistication and technological innovation, with countries that have achieved this stage of development able to attract KFDI. Johannesburg and Cairo are the leading African cities for KFDI due to their strength in innovation and sophistication factors. (See also Part C of this report). A number of studies have similarly shown the importance of ICT innovation for FDI attraction, explaining that it reduces search time and associated costs, thus increasing productivity and efficiency (Pacific and Joshua, 2015). Since development of ICT is closely associated with innovation, this result is aligned with the arguments of Economou (2008) or Azmat and Basu (2003) that a strong ICT infrastructure system creates a conducive environment for innovation and

<table>
<thead>
<tr>
<th>Variables</th>
<th>Knowledge Intensive FDI</th>
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<tr>
<td>Global Competitiveness Index</td>
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<td>Innovation and sophistication factors</td>
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<td>Market size</td>
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<td>Eastern Africa</td>
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</table>

Source: Wall Mehta and Kaur, 2016, based on data from FDI Markets and various other sources

+++ Very significant and positive relation
++ More significant and positive relation
+ Significant and positive relation
--- Very significant and negative relation
-- More significant and negative relation
- Significant and negative relation
0+ Not significant but positive relation
0- Not significant but negative relation

variation. Communications received the largest share of KFDI in Central, Eastern and Western Africa from 2006 to 2014 (Online Appendix 4.7). Most African countries are rapidly catching up on communications infrastructure, such as mobile phone networks and internet connectivity, which not only enables global interaction but also facilitates the dissemination of information and knowledge.
entrepreneurship and this is particularly important for knowledge-based economies to further attract KFDI. Simultaneously, it would lead to the diversification of the economy by generating new economic activities and business activities.

The scatterplot of Figure 4.2 reveals that more developed African economies, such as Egypt, Kenya, Morocco, Nigeria, South Africa and Tunisia, have all attracted higher amounts of KFDI, because they are globally competitive and characterized by a conducive environment for innovative and sophisticated knowledge-based industries.

At an even deeper level, the 12 pillars that make up the three previously discussed GCI categories are explored. These pillars are quality of institutions, appropriate infrastructure, macroeconomic framework, good health and primary education, higher education and training, efficient goods markets, efficient labour markets, developed financial markets, technological readiness, market size, sophisticated production processes and innovation. The results of model 3 (column 4 of Table 4.1), show that, at this level of detail, only market size (efficiency enhancer), technological readiness (innovation factor) and financial markets (efficiency enhancer) matter to KFDI investors, when controlled for country size.

The market size indicator concerns the combined size of a country’s domestic and foreign markets. This measure reflects a country’s efficiency gains through specialization and its ability to take advantage of economies of scale in the production of services and goods. Firms in large markets can realize increasing returns to scale through producing higher output with less input (Yu and Walsh, 2010; Gabriel et al., 2016; Nasir, 2016). Big markets also enable larger incentives for the generation of new ideas, increased human capital and the diffusion of knowledge. This is credible because Algeria, Egypt, Kenya, Morocco, Nigeria and South Africa have large market sizes and attract higher KFDI, when compared to other countries.
The significance of technological readiness reflects the importance of technology for FDI attraction and how agile a country is in adopting new machinery, material, equipment, processes and organizational methods, and where domestic enterprises can either invest in importing technology from overseas, or benefit from the spill-overs of international companies who have invested in their country. Communication technology (ICT) is a major component of technological readiness (WEF, 2016), and as stated earlier, a growing volume of literature has emphasized the importance of ICT in attracting FDI. Arguably the transfer of technological knowledge is proportionate to the foreign investment, the transfer of know-how to local workers, and the relative development level of the country.

Furthermore, although FDI generally nurtures growth, the overall impact possibly also depends on the quantity and quality of local suppliers, human capital, finance, available sectors, and the ability of international firms to cooperate with local contacts.

It is evident from Figure 4.1 and the scatterplot (Online Appendix 4.8) that Egypt, Kenya, Morocco, Nigeria and South Africa are all also ahead of other countries in terms of technological readiness. They are therefore able to attract higher FDI in knowledge-intensive industries and move upwards to advanced levels of technology and development. Moreover, the fact that these countries also have more developed financial markets, further attracts FDI. The significance of the financial market indicator, reveals
how a country’s prices reflect public information, risk-management (e.g. through hedging) and the allocation of savings to the most productive investments. This can only be achieved if financial markets are stable.

More developed financial markets also advance the provision of capital to entrepreneurs by facilitating access by investors to information about opportunities that best enable productivity. Added to this, well-developed financial markets help local firms to take advantage of knowledge spill-overs and to create conducive environments for FDI (Alfaro et al., 2000; Costigan et al., 2016; Alfaro et al., 2009). Cairo and Johannesburg present good examples of such well-developed financial markets in Africa and, not surprisingly, it helps them attract higher FDI (see also Part C of this report). Lastly, by allowing for an efficient system of payments, the financial sector decreases transaction costs in the exchange of goods and services, which generates productivity gains. Again, Kenya, Nigeria and South Africa have stable financial markets that facilitate KFDI attraction (Online Appendix 4.9).

The fourth model (fourth column of Table 4.1) reveals that African regions do not show significant differences across the continent. This suggests that KFDI is unaffected by geography and that the determinants of technological readiness, financial markets and market size serve as generic factors in attracting KFDI. Lastly, the final model strongly explains KFDI attraction in Africa (56%). However, this also means that around 40% of the model still needs to be explained by variables not included in this study. This is an area for future research.

A similar analysis was carried out at the level of African cities (Online Appendix 4.5) and...
revealed that the levels of broadband access and mobile phone subscriptions have a significant and positive influence on KFDI into African cities. This finding aligns with several studies that emphasize the importance of the internet for attracting FDI (e.g. Choi, 2003 and Economoe, 2008). Among the cities analysed, Lagos has the highest number of broadband connections, while Johannesburg leads in mobile subscriptions. Both cities attract higher KFDI than other African cities. Similarly, Appendix 4.5 further suggests that the presence of “technology incubators” also plays an important role in attracting KFDI. An example of this is the newly established Tshimologong IT precinct in Johannesburg.

As seen in the Appendix, higher employment rates also attract higher KFDI inflows. It is also evident that African cities that best attract KFDI are located in relatively developed countries with well-developed sectors that generate better employment opportunities and higher employment rates, e.g. Casablanca, Cairo, Johannesburg and Cape Town.

Conclusions
This study concludes that global competitiveness is a major determinant of KFDI in African countries. Among the three components of the GCI Index, innovation and sophistication factors are the most important for attracting KFDI, whereas efficiency enhancers and basic requirements are insignificant for KFDI as these are associated with relatively lower levels of development. This finding supports the argument that knowledge-intensive industries locate in countries with advanced stages of development and specifically in large cities that provide conducive environments for these activities. New technology provides the opportunities for the emergence of new sectors. For example, Cape Town, Lagos and Nairobi are emerging hubs for knowledge-based start-ups in Africa. Such technologies, combined with efficient policies can lead to sustainable growth in Africa. New technology can promote small-scale manufacturing and enable more competitive and efficient growth. New technology and enhanced infrastructure in the communication sector enable domestic firms to reach and better participate in global markets (African Development Bank Group, 2017).

Egypt, Kenya, Morocco, Mozambique, Nigeria, Tanzania and South Africa attract greater amounts of KFDI, due to their higher levels of development and global competitiveness. At a deeper level, it was found that market size (efficiency enhancer), technological readiness (innovation factor) and financial markets (efficiency enhancer) are the most important factors in attracting KFDI. These factors are strongly associated with cities, explaining why major urban areas are better at attracting knowledge-based FDI. Technology diffusion accelerates overall growth and the productivity of other sectors by generating new economic activities through inter-sectoral linkages.

At the city level, the extent of broadband access and mobile phone subscriptions proved to be the most important factors for attracting KFDI. Broadband access is a significant determinant for the financial and business services subsectors.

Domestic market size is associated with efficiency gains through specialization and the ability to take advantage of economies of scale in the production of services and goods. This further explains the success of Algeria, Egypt, Kenya, Nigeria, Morocco and South Africa in attracting KFDI. The findings also show that well-developed and stable financial markets facilitate KFDI.

At the city level, the extent of broadband access and mobile phone subscriptions proved to be the most important factors for attracting KFDI. Broadband access is a significant determinant for the financial and business services subsectors. Since internet access is closely related to broadband access, it is significantly related to KFDI in the software & IT services subsector. Similarly, mobile phone subscription levels are closely associated with the communications sector, which comprises the largest share of KFDI in African countries. In addition, technology incubators also play a significant role in attracting KFDI by facilitating innovation and technology-related activities. Lastly, higher employment rates also have a positive and significant impact on KFDI in large, developed cities with strong concentrations of economic activities and employment (agglomeration).
Liberia. Road transport in western Africa is slower and more expensive compared to other regions because of insufficient infrastructure.

Infrastructure Networks and Foreign Direct Investment

By Ronald Wall, Lynda Bitrus Elesa and Taslim Alade
Access to good infrastructure is considered to be one of the major factors guiding the investment decisions of multinational enterprises (MNEs). Therefore, this study explores to what extent Africa’s road infrastructure networks determine FDI attraction, with an emphasis on the Lagos-Abidjan (L-A) Corridor in Western Africa. This is done by means of a space syntax methodology, which measures a city’s road connectivity and regional integration.

According to the World Economic Forum (2015), strong and well-developed physical and virtual infrastructure networks enhance economic competitiveness and productivity. Such networks serve as a pull factor for FDI and foster global economic integration. Africa is the least integrated continent in the world, with comparatively low levels of inter- and intra-regional economic exchange, and has the least share of global trade of all major regions in the world. Integration can be facilitated by investments in infrastructure that, together with a stable economic outlook and good domestic institutions, will attract FDI. Conversely, insufficient and low-quality infrastructure impedes investment and economic integration both by raising transaction costs and by limiting access to local and international markets (Rehman et al., 2011).

Land transport is expensive and slow in Western Africa compared to other African regions, which can be attributed to insufficient infrastructure and administrative bottlenecks, such as border control and customs clearance (Kuhlmann, 2011). Investment in physical infrastructure e.g. rail, roads and ports, will improve productivity in the long run, and strengthen firms through facilitating market transactions and positive externalities such as increased connectivity and regional integration.
A 10% improvement in infrastructure is said to lead to an 8% improvement in export performance and increases FDI by 10.3% (Asiedu, 2006). However, infrastructure in the Lagos-Abidjan Corridor is in a state that impedes its productivity and, therefore, the inflow of FDI. This is evident by the obvious lack of an efficient regional rail network; absence of strong regional marine and airport hubs; dilapidated roads; and a generally erratic power supply that all raise the price of goods made there by 75% (Trebilcock, 2015). Bridging these infrastructural gaps and creating a more competitive region could increase Africa’s annual GDP growth by 2% which will enable Africa to achieve sustainable growth in the long run (Trebilcock, 2015).

The objective of this study is to investigate the relationships between FDI and road infrastructure in Africa. Where previous studies used data concerning the quantity or quality of roads in countries, this study goes a step further by also exploring the road network connectivity between West African countries and all other countries in Africa, or what is called the continental “reach” of a country. It is based on a mathematical measure of the connectedness of a country to every other country in a continent. The network analysis technique uses “closeness” - a statistical measure of how integrated a country is within the continental road system. In the tables provided in this section this measure is labelled “integration”.

There is a significant difference in the road network density and connectivity in Western Europe and that of West Africa, as shown in Online Appendices 5.7 and 5.8. Despite the significantly larger population, the connectivity in Western Africa is sparse, apart from several pan-African highways linking the region to Northern Africa and the remainder of Sub-Saharan Africa. It is argued in this study that these weak connections affect a country’s ability to attract FDI.

Globally, FDI has continued its gradual recovery after the financial crisis and subsequent recession, despite continued economic uncertainties and political risk, and grew by 10.9% between 2012 and 2013 (fDi Intelligence, 2014). However, this growth was not uniformly distributed. For instance, in 2013, Africa recorded a 10.8% growth in FDI, while Europe witnessed a 12.1% decline (fDi Intelligence, 2014). According to UNCTAD (2015), although the global inflow of FDI declined by 16% in 2014, there was an increase in FDI to developing countries. Africa accounted for 4.4% of this increase.

Findings

Table 5.1 shows three degrees of road integration to establish whether different limits of regional integration matter to the attraction of FDI. The smallest limit concerns a radius of 3 kilometres around major Western African cities (local). The next radius expands to 30 kilometres for each city (regional), while the final limit (N-km) concerns their reach to all corners of Africa (continental). The statistical models are tested on three types of FDI (from independent sources to check for consistency of results i.e. greenfield FDI, FDI flows and FDI stocks). Greenfield FDI concerns investments

### Table 5.1
Statistical results FDI, integration and Global Competitiveness Index

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<th>Variables</th>
<th>Greenfield FDI</th>
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<th>FDI Flows</th>
<th>Greenfield FDI</th>
<th>FDI Stock</th>
<th>FDI Flows</th>
<th>Greenfield FDI</th>
<th>FDI Stock</th>
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<td>Integration (closeness-3km radius)</td>
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<tr>
<td>Global Competitiveness Index</td>
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<td>Total country population</td>
<td>+++</td>
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+++ Very significant and positive relation ++ More significant and positive relation + Significant and positive relation --- Very significant and negative relation -- More significant and negative relation - Significant and negative relation 0+ Not significant but positive relation 0- Not significant but negative relation
into new projects and therefore excludes mergers & acquisitions (M&A), whereas FDI flows concerns the net inflow of all types of FDI (greenfield, M&A and brownfield). FDI stock concerns the cumulative historic FDI into a country. These different FDIs were used to test the robustness of the results.

The results show that the smallest road integration measure, the 3km radius (see Table 5.1, column 3), has a very significant positive impact on FDI. It implies that strong local road connectivity within Western African cities is an important attribute for foreign firms to locate there. It also suggests that if a particular city improves its local road integration within the urban region, an increase in FDI can be expected. As Table 5.1 indicates, this is valid for all three types of FDI. The most important finding, however, is that the more integrated a road system is (regardless of geographic radius), the more it will attract investment. This becomes even more evident in rows 1 and 2. Row 2, the 30km radius around the city, reveals a very significant but negative effect of road integration upon FDI attraction. It is clear from Online Appendix 5.8, that as we move away from a city of origin, the road linkages become sparse. As the scope of a city’s road network extends from the urban core to the greater

We can conclude that when a city enhances its road connectivity within the immediate urban region and consequently provides firms with reach to more distant markets, more MNEs and investment can be attracted.
region and beyond, the level of integration reverses and starts to negatively affect the city’s ability to attract FDI. In other words, in the case of West African cities, FDI is geared to the immediate urban conurbation, and neither to the greater region nor continent.

In the case of Europe, FDI would be significantly attracted to the local, regional and continental scale, as firms seek greater market penetration. The important finding is that the less cities are integrated with other cities through their road networks, the more this impedes the attraction of FDI. We can conclude that when a city enhances its road connectivity within the immediate urban region and consequently provides firms with reach to more distant markets, more MNEs and investment can be attracted. This is supported by the motives of MNEs to invest in Africa, Europe and globally (Table 6.3 in Part A), where proximity to markets serves as a key factor for firms to invest in cities. Furthermore, it was found in the resulting data that Nigerian and Ghanaian cities are the most integrated with other cities in terms of local connectivity (3km radius) and also receive the highest FDI volume within the region, whereas Gambian cities proved to be the least locally connected, and also held the lowest FDI flows. This can be inferred from Map 5.1 as well. African cities are experiencing high infrastructure deficits, where poor transport infrastructure is responsible for 40 percent of logistics costs in coastal areas and 60 percent in landlocked countries. Road networks are clearly not efficient, while rail networks are also sparse and poorly maintained (UN-Habitat, 2014).

Map 5.2. Road integration measure of the North Sea-Mediterranean Corridor in Europe (2016)

Map of road networks utilized for Space Syntax modelling.

A. United Kingdom
B. Netherlands
C. Belgium
D. Luxembourg
E. Germany
F. Czech Republic
G. Switzerland
H. Austria
I. Slovenia
J. Italy
K. France
L. Spain
Row 1 of Table 5.1 shows the same outcome. This model uses the most extreme radius (the full extent of the Western African countries to the entire African continent (N-km radius)). In this case, there is also a very significant but negative effect of continental integration upon the attraction of FDI. It infers that Western African countries are not strongly connected to the remainder of the continent. It further suggests that if continental road connectivity improves, increased FDI can be expected.

For instance, Cairo is well connected to the other Egyptian cities through a network of roads and attracts large values of FDI, whereas Kigali lacks regional connectivity, particularly the distance to seaports hinders FDI attraction in the city (see also Part C of this report). The Gauteng Urban Region in South Africa - a system of clustered core cities with an approximate radius of 100 kilometres from the Johannesburg CBD - is densely linked through roads and other physical infrastructure and shared services, but also connects strongly to Durban, Maputo, Richards Bay and Harare (UN-Habitat, 2008; Anon,
This provides foreign and domestic firms with a much better reach to more distant markets. In turn, this amplifies both intra- and inter-country trade and contributes to economic growth. Nonetheless, even though integration has a strong bearing on FDI, it explains only to a limited extent the region’s (L-A Corridor) ability to attract investment (Online Appendix 5.5). Therefore, Table 5.1 also shows the findings after testing whether integration still has significance when the Global Competitiveness Index (GCI) is included in the model, as well as population to control for country-size effect.

GCI has a very significant and positive effect on attracting FDI. Since competitiveness is a country’s capacity to compete in the global economy, it plays an important role in attracting FDI. It is a measure which includes governance and economic variables such as economic growth, education, innovation and ICT. In the section on knowledge FDI in Part B, it was found that GCI is also a significant factor for attracting KFDI into African countries.

The results also show that the size of a country’s population matters to FDI attraction, and particularly at the smaller scales of 3km and 30km radius. This aligns with previous studies, which claim that countries with a larger population attract more FDI (Checchi and Faini, 2007; Yu and Walsh, 2010) because larger populations provide the bigger markets that investors seek. The African Economic Outlook (OECD, 2017) also states that increasing consumption demand due to a growing population and expanding middle classes is an important source of economic growth in Africa.

In a follow up to Table 5.1, the GCI was unfolded to reveal which sub-indicators are essential to FDI attraction while maintaining the road integration and population variables (Online Appendix 5.6). The significant GCI sub-indicators proved to be market size and higher education. In these more detailed results, all three scales of road integration remain highly significant and their signs remain the same (Online Appendix 5.6). In West Africa, Ghana and Nigeria have the highest association between FDI and market size, whereas Guinea and Sierra Leone have smaller market sizes and attract lower values of FDI.

As seen in Table 5.1, higher education also proves to be an essential positive attractor of investment, suggesting that the higher the education levels in countries (i.e. well-educated workforces), the more interesting these countries are to foreign firms. This indicator shows that foreign firms seek out countries with educated and cheap labour, where manufacturing and service production can be developed. The case study of Cairo shows that the availability of cheap and educated workers makes this city attractive for FDI (Mahdi et.al, 2018). Borensztein et.al (2008) also found a strong relationship between human capital (particularly higher education) and
FDI, and showed that the interaction between FDI and higher education leads to higher economic growth in host countries. In the Western African corridor, FDI is, indeed, associated with higher education levels in countries e.g. Benin, Burkina Faso, Ghana, Mali, Nigeria and Senegal. Furthermore, in these detailed results, population size continues to explain the attraction of FDI, highlighting the relevance of economies of scale. So the more a country’s population, market size, higher education and road integration at local, regional and continental scales increase, the more FDI will be attracted.

Conclusion and recommendations

For the Western Africa corridor, extending the integration of its road network to the immediate region and Africa as a whole is likely to significantly improve its ability to attract FDI. This will require overcoming various bottlenecks e.g. linguistic differences, cultural and ethnolinguistic diversity, multiple economic communities (CEN-SAD, COMESA, EAC, ECCAS, ECOWAS, IGAD, SADC and UMA), border and customs issues, lack of integrated holistic regional vision and policy, and market heterogeneity along the corridor. These factors impede development and FDI attraction. Therefore, unified trade and economic policies are needed, perhaps collapsing multiple economic communities into a broader one, and harnessing the market size potential of the entire West African corridor.

In this context, the key message of this study, unlike previous studies, is that a country should not only focus on improving its own national road connectivity, but also its connectivity with the countries in its immediate region, and ultimately the entire continent.

The more the continent’s road infrastructure integrates nations, the more this will spur African
economic development. Although this study only looked at road connections, it is expected that by also improving rail, air, port and utility infrastructures a highly accessible environment can be created for domestic firms to compete favourably in international markets. Investment in road, railway and energy networks is crucial to urban economies, as it will connect remoter areas with cities and unlock their agro-industrial and manufacturing potential. It will facilitate the flow of people, goods and services and connect the landlocked countries of the region to the world, while ensuring the security of water, food and energy supplies (UN-Habitat, 2014).

A diverse and connected system of African cities can accelerate the process of industrialisation, both by opening up new locations for industry and creating access to larger markets (African Development Bank, 2016; UNECA, 2017b). A successful example of this is Cairo’s connection to all Egyptian cities through a network of roads, including the Red Sea Highway that connects Cairo with Egypt’s eastern coastline and the Sinai Peninsula. Several African countries have realized the potential of urban development corridors and transnational corridors. Examples include the Maputo Development Corridor, linking the South African industrial heartland of Gauteng with the seaport of Maputo, Mozambique; the Kenitra-Casablanca Corridor; and the Thika-Nairobi-Machakos Corridor, amongst others (UN-Habitat, 2008).

Due to data limitations, this study focused somewhat narrowly on road integration but other modes of transport such as railway, air and water transport also play important roles in connectivity amongst cities. Therefore, African governments should focus on improving all modes of transport for increasing integration within the continent. Most African countries have an inefficient and weak railway system. Railways are particularly efficient in the transportation of bulk, whether raw materials, half or end products or large volumes of people across cities, countries and internationally. It is therefore strongly recommended that Africa develops efficient light and heavy railway systems to connect, in particular, port cities with their hinterlands and landlocked countries. Railways typically have high front-end investments but are very often the better option in the long run. As highlighted in the New Urban Agenda of UN-Habitat, cities should be connected through economic, social and transportation links to form a system of cities, domestically and internationally. This will not only strengthen local, national and regional economies, but also attract more foreign investment. Technology-based, environmentally friendly new modes of public transport such as transit systems should be promoted to reduce pollution and congestion in cities (United Nations, 2017) and more effectively integrate urban mobility with enhanced transportation of goods and services (UN-Habitat, 2014; Lall et al., 2017; UNECA, 2017b).

Further research on infrastructural integration should be carried out. Scenarios of the optimal market reach of cities to the rest of the continent should be simulated for better insight. This can inform regions where to invest to improve connectivity and optimize economic development. The emphasis should be on the quality and efficiency of infrastructural networks, such as road, rail, ICT and electricity, for stronger regional and continental integration. This requires economic and trade policies like, for instance, the European Union’s Trans-European Transport Networks (TEN-T). Similarly, the Western African region is characterised both by ethno-linguistic duality and a multitude of institutions that focus on promoting regional integration and cooperation. These are the very institutions to guide the processes of policy and strategy development towards closer integration and effective coordination. Member countries of ECOWAS or WAEMU should strengthen these institutions and frameworks that foster public infrastructure financing through integrated corridor approaches. This can be achieved by partnering with development and financial institutions such as the African Development Bank (AfDB) and European Investment Bank (EIB), amongst others.
Investment in the construction sector can provide a relatively large amount of jobs in Africa because of its high multiplier factor.

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Many urban centres in Sub-Saharan Africa (SSA) currently do not function as the envisioned engines of growth (World Bank, 2008; UN-Habitat, 2012; Castells-Quintana, 2015). This is, at least partially, caused by “urbanization without growth” (Fay and Opal, 1999) and institutional failures that are associated with “poor country urbanization” (Glaeser, 2014). In these urban areas, the negative agglomeration externalities outweigh the positive (Castells-Quintana, 2015; Glaeser, 2014) and diminish the economic growth potential normally accompanying urban agglomeration. Because real estate plays a particularly crucial role in modern economies, this study argues that foreign real estate investment (FREI) may help to break through the negative urban dynamics. In many countries housing constitutes the largest share of national wealth, and real estate functions are an important countercyclical asset for the financial sector (Lowe, 2015; Harvey, 2014; World Bank, 2008).

The construction sector often also represents a significant part of GDP and due to its high multiplier factor, provides a relatively large amount of jobs, directly and indirectly (Tibajjuka, 2009). Therefore, although SSA currently suffers from severe deficits in urban housing and services provision while urbanizing at break neck speeds, urban development...
FREI has the potential to fulfil a conducive role in African urban development by enhancing economic growth, improving the built environment and by creating large numbers of jobs. FREI has the potential to fulfil a conducive role in African urban development by enhancing economic growth, improving the built environment and by creating large numbers of jobs. (Dasgupta et al., 2014; Harvey, 2014; FY, 2015). Inappropriate urban planning and building regulations and inadequate urban service provision can, however, deter the economic growth normally associated with real estate development (Collier and Venables, 2013; Brueckner and Lall, 2015; Castells-Quintana, 2015). Although the interest in FREI into Africa is increasing (Watson, 2013; KnightFrank, 2015; JLL, 2015; PWC, 2015), we have to keep in mind that the amount of FREI attracted by Sub-Saharan Africa is still very small.

The determinants of total FDI have been extensively researched, but FREI has received far less attention (Rotherberger, 2010). Expectedly, the location factors that attract FREI are different from those that determine general FDI attraction (Laposa and Lizieri, 2005; Holsapple et al., 2006; Rodriguez and Bustillo, 2010; Fereidouni and Masron, 2013; Salem and Baum, 2016; Rotherberger, 2010). One such overlooked factor is the impact of legislative, regulatory and procedural aspects therefore this study seeks to explore this in general and in the context of SSA in particular.

General determinants of FREI
Since the 1990s, international capital flows into real estate have experienced rapid growth (Moshirian and Pham, 2000; Sassen, 2014; Rotherberger, 2010). Increased global connectivity and its financial impact on real estate have made this formerly non-tradable good now tradable (Bardhan et al., 2004; Bardhan and Kroll, 2007; Harvey, 2014; Sassen, 2014) and FREI now functions as a countercyclical storage of surplus capital (Harvey, 2014). For example, a strong correlation exists between the US stock market decline and the increase in FREI outflows (Moshirian and Pham, 2000). As is the case with general FDI flows, FREI is determined by macroeconomic and institutional factors such as GDP per capita, inflation, population size, political stability and interest rates (Selma Kurtishi-Kastrati, 2013; Lieser and Groh, 2013; Fuerst et al., 2015; Moshirian and Pham, 2000; Rodriguez and Bustillo, 2010; Fereidouni and Masron, 2013; Salem and Baum, 2016). Total FDI inflows are also a determinant for FREI (Masron and Fereidouni, 2012), emphasizing the interdependence of real estate and international economic activity. Furthermore, FREI is also influenced by specific determinants, such as tourism, infrastructural development, access to sanitation and obviously house prices. (Rodriguez and Bustillo, 2010; Fereidouni and Masron, 2013). In contrast to general FDI, financial sector development is of less importance to FREI since it is less dependent on local financial and capital markets. This is especially the case in SSA, where there is relatively little use of real estate as collateral (Rotherberger, 2010).

Urban Africa’s locational context
Although the post-Independence urbanization wave in SSA was partly triggered by rural-urban wage differences (Fay and Opal, 1999) and the lifting of restrictions on settlement in urban areas, its colonial history, lack of productivity in the agricultural and industrial sectors, resource booms, and internal conflicts have all created urban dynamics that differ from the rest of the world (Henderson et al., 2013; Jedwab et al., 2014; Obeng-Odoom, 2015). Most SSA cities have not been able to reap the potential of positive agglomeration externalities. It seems that in many SSA cities the equilibrium model of production and consumption is distorted and that negative agglomeration externalities outweigh the benefits of urban density. Therefore, many SSA cities currently do not function as the proverbial engines of growth (Henderson, 1974; Glaeser, 2014; World Bank, 2008), instead exhibiting “Malthusian urban dynamics”, where cities are not able to take advantage of agglomeration economies due to congestion effects and weak economic productivity (Castells-Quintana, 2015). Only when the majority of urban populations have access to transportation, employment, water, electricity and sanitation, can the growth-enhancing benefits of agglomeration outweigh the costs (Henderson, 1974; Castells-Quintana, 2015).
Today, many SSA cities have a bewildering mixture of customary, formal private, state-owned, and informal land and housing tenure systems, often blended within the same city or even urban neighbourhood.

Current urban housing and services deficits and the subsequent mushrooming of informal settlements (slums) pose significant barriers to formal real estate markets. Informal real estate markets affect formal ones in SSA (and vice versa) by limiting land supply, eroding municipal tax-bases, and serving as both an affordable and profitable alternative to formal sector development (Marx et al., 2013; Brueckner, 2013; Brueckner and Lall, 2015). Informal and formal market competition increases the “informality [price] gap” (Brueckner, 2013). Although the overall formal market size in SSA might be relatively small, the inelasticity of these markets, combined with rising demand, has rewarded investors with high returns on investment.

International development agencies have advocated further privatization and formalization of land and housing ownership. However, attempts to formalize property transactions seem to have had limited success and some have even questioned how positive its effects are (Rakodi and Leduka, 2002; Payne et al., 2009; Mooya, 2011; Marx et al., 2013; Brueckner and Lall, 2015).

Today, many SSA cities have a bewildering mixture of customary, formal private, state-owned, and informal land and housing tenure systems (UN-Habitat, 2010), often blended within the same city (Selod and Tobin, 2013; Brueckner and Lall, 2015) or even urban neighbourhood. This opaqueness of real estate markets, ambiguous titling systems, and the notorious inefficiencies of state-encumbered land, are likely to limit the potential amount of inward FREI. Furthermore, often excessively cumbersome, complex and lengthy procedures for property registration and obtaining construction permits can further deter FREI, especially in countries with high currency risks (Malpezzi and Mayo, 1997; De Soto, 2000). De Soto found that, in Egypt, it can take 77 bureaucratic procedures, involving 31 private and public agencies to develop a project on state-
owned land (De Soto, 2000). In addition to such procedural barriers, supply restricting regulations like urban growth boundary and density controls, rational as these may be in the larger picture, put an indirect fee on top of construction costs which arguably limit the quantity of investments (Cheshire et al., 2012 and 2014; Brueckner and Lall, 2015). These “implicit taxes” can decrease supply elasticity and thereby inflate prices (La Cava, 2016; Buckley and Mathema, 2007; Cheshire et al., 2014).

An important nuance is that different aspects of urban planning can impact differently across regions. For example, in low-density urban areas of Western Europe, density restrictions negatively impact on FREI attraction because of implicit taxes (Cheshire and Hilber, 2008). Perhaps this has the opposite effect in SSA, where excessive population density can cause negative agglomeration externalities, such as limiting the supply of developable land, which deters investment (Castells-Quintana, 2015; Brueckner and Lall, 2015). Either way, urban planning regulation can be expected to impact investment patterns. In this light, FREI factors can have different impacts in different regions, and local characteristics typically have a relatively large influence on FREI flows (Laposa, 2007; Holsapple et al., 2006; Fereidouni and Masron, 2013; Rotherberger, 2010). In summary, it can be concluded that international economic activity, the macroeconomic environment, locational factors, institutional factors and urban planning mechanisms all influence FREI to one extent or another.

The geographical distribution of FREI

The total inflow of FREI into global cities in terms of US dollar values is unevenly distributed (see Figure 6.1). It was found that London, for example, attracts approximately 15% of total global FREI capital and that the top 30 cities of the world account for roughly 90% of total FREI flows. London, Cairo and Tunis form the top three global recipients, in descending order, and attract approximately 33% of FREI capital. The four SSA cities in our sample, attracted a relatively small amount; less than 1% of the total FREI flows. However, concerning employment generation, it was found that worldwide, it is better to attract a higher number of investments, than a higher capital value of investments. For example, Bucharest received over 104 investments at a total value of approximately USD15.6 billion, that generated more than 210,000 direct
jobs. During the same period, Tunis only received six investments, at a combined value of USD20.4 billion which generated only about 10,000 jobs.

The distribution of FREI into the African continent is highly skewed towards Northern Africa (Figure 6.1). Together, Algeria, Egypt, Morocco and Tunisia attracted approximately four times as much FREI capital as the remaining 49 African countries combined, from 2006 to 2014. A similarly skewed distribution of investments was found in other studies, with a concentration of FREI in the Casablanca-Tripoli and Nile FDI-Corridors (Adb et al., 2016). This region is not only in an advantageous position in terms of FREI but also receives the highest value of total FDI. This is likely due to its cultural affinity to the Arab States and proximity to Europe, while these Northern African countries all have strong economies, superior infrastructure and well-developed human capital, which make them attractive for investment. Large and growing populations and consequential housing demand give rise to new cities thereby boosting FREI (see also the case study of Cairo in Part C of this report).

In Online Appendix 6.3 it is evident that capital flows in terms of US dollars (value) are more concentrated than the actual number of investments (count). In terms of FREI, count investments are more widely spread in other African investment corridors, such as the Gauteng-Maputo and the Accra-Lagos Corridors. The distribution and concentration of the number of FREI in SSA (Online Appendix 6.3) show a concentration in the Accra-Lagos and Gauteng-Maputo Corridors. The number of FREIs have a similar clustering, and the emergence of a new corridor that stretches from Pemba to Lake Victoria can be seen. Incidentally, the two SSA cities with the highest FREI, Luanda and Djibouti, are located outside Africa’s main investment corridors (Adb et al., 2016). Luanda can be explained by inflated real estate prices in the wake of oil exploration. Djibouti’s FREI is arguably due to tourism, which is one of its main growing economic sectors, generating around 63,000 arrivals per year, due to its attractive beaches, islands and climate. It is also situated on one of the most intensive shipping lanes in the world and consequently has a flourishing port, which requires specific types of real estate.

### The determinants of FREI

Our global and African research findings show that total FDI serves as a strong determinant of inward FREI, whereas trade barriers have a negative impact (see Map 6.1 and Online Appendix 6.2). These outcomes emphasize the importance of economic internationalization and integration for FREI. This is in line with theories such as the Uppsala model (Vahlne and Johanson, 2013), World and Global city network concepts (Friedmann, 1986; Sassen, 2005; Wall and van der Knaap, 2011), as well as different theories related to competitiveness and agglomeration effects (Jacobs, 1969; Duranton and Puga, 2004; Cheshire et al., 2014). As expected, our analysis confirms that urban population size and growth positively influence FREI attraction because this creates demand for housing and provides larger market sizes for investors (see also the Cairo case study in Part C of this report).

Furthermore, better regulatory quality increases the prospect of attracting FREI as indicated by the very significant negative signs of rigid town planning policies and number of days to obtain building permits. So well-governed land and property titling processes are more important than whether the land can be owned as freehold.

Both rigid town planning policies and the time required to obtain a building permit have a significant negative impact on the amount of FREI attracted (see Figure 6.1 and Online Appendix 6.2). This is in line with authors who argue that town and country planning acts set inappropriately high

<table>
<thead>
<tr>
<th>Variables</th>
<th>Negative Binominal Model (Africa) Total FREI</th>
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<tbody>
<tr>
<td>Regulatory quality</td>
<td>++</td>
</tr>
<tr>
<td>Freehold landownership possibility</td>
<td>0-</td>
</tr>
<tr>
<td>Rigid town planning policies</td>
<td>---</td>
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<tr>
<td>Days to obtain building permit</td>
<td>---</td>
</tr>
<tr>
<td>Urban population size</td>
<td>++</td>
</tr>
<tr>
<td>Urban growth rate</td>
<td>+</td>
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<tr>
<td>Total FDI</td>
<td>+++</td>
</tr>
<tr>
<td>Control of corruption</td>
<td>++</td>
</tr>
<tr>
<td>Special economic zone</td>
<td>++</td>
</tr>
</tbody>
</table>

Source: Van Gils, Van Haaren and Wall, 2017, based on fDi Markets and various sources of indicators

+++ Very significant and positive relation
++  More significant and positive relation
+   Significant and positive relation
--- Very significant and negative relation
--- More significant and negative relation
0+  Not significant but positive relation
0-  Not significant but negative relation

### Table 6.1. Determinants of foreign real estate investment (FREI) in African countries (2006-2014)
standards vis-à-vis the income levels across Africa and that this planning disjunction is related to poor economic performance and informal settlement (slum) formation (Mabogunje, 1990; Obeng-Odoom, 2015; Collier and Venables, 2013; Brueckner and Lall, 2015). Land registration in Africa is a cumbersome and expensive process. Land grabbing, inefficient land administration, poor documentation, lack of transparency, low capacity and demand for land surveyors are the main obstacles to improving land governance (Lall et al., 2017). The case study of Kigali in Part C of this report shows that administrative and institutional reforms have put Rwanda among the top countries for ease of doing business and, as a result, the country attracted increasing amounts of investment in past years. The Rwanda Development Board was established in September 2008 as a specialized entity for fast tracking development activities and assisting foreign investors in establishing their businesses in Rwanda through information provision and easing administrative barriers.

It seems very plausible that a precarious balance in the regulation of urban development is required to attract investments. While basic planning regulations reduce the chance of not receiving any investments at all, it can also limit the amount attracted. The conclusion is that regulation should be less complicated, more transparent, appropriate for the local context and limited to the bare necessity. Urban plans and planning institutions are often ineffective across Africa because most of the regulatory codes and planning models are inherited from colonial regimes or imported from other developed countries and are not always appropriate for Africa today. In several African cities, it is economically not feasible for households and firms to formally acquire land because of inefficient regulation. Instead, alternative land sources are sought, and found, in the informal sectors (Lall et al., 2017).

Figure 6.1. FRI (count) and urban planning regulatory quality in Africa (2006-2014)

Source: Van Gils, Van Haaren and Wall, 2017, FDI Markets and WB World Development Indicators.
This research has focused on FREI attraction because it can be a beneficial source of capital for urban real estate development in SSA. FREI creates a relatively large number of jobs, can enhance economic growth and is a direct investment into the built environment. FDI in other sectors has the largest positive and significant impact on inward FREI, both in global and SSA cities. Trade barriers have been shown to have a negative effect on FREI attraction, which emphasizes the importance of international economic activity in the pursuit of FREI attraction. Though contradictory to general FDI theories, our global city study has shown that somewhat less-transparent environments, combined with lower levels of technological and financial development, can have a positive impact on direct FREI attraction. These results indicate that direct FREI, in contrast to indirect FREI (Lieser and Groh, 2013), is a creature of market imperfections (Kusiluka, 2012; Rotherberger, 2010). Lower levels of transparency may provide preferential access to profitable markets (Salem and Baum, 2016). However, the results also indicate that a lack of transparency and other market imperfections deter FREI attraction and that there is a limit to the conduciveness of such imperfections.

In the African analyses, higher income levels have a very small though negative impact on the amount of FREI attracted, which contrasts with the literature on general FDI and indirect FREI (Lieser and Groh, 2013). However, a higher level of income does significantly reduce the chance of not receiving investments. It implies that direct FREI is attracted by niche markets with a fair level of institutional, infrastructure and economic development where indirect FREI is not (yet) a reliable or functional alternative, because of a limited level of technological and financial development.

The special economic zone (SEZ) development model seems to work well for increasing FREI and FDI in general (Zeng, 2015). SEZs are designated areas where
Regulatory quality proved more important in the Africa analysis. This reveals a similar indication of ‘getting the basics right’ when it comes to the attraction of investment (Angelopulo, 2015; Tibaijuka, 2009; Dasgupta et al., 2014; Glaeser, 2014). However, restrictive urban planning environments do seem to limit the amount of FREI attracted, even for areas that have their ‘basics right’. This is confirmed by other research (Mabogunje, 1990; Cheshire and Hilber, 2008; Alterman, 2013; Collier, 2013; Cheshire et al., 2014; Obeng-Odoom, 2015). So, even though basic regulations are necessary to enable FREI attraction, too stringent planning regulations can limit the amount attracted and regulation should be kept to a bare minimum. According to The State of African Cities 2010, relaxing planning standards will improve formal land markets in Africa, if only by reducing the number of people seeking alternatives in informal markets. That report recommends effective urban planning, formalized land markets and clear property rights for an efficient development path for African cities (UN-Habitat, 2010). The State of African Cities 2010 further states that minimum plot-sizes, land zoning which limits the type and intensity of land use, limitations on floor-area ratio, and land subdivision ratios of developable and saleable land in new greenfield developments are the most crucial regulations. Urban planning audits can be used to determine which regulations require revision to achieve density and urban form according to the rate of urbanization (The World Bank, 2010).

Conclusion

Our research results emphasize the general importance of planning and regulating urban growth and that, at least for stimulating FREI attraction, urban centres should invest in basic infrastructure before attending to more high-tech infrastructure such as broadband access. More importantly, urban centres with high-growth rates should also “build for growth” (Angel et al., 2011) rather than excessively pursuing the “compact city” concept.

An effective city coordinates investment in infrastructure, enterprise investment in productive capital and household investment in housing (Collier, 2013). To facilitate these investment processes, a city must have clear, minimal, efficient, transparent and equitable regulations and procedures governing urban development processes.
Africa suffers from a food security paradox in that there are insufficient food supplies in a continent with a very high potential for food production.

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Food security exists when all people at all times have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (World Food Summit, 1996). The concept covers four dimensions: a) physical availability of food (supply and demand); b) economic and physical access (affordability and preference); c) food utilization (nutrition); and d) food stability (sustainability) over time. Several factors, such as low productivity, economic shocks, political instability and poor weather conditions can affect these dimensions (FAO, 2008).

Food insecurity is one of Africa’s ruthless ails associated with prevalingly high levels of poverty and health problems that have persisted for decades. Acknowledging the lack of resources in the food sector, African governments are increasingly encouraged to attract FDI to improve food security. The present section explores the African food security paradox of insufficient food supplies in a continent with a very high food producing potential. To this end, this study examines the bearing FDI has upon the Food Security Index (FSI) by comparing its impact at the global level to that of Africa. The FSI is a normalized score based on 28 unique indicators developed by the Economist Intelligence Unit, using three parameters: availability, affordability, and quality of food (nutrition). These three food security parameters are generally accepted in food security literature on African countries.

To this end, the effect of total FDI and food FDI (investments particularly in the food sector) upon the overall FSI is tested at both geographic scales. The same analysis is carried out at a deeper level for the FSI sub-indicators affordability, availability, and quality/safety. For all statistical models, control variables were also included, i.e. agricultural exports, improved sanitation facilities, agricultural import tariffs and the Food Production Index.

Africa has a comparative advantage in the global economy with its vast tracks of arable land, seasonal rainfall and semi-skilled labour in agriculture. Despite these advantages, the continent has struggled with food insecurity for decades. Emerging and pressing threats to food security have been amplified by poverty, rapid urbanization, population growth,
food price-hikes, conflict and civil strife, misguided policies, weak institutions and failing markets, climate change, and reduced productivity and investments (Kwasek, 2012; Africa Human Development Report, 2012; SFIW, 2015).

When faced with high food prices, poor families cope by eating cheaper but often less nutritious food. This can have severe impacts on the social, physical, and mental well-being of millions, especially young people. One-third of all child deaths globally are attributed to malnutrition (World Bank, 2010). This is particularly alarming when considering that youth constitutes more than half of Africa’s entire population. As in other parts of the world, Africa’s food security will require a sustained and sustainable increase in agricultural productivity, income generation and production of nutritious, safe and affordable food. To this end, the African Development Bank, in 2015, launched its “Feeding Africa” strategy which aims at managing African food self-sufficiency by 2025, through agricultural transformation (UNECA, 2016).

In recent decades, the African economy has started its transition from a predominantly agrarian to a more services-oriented economy. At the same time, Africa has become a preferred investment destination of investors in Europe, North America and, increasingly, the Middle Eastern and East Asian emerging economies, e.g. China and India. This is expected to grow further (McMichael & Schneider, 2011). Although the impact of FDI on food security is unclear, if done correctly, it can contribute to a sustainable solution that secures food while also generating new and additional employment and wealth.

The number of undernourished people in Africa is steadily rising, which appears to contradict the positive direction of FDI growth in Africa. This raises questions about the impacts on food availability, affordability and quality, on the one hand, and multinational corporations’ (MNCs’) activities and FDI on the other. Seeking answers, empirical studies were carried out to test possible relationships by estimating the relationship between food security (dependent variable), and FDI (independent variable), in panel regression models.

Distribution of FDI and food security across African countries

FDI serves as a good measure of how a country has become globally integrated and how attractive it is for international business and trade. In Online Appendix Part B, 7.3, the regional variation within Africa is evident. Northern Africa receives the largest share of total FDI, although the job conversion rate (jobs generated by USD1 million of FDI) of 1.43 is below the African average of 1.91. Northern Africa is followed by Western and Eastern Africa, whereby the latter shows a higher job conversion ratio when compared to other African regions, except for Southern Africa. Although it receives the least capital, Southern Africa has the highest investment-job conversion rate (2.84).

Map 3.1 presents inward food FDI and Food Security Index (FSI) levels across the world. Most African countries have low levels of FSI, whereas North American, Australian and the EU countries are the most food secure in the world. Within Africa, Egypt is the largest recipient of food FDI, followed in descending order by Nigeria, Ghana, South Africa and Mozambique. Perhaps not surprisingly, Egypt also has the highest food security in Africa. But other factors clearly play a role as well, considering that Nigeria and Ghana have both received strong food FDI, but are nevertheless among the least food secure countries in Africa. Other countries with relatively high food security are Morocco, South Africa and Tunisia. A majority of African countries experience food insecurity, particularly the DR of Congo, Tanzania, Mozambique, Madagascar, Guinea, Côte d’Ivoire and Togo in descending order. These countries are followed by Mali, Niger, Chad, Sudan, Angola, Zambia and Malawi.

Food security at the global scale
Food security is a global concern. It is the second United Nations’ Sustainable Development Goal (SDG) after poverty and these two topics are interlocked. It is known to be both a cause and an effect of conflict,
population growth, droughts, rising food prices and poor agricultural practices (Maxwell, 1999; Naylor and Falcon, 2010; Altman et al., 2009). Since economic growth is a game changer of poverty and food insecurity, countries are adopting policies such as open trade and liberalization to promote growth, where FDI is considered an important means of increasing economic growth.

Online Appendix Part B, 7.2 shows the relationship between FDI and food security at the global scale. Firstly, both total FDI and food FDI do not significantly influence the FSI, nor its sub-indicators affordability, availability, and quality (see columns 2 to 8). This may be due to heterogeneity in the data (too many different country-specific influences e.g. policy, language and culture). Nonetheless, other factors such as agricultural exports, improved sanitation facilities (cleanliness of handling, processing and packaging of foods), agricultural import tariffs, and the Food Production Index, do have a significant impact on food security at the global level.

Secondly, in model 1 (Online Appendix Part B, 7.2, column 2), improved sanitation facilities have a highly significant effect on improving global food security. This links higher cleanliness and hygiene levels to higher food security levels because improved sanitation is associated with better health, productivity and incomes. It is particularly important for the food processing industry, whether it concerns the processing of dairy products, meat, vegetables or fruits. Looking closer into the FSI sub-indicators, improved sanitation facilities particularly matter to the availability and quality/safety of food but they do not affect its affordability.

Thirdly, agricultural import tariffs show a positive significance on global FSI. This means that countries that are less reliant on imports from other countries, i.e. the more they produce their own food, are ensured higher food security. This is further supported by the fact that the only positively significant sub-indicator is affordability. This suggests that agricultural food tariffs deter competitive foreign products and stimulate local competition for food production and, consequently, affordable food prices. Agricultural import tariffs do not show any significance to the availability and quality/safety components of food security.

Fourthly, the Food Production Index does not seem to have a significant effect on the FSI, while agricultural food exports evidently decrease the availability of food and hence raise food insecurity. This is because food

Map 3.1. Distribution of average food FDI and food security across countries (2012-2014)
exports can be at the expense of local food supplies e.g. food crops exported for bio-fuels or animal feed. This finding is further supported across the sub-indicators of affordability, availability, and quality/safety that all reveal negative, significant impacts. Since the 1980s, agricultural imports have been increasing faster than exports, reaching USD47 billion, and leading to a deficit of USD22 billion (FAO, 2011). The conclusion is that the more a country disproportionately exports crops, the less food will be locally available and affordable. This in turn impacts the quality and safety of food products.\[\text{Food security at the African continental scale}\]

Next, the impact of FDI on Africa’s food security is explored. Table 3.1 indicates that total FDI significantly and positively impacts FSI in Africa, albeit that in terms of the FSI sub-indicators this relates specifically to affordability, and to a lesser degree quality/safety. This conveys the generally accepted view that increased FDI into African countries contributes to general productivity and income level increases which, in turn, enables populations to better afford food and demand higher levels of food quality and safety. Amongst African countries, Egypt showed the highest food affordability and, perhaps not surprisingly, it is the country that receives the largest amount of FDI in Africa in terms of value. It is followed by Nigeria, Angola, South Africa and Kenya (see Figure 3.1). On the other hand, countries such as Niger, Burundi and Guinea receive minimal amounts of FDI, while having Africa’s lowest food affordability levels.

Food FDI into Africa has an insignificant effect on FSI. This is probably because food investments are aimed at export destinations outside of Africa, rather than at stimulating local food security. This finding is confirmed by the agricultural exports indicator, which negatively influences the FSI sub-indicator availability. It is also evident from Table 3.1 that improved sanitation facilities, like total FDI, positively affects FSI and its sub-indicators affordability, availability, and quality/safety. Hence, the level of cleanliness and hygiene contributes to the improvement in food security. Similar to the results of the global analysis (Online Appendix Part B. 7.2), agricultural import tariffs also positively contribute to improving food security. This is arguably because

Table 3.1. Relationship between FDI and food security in Africa

<table>
<thead>
<tr>
<th>Variables</th>
<th>Food Security Index</th>
<th>Food Security Index</th>
<th>Affordability</th>
<th>Affordability</th>
<th>Availability</th>
<th>Availability</th>
<th>Quality and Safety</th>
<th>Quality and Safety</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total FDI</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>0-</td>
<td>0-</td>
<td>+</td>
<td>0+</td>
<td>0+</td>
</tr>
<tr>
<td>Food FDI</td>
<td>0-</td>
<td>0-</td>
<td>0-</td>
<td>0-</td>
<td>0-</td>
<td>0-</td>
<td>0-</td>
<td>0-</td>
</tr>
<tr>
<td>Agricultural exports</td>
<td>0-</td>
<td>0-</td>
<td>0+</td>
<td>0+</td>
<td>--</td>
<td>0-</td>
<td>0-</td>
<td>0-</td>
</tr>
<tr>
<td>Improved sanitation facilities</td>
<td>+++</td>
<td>0+</td>
<td>0+</td>
<td>0+</td>
<td>++</td>
<td>++</td>
<td>++</td>
<td>+++</td>
</tr>
<tr>
<td>Agricultural import tariffs</td>
<td>++</td>
<td>0+</td>
<td>+++</td>
<td>0+</td>
<td>0+</td>
<td>0-</td>
<td>0-</td>
<td>0+</td>
</tr>
<tr>
<td>Food production index</td>
<td>0+</td>
<td>++</td>
<td>0+</td>
<td>0+</td>
<td>0+</td>
<td>0-</td>
<td>0-</td>
<td>0-</td>
</tr>
</tbody>
</table>

Source: Wall, Nyamai and Asubonteng (2016)

++ More significant and positive relation
+++ Very significant and positive relation
+ Significant and positive relation
-- More significant and negative relation
- Significant and negative relation
0+ Not significant but positive relation
- Not significant but negative relation
Cleanliness and hygiene promote food security because a lack of sanitation causes disease and affects labour productivity.

FDI and the African Food Security Paradox

tariffs keep out competitive foreign products and consequently stimulate local competition in food production. As shown by the FSI sub-indicators, this particularly affects food affordability.

To verify the degree to which African countries import and export food, a separate analysis is included in this study, which explores the imports and exports of various food products between countries of the world. The example (in Online Appendix Part B, 7.4) shows the global trade geography of wheat (2007-2011). Africa, like many other regions of the world, imports a lot of wheat (green nodes) but it hardly exports any, whereas, in highly food-secure regions like Europe and North America (see Map 3.1), both wheat export and imports are strongly present. This is arguably because Africa’s agriculture sector is generally not advanced enough to be globally competitive, and where food production today often costs more to produce at home. In many cases, it is cheaper to import food.

Based on the above, it is arguable that smaller import-export trade differences ensure higher food security. Besides wheat (Online Appendix Part B, 7.4), African countries are generally also dependent on other important grain imports like rice and corn, as well as vital meat products (essential proteins) e.g. chicken, beef and pork. Disproportionate imports of such vital carbohydrate and protein products is, quite obviously, a likely determinant of food dependency, vulnerability and insecurity. Furthermore, both at the African (Table 3.1) and global scales (Online Appendix Part B, 7.2), agricultural import tariffs positively improve food security, particularly the sub-indicator affordability. In other words, stronger import regulation will safeguard domestic food producers, stimulate local food production and ensure greater
Food affordability. In turn, this can lead to surplus food productivity and stimulate exports. Once a trade balance is achieved, the food security of many African countries will expectedly rise.

The chart in the in Online Appendix Part B, 7.5, shows a positive relationship between FSI and improved sanitation facilities. Algeria, Egypt, South Africa and Tunisia are the leading African countries in terms of food security and improved sanitation, whereas Chad, Madagascar, Nigeria, Sierra Leone, Tanzania and Togo score the lowest on these measures.

**Conclusions**

Food security is a highly relevant topic for Africa, especially as the number of undernourished people continues to rise (FAO, 2015). Africa also faces an increasing demand for affordable, nutritious food for its rapidly growing population. Not only is the continent food insecure today but future generations remain at higher risk. Although governments and international agencies have greatly influenced food security, due to reduced resources input by national and international partners alike, the agricultural sector has lost public expenditure priority to other sectors (World Economic Forum, 2015). FDI could fill this investment gap.

The current study explores the impacts of FDI upon food security at the global and African levels. Positive, ambiguous and even negative impacts of FDI on host economies have been found. Such contradictions have also been found by other studies. Studies on food FDI and its impacts on food security have revealed similarly contradictory results. Our results show that at a global level, neither total FDI nor food FDI have a significant impact on food security, nor on its sub-components affordability, availability and food quality/safety. Control variables, such as

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**Figure 3.1. The relationship between food affordability and total FDI in Africa (2012-2014)**

Source: Wall, Njama i and Asubonteng, 2016, fDi Markets and WB World Development Indicators
agricultural exports, improved sanitation facilities, agricultural import tariffs, and the Food Production Index, all have a substantial impact on food security.

Enhanced sanitation facilities have a positive and significant impact on improving FSI at the global level. Cleanliness and hygiene promote food security because a lack of sanitation causes disease and influences labour productivity and income. Sanitation is also important in the food processing industry. Improved sanitation facilities also improve the availability and quality/safety of food but do not affect the affordability of food. This study also shows that agricultural import tariffs increase food security because less dependency on imported food encourages domestic food production and leads to higher food security.

On the other hand, increasing agricultural exports has a negative effect on food security and its sub-indicators affordability, availability, and food quality/safety. This means that increased food exports by foreign firms do not lead to local food availability and affect the affordability of food, with negative implications for the quality and safety of these products for local populations. Food FDI should in future become more geared towards partnerships and economic inclusion and should increasingly target local markets.

In the case of Africa, total FDI significantly and positively impacts FSI, particularly in terms of affordability, while it relates less to the quality and safety of these products. Similar results have been found across various local municipalities in South Africa, in which total FDI proves to alleviate hunger and food insecurity (Dunstan et al., 2018). Countries such as Angola, Egypt, Kenya, Nigeria and South Africa show a stronger relationship between FDI and affordability with larger values of inward FDI and higher affordability of food (see Figure 3.1). Because the manufacturing sector (which includes food processing) attracts the largest share of FDI in Africa, it also generates the highest number of jobs. It can therefore be inferred that more FDI in African countries because of the higher productivity and incomes it generates makes food more affordable and increases demand for better food quality and safety. FDI in different sectors also has indirect impacts on food security through spillover, whereas FDI in agriculture improves food security in developing countries by increasing agricultural production. It also increases local knowledge and technology transfers.

In the case of Africa, the study revealed contradictory results in which food FDI does not significantly affect FSI. However, the negative signs indicate that if the relationship were to be significant, the impact would most probably be negative. The logic here is that a large share of Africa’s food FDI goes towards agricultural land acquisition, which negatively impacts local economies due to related social, economic and political conflict. Studies have shown that 115 million acres of agricultural land have been leased to investors worldwide (international land outsourcing for food exports) and that the bulk of this is in Africa (Land Matrix, 2016). Hence, food investment in Africa has become a ‘resource-seeking production and export platform’ venture that generally does not support local food availability. Food production by investors (MNCs) is predominantly tailored towards crops (e.g. fruits, oilseeds, coffee, and cocoa) with higher economic value on the global markets. These crops are generally not the staple foods of host countries. This explains the paradox of food shortages in a continent of high food security potential.

Many African subsistence farmers are displaced by international land outsourcing and have little alternative but to migrate to urban centres to seek livelihoods

Many African subsistence farmers are displaced by international land outsourcing and have little alternative but to migrate to urban centres to seek livelihoods (UN-Habitat 2008, 2010 and 2014). Since these migrants typically lack the skills for employment in urban-based manufacturing and service industries, they are more likely to add to the cohorts of the urban unemployed or end up in the informal sector than be absorbed into productive formal urban activities. Moreover, food FDI is usually aimed at exporting food products outside Africa with negative outcomes for local food security. This is supported by our finding that agricultural exports can have a negative significance for food availability. Higher food exports from African countries to the world leads to lower availability of food in local markets and can affect overall food security.

Consequently, African policy on food exports should encourage more sustainable forms of trade that do not come at the expense of local communities. This finding, however, is contrary to the findings in some
When food is secure locally, food-related FDI can make the agro-food sector a key contributor to GDP as countries like Argentina have shown.

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other studies that investments into the agricultural sector significantly increase food security in developing countries. Our findings support the argument that food FDI, particularly in the agriculture sector, fails to benefit local agriculture because such investments are all too often characterized by highly mechanized production, limited employment creation, poor working conditions, lack of labour rights, fresh water depletion and the widespread use of chemicals (some of which have long been prohibited in other economies) with the associated contamination of the environment. Hence, it is important to realize that great care has to be taken in comprehensive food policy formulation by African nations to reduce the above inherent risks and also to ensure that host countries should have sufficient capacity to absorb new technology and know-how to better benefit from food FDI inflows.

Recommendations

General

Although it is recommended that African governments promote the attraction of FDI, some caution is warranted. Food FDI does not have a significant relationship with food security because food MNCs control these markets and typically produce most for export with little spill-over into local development. Therefore, any policy to attract food MNCs should also be aimed at local markets, technology absorption, cooperation with local firms, and social inclusion.

The findings recommend a two-way strategy to improve the agriculture sector in African countries. Firstly, the strengthening and modernization of agriculture by adopting increased commercial but inclusive farming following sustainable agricultural practices and making agricultural policy and produce worthy of export.

Secondly, policy for promoting local agro-based industries, agri-business and their collaboration with MNEs is essential to create links between the agriculture and manufacturing sectors and across corporate scales.

FDI should be a complementary investment to fill the financing gap in the food sector in Africa, but undirected FDI should be avoided for achieving food security. Instead, food security must be achieved through promoting the entire food industry sector, from agricultural production to food processing and the associated value chains.

When food security is achieved locally and quality food is produced, food-related FDI can facilitate exports. Africa can learn from Argentina, Brazil and Chile, where the agro-food sector is a major contributor to GDP, employment and exports. African countries should focus on improving their agricultural productivity, food quality, as well as the diversity of agricultural products. Agricultural produce should be processed into diverse food products according to international standards and exported to international markets in order to gradually move African countries to high-value products for export (which are consumed by developed world markets). This will lead to the increased economic growth, competitiveness and integration into global economy. To this end, institutional and infrastructure development with FDI attraction is vital.

Urban agriculture and non-polluting peri-urban farming should be promoted in African cities drawing on the skills of displaced agricultural labour.

African food security policy should become more sensitive to looming urban food security crises by better accommodating local and international firms and smallholders, food innovation, food technology, food services, and food transport and logistics.

African countries should increase their technology and knowledge-absorptive capacity in terms of human capital, infrastructure, technology and innovation levels, governance and quality of institutions to increase agricultural production and achieve food security.

Since improved sanitation helps improve FSI in terms of affordability, availability and quality/safety, it is recommended that cleanliness and the promotion of hygiene and prevention of disease by maintenance of sanitary conditions for foods, food handlers, and food processing, preparation facilities and equipment be encouraged throughout the production process and in accordance with internationally accepted standards of quality and safety. To expand the markets for unprocessed and processed food outside Africa, agricultural import tariff policy should control the import of staple diet food products and allow for local competition.
It is recommended that host countries be cautious that investment contracts and business models follow legislative and policy frameworks to maximize benefits and minimize risks so that foreign investment can be used to fill the investment gap in African countries with lower risk.

It is vital that regional and national institutions play a mediatory role in ensuring that multinational firms are jointly accountable for a nation’s food security, as recently initiated in Liberia and Madagascar, and that all food stakeholders, especially small-scale farmers, participate.

**Urban food security**

Rural areas should become better linked to urban markets through closer proximity i.e. there needs to be more peri-urban agriculture and horticulture and more expedient long-distance connections and value chains. African food security policy should become more sensitive to looming urban food security crises by better accommodating local and international firms and smallholders, food innovation, food technology, food services, and food transport and logistics. This approach should not treat cities as isolated entities, but as elements in a larger concept to integrate their development within regional, and even global city networks (markets and production areas).

Urban-regional policy must more effectively address the food security dimensions of affordability, availability and quality, through promoting resilient, practical urban and peri-urban business models, including competitive food clusters (production and services, sectoral co-location, value-added food production, processing, packaging, logistics, transport, wholesale, retail, storage, cold-chain facilities, port development, and R&D stimulation).

Lastly, researching Africa is restricted by very limited data availability. Ready access to vital information about the food sector would inform investors, producers and traders, including about loopholes in the nature and needs of the sector. Access to open data should be routinely updated.
Policy Instruments for Attracting FDI in Renewable Energy

By Ronald Wall, Stelios Grafikos, Alberto Gianoli and Spiros Stavropoulos
Global warming is rapidly rising on the agenda of policy makers in the developing south who are keen to improve environmental and economic sustainability. The industrialized countries have committed to supporting them by providing USD100 billion annually through the Green Climate Fund (GCF), established by the 16th conference of the parties (COP16). While foreign investment has great potential to help mitigate the current global environmental threat, its actual role has remained largely unexplored (Mahews et al., 2010; Peake and Ekins, 2016). Therefore, this study explores green foreign direct investment (GFDI), which in our case particularly refers to the renewable energy sector.

UNCTAD (2010) defines GFDI as the transfer of technologies, practices or products by transnational companies (TNCs) to host countries, through equity (FDI) and non-equity participation, so that their activities generate significantly lower greenhouse gas emissions than would otherwise prevail in the industry under business-as-usual circumstances. GFDI already has a good track record of contributing to environmentally friendly industries, practices, technology and skills. There is increasing evidence that it would be more effective to promote private investment in developing countries, rather than the financing of individual clean energy projects by donor agencies (Buntaine and Pizer, 2015). There is a lack of public investment in renewable energy and private investment can be used to fill the investment gap. In addition to creating jobs, private investment can also lead to the transfer of knowledge, skills and expertise. Consequently, it is useful to identify the policies that are most effective in attracting GFDI.

There is a lack of research on this topic, especially studies with a global perspective using a large sample of countries. Therefore, this study seeks to demonstrate the extent to which national sustainable...
energy policies have affected the attraction of GFDI into different advanced and developing economies. More specifically, this study investigates the geography of global GFDI networks and the policy instruments that influence this.

**Green growth**

Green growth is gaining visibility as a critical alternative economic development strategy (Sterner and Damon, 2011). The concept was introduced in 2005 by the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP) to explore ways of encouraging a low-carbon sustainable development model for fast-growing Asian economies (UNESCAP, 2005). More recently, the OECD (2010) formulated green growth as economic growth that ensures that the capacity of existing natural assets is protected. In other words, the green growth model stresses the need for policies that bridge economic and environmental challenges and create economic payoffs that reflect the value of the natural resource base (OECD, 2011).

**Green foreign direct investment (GFDI)**

A clear definition of green investment does not yet exist, as there is no theoretical consensus on this term (Inderst et al., 2012). However, studies refer to GFDI in terms of clean, sustainable, pro-climate investments. Golub et al. (2011) explored two hypotheses in their research on FDI and the environment. The first one concerns the ‘pollution haven effect’ referring to FDI that seeks higher returns in locations with weak environmental regulations. The second one is the ‘pollution halo effect’ whereby, in contrast, FDI spreads environmental best practices and technology. This study focuses mainly on the second hypothesis and the relationships between different policy instruments and the deployment of renewable energy.

The determinants that affect GFDI in host countries and, particularly, the decisions of multinational companies (MNCs) include: a) general policy frameworks - environmental, energy, climate and industrial policies; b) economic factors - the general determinants of FDI such as market seeking, resource seeking, efficiency seeking, and strategic-asset seeking factors; c) business facilitation - national and local policies that favour low-carbon investments; and d) costs of production - cost reductions resulting from material, resource and energy savings (UNCTAD, 2010; Hanni et al., 2011).

**GFDI in renewable energy**

Renewable energy has the potential to reduce greenhouse gas emissions and mitigate climate change through cleaner processes, products and services. GFDI in renewable energy (e.g. solar, wind, hydroelectric, geothermal and biomass-generated energy) has risen since 2003, due to international interventions to reduce GHG emissions (UNCTAD, 2010) but also because MNCs have become aware that greening their business and value chain can increase their competitiveness besides creating new markets for green products, services, technologies and innovation (Bisgaard et al., 2012). In this light, MNCs are already the dominant actors in renewable energy generation in advanced economies.

More than half of all GFDI projects so far have taken place in Europe because of the EU’s commitment to renewable energy policies. Between 2004 and 2010, Europe (Denmark, Germany, Italy and Spain), North America (Canada and the USA) and Asia (China and Japan) were the largest GFDI investors in renewable energy. Nonetheless, in recent years, developing economies have steadily attracted more GFDI than developed economies. Between 2003 and 2010, China, India and Malaysia emerged as favourite destinations for GFDI in renewables. In 2010, China actually invested more in renewable energy than Europe and became a world leader in the production of photovoltaic modules and wind-power equipment. Latin America and the Caribbean became favoured destinations for renewable energy in 2009 and 2010. (Eyraud et al., 2011; Hanni et al., 2011; UNCTAD, 2010).

Wind power represented about half of the total GFDI flows between 2004 and 2010 (Eyraud et al. 2011). Wind investments have experienced steadier growth because wind is the most commercially viable renewable energy technology, and due to its technological maturity, lower risks and widespread policy support.
Policies for GFDI in renewable energy

Many international, national and local renewable energy promotion or facilitation policies have been introduced to reduce greenhouse gas (GHG) emissions and mitigate climate change, improve energy security, and foster green growth by stimulating the creation of green jobs and innovation (Eyraud et al., 2011). Promotion and facilitation policies can help attract GFDI for renewable energy projects especially when they are combined with market-creation policies. Conducive policies include capital subsidies, grants, fiscal incentives, public investment, or loans (Hanni et al., 2011).

The choice of policies or policy combinations varies depending on the country’s resources, its energy market maturity and its political context (Kitzing et al., 2012). The most common renewable energy policy categories are regulatory, market and public policies (POLIMP, 2014) with the following associated policy instruments.

**Regulatory policies**
- Renewable Portfolio Standards: Under this mechanism, electricity companies have to produce a certain share of electricity through renewable resources.
- Net Metering: Allows those who generate electricity to use that electricity anytime regardless of the time when they created electricity market policies.
- Feed-in-Tariffs: Policies to regulate the price of renewable energy, ensuring that it will remain stable. Feed-in-tariffs are the mechanisms which provide remuneration to the people who produce clean energy.
- Financing Support: One-time governmental payment to promote investment by covering a share or all of the capital cost.
- Fiscal Measures: Tax reductions for promoting renewable energy investments.
- Energy Production Payment: Payments by the government per unit of renewable energy produced.
Regulatory policy obligations tend to be effective instruments to promote investments in renewable energy, confirmed by different studies (e.g. Bolkesjøa et al., 2014) demonstrating that these obligations and tendering have had a significantly positive effect on the development of bioenergy for power generation in European countries.

- **Renewable Energy Certificates**: Tradable renewable energy quotas between companies and countries that exceeded their quota obligations and those that fell short. RECs are issued when one megawatt-hour (MWh) of electricity is generated and delivered to the electricity grid from a renewable energy resource.

**Market policies**

- **Tendering**: Defining the required volume of renewable energy by inviting interested parties to submit a proposal.
- **Public Investments**: Government investment in renewable energy projects.
- **Carbon Tax**: A tax imposed on the carbon content of fossil fuels.
- **Emissions Trading Scheme**: This regulates a market’s clean energy production and consumption.

Regulatory policy obligations tend to be effective instruments to promote investments in renewable energy, confirmed by different studies (e.g. Bolkesjøa et al., 2014) demonstrating that these obligations and tendering have had a significantly positive effect on the development of bioenergy for power generation in European countries. Likewise, for policies that were designed to promote wind power generation in the United States (Menz and Vachon, 2006). However, for the diffusion of renewable electricity technologies, although having a positive effect, these policies may not be the most efficient instrument (del Rio and Bleda, 2012).

Market policies such as carbon taxes and tradable certificates have the potential to foster the investment and deployment of renewable energy (Helm, 2002; Rogge and Hoffmann, 2010; Smith and Swierzbinski, 2007). However, mixed evidence was found for market-based incentives, such as emission trading schemes and green certificate schemes on renewable energy investments (Polzin et al., 2015). In relation to trading systems, there seems to be a sectoral differentiation as the study by Polzin et al. (2015), shows a positive influence on the wind and biomass sectors, but a negative one in the solar sector. This could be due to the fact that solar energy technologies are less mature and more diverse than wind, and are therefore more heavily dependent on regulatory instruments. The same applies to green certificates, which do not appear to strongly incentivize investments in solar technologies because of the lack of technological maturity and the low amount of certificates generated per capital invested, when compared to other sectors such as wind. According to Oikonomou et al. (2010), although the combination of maximum amounts of renewable energy policies are considered to provide more options and therefore have a wider effect, in practice the selection of combined policies needs to be careful, and should take into consideration trade-offs and different targets and not only economic criteria. Furthermore, regulatory policies are not enough to influence renewable energy investments, without the additional support of financial schemes to support project development costs, and to fill the market gap (Klessman et al., 2013).

Based on the theoretical background above, it is of interest to further investigate how different policies influence FDI in renewable energy for high, middle and low-income countries. To do this, a table with all policy instruments used in this report can be seen in Online Appendix 8.8, along with a correlation matrix for policies shown in Online Appendix 8.7. Furthermore, this study is based on fDi Markets data, concerning the renewable energy sector, as well as its sub-sectors solar, wind and biogas. The data has been geocoded for GIS purposes and aggregated at the country level for statistical modelling. The latter also required data on renewable energy policy, which was gathered from various sources. Econometric models were used to reveal the relationships between the data. For more on this see Online Appendix 8.6.

**Findings**

Map 8.1 shows the network of GFDI in renewable energies for the period 2005 to 2014. The bilateral investments between countries are indicated with grey lines. The thicker the line the more investment taking place between these countries. The blue nodes are country aggregations of investment received...
by a country in that period. The larger the node, the greater the aggregate investment. The green nodes represent the total outward investment from particular countries to other countries. It should be clear that the majority of renewable energy investments takes place between regions of the global north but fairly strong investment flows also occur between these northern regions and several countries in the Global South, particularly Australia, Brazil, Chile, Morocco and South Africa.

Map 8.1 further reveals that Africa hardly receives any GFDI for renewable energy apart from into South Africa, Morocco, Kenya, Nigeria and Zambia, in descending order. Nonetheless, four of these countries receive only small amounts of GFDI in renewable energy when compared globally, except for South Africa. The US, EU countries and India are the major renewable energy investors in South Africa, whereas Nigeria receives most of its investments from the US. For Kenya, it is Morocco and Zambia which are the key sources.

Map 8.1 also reveals countries’ CO₂ emission levels in shades of yellow. The darker the colour, the higher the emissions. The highest CO₂ emissions are found in the more advanced economies, which also receive the highest renewable energy GFDI. This shows not only that the advanced economies have a clear commitment to reducing their CO₂ emission levels but also that investing in the renewable energy sector is a profitable option in these advanced economies. In other words, it shows that environmental commitments and corporate interests can be successfully combined.

The ranking of countries by renewable GFDI is shown in Online Appendix 8.3, as well as a graph reflecting investments between 2005 and 2014 in Online Appendix 8.4.

Table 8.1 shows the statistical results of the study, in which it is seen that feed-in-tariffs (FIT) significantly and positively influence FDI attraction, both in total renewable GFDI, as well as the sub-sectors wind, solar and biomass. This result concurs with previous research that also found a significant impact of FIT on increasing renewable energy capacity in these sectors in OECD countries (Polzin et al., 2015; Eyraud et al., 2011). Other studies conducted in European countries also revealed clear evidence that FIT significantly affects the development of solar and wind energy (Bolkesjo et al., 2014). Our research also verifies similar findings by various other studies (e.g. Polzin et al., 2015; Verbruggen and Lauber, 2012; del Rio and Bleda, 2012 and Johnstone et al., 2010).
Table 8.1. Policy impact on the attraction of renewable energy GFDI of different modes (2005-2014)

<table>
<thead>
<tr>
<th>Variables</th>
<th>M1</th>
<th>S.E.</th>
<th>M2</th>
<th>S.E.</th>
<th>M3</th>
<th>S.E.</th>
<th>M4</th>
<th>S.E.</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIT (Feed in Tariffs)</td>
<td>++</td>
<td>0+</td>
<td>++</td>
<td>0+</td>
<td>+</td>
<td>0+</td>
<td>+++</td>
<td>0+</td>
</tr>
<tr>
<td>REC (Renewable Energy Certificates)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RPS (Renewable Portfolio Standards)</td>
<td>++</td>
<td>0+</td>
<td></td>
<td></td>
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<td></td>
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</tr>
<tr>
<td>NEMET (Net Metering)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>--</td>
<td>0+</td>
</tr>
<tr>
<td>FS (Financing Support)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>+</td>
<td>0+</td>
</tr>
<tr>
<td>FM (Fiscal Measures)</td>
<td>+</td>
<td>0+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>++</td>
<td>0+</td>
</tr>
<tr>
<td>EPP (Energy Production Payment)</td>
<td>---</td>
<td>0+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>--</td>
<td>0+</td>
</tr>
<tr>
<td>TEND (Tendering)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PUBLIC (Public Investments)</td>
<td>-</td>
<td>0+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>--</td>
<td>0+</td>
</tr>
<tr>
<td>ETS (Emissions Trading Scheme)</td>
<td>+++</td>
<td>0+</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>++</td>
<td>0+</td>
</tr>
<tr>
<td>CT (Carbon Tax)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Wall, Grafikos, Gianoli, Stavropoulos, 2017, based on fDi Markets and various sources of policy data

+++ Very significant and positive relation ++ More significant and positive relation + Significant and positive relation 0+ Not significant but positive relation 0- Not significant but negative relation -- More significant and negative relation - Significant and negative relation

Investors have little confidence in public policy as it can be subject to reversal by newly elected administrations as was the case with the US President’s withdrawal from the Paris Climate Agreement.

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Fiscal Measures (FM) such as tax incentives show a significant and positive impact on total renewable energy GFDI, as well as on the solar energy sub-sector. Whereas the findings confirm that, in general, fiscal instruments have a positive impact on the diffusion of renewable energy, this study goes beyond this conclusion by illustrating the impact each fiscal instrument has on increasing renewable energy FDI and its sub-sectors. Our findings show that carbon tax policies have a strong positive influence on renewable energy investments because carbon taxes add to the unit costs of electricity produced by fossil fuel-based energy technologies. This finding is particularly relevant for total GFDI and the solar and biogas sub-sectors but proved insignificant for the wind sector.

Other studies have found that carbon pricing has a statistically significant positive effect on investment (Eyraud et al., 2011). Our research further showed that energy production payments (EPPs) have a strongly negative effect on total renewable GFDI and the wind sector. In other words, EPPs do not spur attraction of FDI in both wind and total investment but rather influence these negatively. This seems counterintuitive but is explained by the fact that investors generally have little confidence in public policies since these may be reversed by newly elected administrations (Johnstone et al., 2010). The withdrawal of the US from the Paris Climate Agreement after the 2016 elections is a good illustration of such a public sector U-turn.
In line with existing empirical evidence, renewable portfolio standards (RPS) have a positive impact on total GFDI attraction but not at the sectoral level. By contrast, both tendering (TEND) and net metering (NEMET) show neither relevance at the total nor sectoral levels, with the exception of net metering, which revealed a negative effect in the biomass sub-sector. Differences between these findings and those in previous literature may be due to our specific focus on foreign investment, rather than other types of renewable energy investments.

Lastly, renewable energy certificates (REC) and emissions trading schemes (ETS) show no statistical importance in total FDI attraction. In the sub-sectors, REC has no effect on wind and biomass, but a negative influence on solar whereas ETS has no effect on wind and solar, but a positive one on biomass. For reasons explained above, these findings contradict existing empirical evidence that show a positive impact of REC and ETS on renewable energy investment, particularly in the wind sector.

The next part (see also Online Appendix 8.11), repeats the previous analysis, but aggregates the data from OECD and non-OECD countries (Online Appendix 8.2 and 8.10). As expected, feed-in-tariffs (FIT) are significantly present in both groups, but have a greater influence in OECD countries, where renewable portfolio standards (RPS) and carbon tax (CT) policies also have a strong positive effect on attracting renewable GFDI, with a more than a 100% rise when the policy is implemented. Public investments (PUBLIC), in contrast, are a negative influence on investment in renewables.

In the case of non-OECD countries, carbon taxes (CT) have no impact on attracting GFDI while emissions trading schemes (ETS) appear to be an important policy instrument indicating a statistically significant, positive effect on renewables investment. The results of the non-OECD countries are clearly particularly important for African countries, as these findings shed light on policies that are likely to be effective in the region today. On the other hand, the results in Table 8.1 show that policies that proved effective in OECD countries (Online Appendix 8.10) might also interest African countries seeking to attract GFDI for developing renewable energy practices.

The performance of African countries in terms of renewable energy investment is much weaker than other countries of the world, pointing at the likelihood that African nations can learn from the experiences of non-African countries. In addition, green growth of the energy sector not only provides clean energy but also generates employment. Therefore, it is recommended that African countries should consider the above-mentioned policies, such as feed-in-tariffs, carbon taxes, renewable portfolio standards and emissions trading schemes, so as to attract FDI in the renewable energy sector and achieve green growth and employment (Wall, R., Grafakos, S., Gianoli, A., & Stavropoulos, S. (2018). Which policy instruments attract foreign direct investments in renewable energy? Climate Policy, 1-14). Realizing both the need to and advantages of moving towards more renewable energy generation, African leaders launched the Africa Renewable Energy Initiative in 2015 with a view to promoting the continent’s potential for generating renewable energy. It aims to install 10 gigawatts of new and additional capacity by 2020 and increase this to 300 gigawatts by 2030 (African Development Bank Group, 2017; UNECA, 2016).

Although the commensurate infrastructure to produce and distribute such renewable energy is limited when compared to carbon-based energy, it has the advantage of decentralized production and off-grid access that supports greater social inclusion and security in supply. This could also benefit remote localities currently not served by the grid.

The renewable energy sector also generates higher employment compared to the traditional energy sector. Most importantly, investment in green renewable energy infrastructure ensures a reduction in resource dependency and enables greater climate change resilience (UNECA, 2016). To achieve the goal of such structural transformation in Africa, however, requires a significant advancement in technology and institutional capacities particularly in the urban informal sector because a large proportion of the working population is based there.
Definitions of a smart city must reflect the urgent need for cities to understand their changing position within a highly globalized economic system.

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The smart city is a multidimensional concept with no universal definition. Efforts and policies to develop smart cities in countries around the world to achieve sustainable growth and higher efficiency are increasing. At the same time, cities around the world compete to attract higher volumes of FDI, which requires specific urban characteristics to enable these cities to become more competitive and resilient. In these developmental pursuits, Africa’s involvement and performance in smart city innovation and FDI competitiveness remains modest. This study analyses how the smart city concept can become more integrated in urban Africa’s economic and social development.

A multitude of definitions of smart city exist, but none is universally acknowledged. They include intelligent city, knowledge city, ubiquitous city, sustainable city and digital city, among others (Cocchia, 2014). In terms of content, strong differences exist in the importance of the role of technology in linking people and institutions (Belissent and Giron, 2013; IBM, 2013; Nam and Pardo, 2011; Coe et al., 2000); the importance of human capital in bridging the gap between education and productivity (Florida and Mellander, 2012; Storper and Scott, 2009; Shapiro, 2005); or the need for greater environmental considerations in city planning (Fitzgerald, 2010). Information technology is an essential and shared component in the various interpretations of the smart city concept (UN-Habitat). Most definitions are based on standard indicators, such as education levels, creative class, mobility, ICT and environmental quality (Caragliu et al., 2011) and do not specifically differ from previous conceptions of urban progress such as sustainable cities, for instance. All these definitions, however, seem unable to accommodate the contemporary urgency for cities to understand their changing position within a highly globalized economic system. That is one of the major reasons why a unique, universal academic smart city definition does not yet exist (Hemment and Townsend, 2013).
In this study, we aim to contribute towards a clearer definition, by postulating a crossover between smart city literature and World City Network literature. A tentative bridge can be found when treating smart cities as multilayered territorial systems that seek to maximize problem solving capacities (Komninos, 2002; Komninos, 2006). Whereas smart city literature generally views that social, economic, technological, political and environmental characteristics make a city smarter than others (Caragliu et al., 2011), the World City Network literature stresses that the success of a city is increasingly conditional on its relative position within the worldwide networks that connect cities and their economies through multiple globalized flows comprising the movement of capital, people, knowledge, information and ideas (Sassen, 1991; Knox and Taylor, 1995; Alderson and Beckfield, 2004; Coe et al., 2004; Derudder et al., 2010; Wall and v.d. Knaap, 2011).

Global FDI is one of the key worldwide networks in which cities can competitively excel. The higher a city’s relative position in FDI attraction, the more stable its economy, and the more likely investors will continue to invest there in future

Global FDI is one of the key worldwide networks in which cities can competitively excel. The higher a city’s relative position in FDI attraction, the more stable its economy, and the more likely investors will continue to invest there in future

‘smartness’ will also be conditional on territorial characteristics, e.g. social, economic, technological, political and environmental location factors (Kitson et al., 2004; Wall and Burger, 2013).

Smart city investments are cheaper and easier to run in the medium term because there is a single control system to manage such urban characteristics as transportation, water and energy grids (more coordinated and flexible systems). This improves efficiency, transparency, and public safety; reduces

Figure 9.1. GIS map of total FDI flows between 126 smart cities (2005-2013)

Source: Wall and Stavropoulos, 2017, based on fDi Markets data

In network studies, this characteristic is known as ‘preferential attachment’ (Barabási, 2003; Boschma and Ter Wal, 2009) and can be derived from network centrality measures (as explained below). Nonetheless, besides network measures, urban
congestion and pollution; and enhances traffic management and routing. Major ICT companies are investing heavily in technologies that allow city managers to address their urban challenges in new ways. Therefore, being part of worldwide networks is an opportunity not to be missed (Anderton and Akinola, 2011).

For cities, and particularly for African cities, economic sustainability is a central issue because many cities lack appropriate urban and socio-economic planning strategies while their populations are booming. Economic sustainability is a major pillar of smart city development and besides improving the local economic context, needs to be seriously addressed to promote the attraction of investment and business.

Economic sustainability is a major pillar of smart city development and besides improving the local economic context, needs to be seriously addressed to promote the attraction of investment and business.
### Table 9.1.
City smartness, network and location characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Overall</th>
<th>Less Smart</th>
<th>Moderately Smart</th>
<th>Smart</th>
<th>Very Smart</th>
</tr>
</thead>
<tbody>
<tr>
<td>Betweenness (global strategic position)</td>
<td>---</td>
<td>+++</td>
<td>+++</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Inward distance (geographic expanse)</td>
<td>+++</td>
<td>---</td>
<td>--</td>
<td>+++</td>
<td>++</td>
</tr>
<tr>
<td>Outdegree (investment power)</td>
<td>---</td>
<td>+++</td>
<td>+++</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Indegree (investment prestige)</td>
<td>+++</td>
<td>---</td>
<td>+++</td>
<td>---</td>
<td>+++</td>
</tr>
<tr>
<td>Population (citizen count)</td>
<td>---</td>
<td>+++</td>
<td>+++</td>
<td>---</td>
<td>+++</td>
</tr>
<tr>
<td>GDP (market size)</td>
<td>+++</td>
<td>---</td>
<td>---</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Strength of legal rights (democracy level)</td>
<td>+++</td>
<td>---</td>
<td>---</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Gini Coefficient (level of inequality)</td>
<td>---</td>
<td>+++</td>
<td>+++</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>Openness (level of internationalization)</td>
<td>+++</td>
<td>---</td>
<td>---</td>
<td>+++</td>
<td>+++</td>
</tr>
<tr>
<td>Area (km²) (urban size)</td>
<td>0-</td>
<td>0+</td>
<td>0+</td>
<td>0-</td>
<td>0-</td>
</tr>
<tr>
<td>Unemployment rate (economic status)</td>
<td>---</td>
<td>+++</td>
<td>++</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

Source: R. S. Walla, and S. Stavropoulos, 2018 based on FDI Markets and Euromonitor Passport data

+++ Very significant and positive relation ++ More significant and positive relation + Significant and positive relation 0+ Not significant but positive relation
-- More significant and negative relation - Significant and negative relation 0- Not significant but negative relation

Emerging globally connected cities like Lagos should focus on widening their continental and worldwide investor base through regional institutions such as ECOWAS.
relationships emerged for other indicators: the Gini Index (degree of inequality), unemployment level (economic condition), population (citizen count) and area (urban territory size). These statistical characteristics explain to a large extent African cities’ modest smartness. African cities are characterized by various combinations of rapidly growing populations, high levels of income inequality and high to very high unemployment levels (especially among youths and in weaker urban economies with large informal sectors). The results for the different smartness groups in columns 2 to 5 support the view that the responsiveness of city smartness to network and city characteristics differs between the four groups. The signs of coefficients for the first two low smartness groups are both similar and the opposite of those for cities in the two high smartness groups.

Conclusions
This study first and foremost aimed at introducing a more contemporary methodology for future smart city analyses by merging the methods used in World City Network literature with those of smart city studies (Wall, R. S., and Stavropoulos, S. (2016). Smart cities within world city networks. Applied Economics Letters, 23(12), 875-879). The results show that besides regular territorial features, network characteristics also play an important role in city smartness. This challenges the mainstream, over-territorialized approach to smart city research, by introducing

Learning from foreign technology and investment promotion agencies to design more diverse, expansive and efficient FDI-attracting conditions is essential for African cities
sense, this concerns matchmaking the development of a city with systemic changes in the world city network. In other words, city managers, notably those in developing economies, should come to better understand the importance of improving their locality-specific urban features to better match the demands of the global economic system, if they seek to enhance the degree of smartness.

Learning from foreign technology and investment promotion agencies to design more diverse, expansive and efficient FDI-attracting conditions is essential for African cities. It will not help to merely address one of the major challenges like, for instance, how to promote sustainable urbanization. Cities should simultaneously attempt to significantly improve their position in the world city network. African cities can learn from cities in the more advanced economies on how to develop smart city characteristics. For instance, Africa has huge potential for developing its renewable energy sector, assisted by renewable energy FDI. The smart technologies FDI can bring, can play an important role in, among others, achieving more sustainable growth and generating employment.

Lastly, based on the econometric results, it can be concluded that smart cities are cities that: a) have a good track record in attracting FDI from geographically distant and diverse sources; b) are socially and economically open to the world; c) have high economic production and employment levels; d) foster strong equality amongst citizens; and e) have relatively small populations and geographic sizes.

These will be challenges for African local authorities, national governments, regional alliances and the African continent as a whole. It will require policies and strategies that enable destination cities to attract FDI from as many source cities as possible (diversity), and from the farthest reaches of the globe (reach). This requires municipalities to develop the stringent internationalization marketing strategies demanded by global investors, through investment promotion agencies (IPAs), smart procurement agencies (SPAs) and competition commissions. The aim should be to increase cities’ global and regional portfolio of foreign investors.

Emerging globally connected cities like Cairo, Johannesburg, Lagos and Nairobi should focus on further African, continental and worldwide expanse through their regional institutions like SADC and ECOWAS. Medium-sized cities like Durban and Mombasa would benefit most from first improving their national and regional investment base.
The Effect of Green Competitiveness on FDI

By Ronald Wall, Dorcas Nyamai and Meera Malegaonkar
To address the twin challenges posed by global economic integration and global climate change, cities and countries must be both economically competitive and environmentally sustainable. However, theories about the coexistence of these goals have been in conflict. This study therefore aims to contribute to the debate by proposing the concept of ‘green-competitiveness’ (GC) which consolidates the World Economic Forum’s Global Competitiveness Index (GCI) and Yale University’s Environmental Performance Index (EPI). To this end, the study tests the effect of three indicators on: a) the attraction of FDI into countries worldwide; and b) the attraction of FDI into African countries by comparing the results and eliciting policy recommendations for Africa.

Traditionally, the objectives of development have been the satisfaction of basic needs and maintenance of good standards of living and welfare. But the impacts of development on the environment were mostly not well considered, if at all. Consequently, environmental deterioration and climate change have forced the world to acknowledge the need for more environmentally sustainable and equitable development paths. In today’s global economy, the
The path to economic progress for firms, cities and nations is even more dictated by competitiveness than before, since trade liberalization has promoted the economic integration of cities and firms worldwide. While economic competitiveness and environmental progress are now accepted global concepts of development, their meaning varies for different geographic areas e.g. Europe, Asia or Africa. The main concern of the world’s developing economies is poverty reduction through economic growth and consequently the environmental aspects of development are often of a lesser concern. In contrast, for advanced economies, excess wealth that is actually at the basis of climate change has enabled these countries to pay greater attention to environmental and climatic issues. However, because 90% of the world’s future population and economic growth will be in developing economies, the importance of environmental issues cannot be ignored by either the advanced or developing areas of the world.

To address the twin challenges of economic growth and climate change, firms, cities and countries need to simultaneously focus on often-conflicting growth and sustainability goals. Climate policies are said to cost money and lead to the argument of many countries to “grow first, clean up later” (Hallegatte et al., 2012; Dasgupta et al., 2006). Theories from the field of environmental economics, emphasize the damaging effect of human development on ecosystems and claim that the propensity of a destination to become a ‘pollution haven’ attracts FDI (Wheeler, 2001; Dasgupta et al., 2002; Meadows et al., 1972). Conversely, sustainable development approaches advocate the concept of competitive sustainable development based on well-designed environmental policies that will not negatively affect ecosystems (Porter and Van Der Linde, 1995).

In the 21st century, different parts of the world are still in various stages of development and competition (Rostow, 1956; Narula and Dunning, 2000). The more advanced economies have already undergone their process of industrialization and wealth accumulation, which have led to today’s polluted, crowded and car-dependent cities. The more recent shift of such cities to inherently less polluting service-oriented economies has directed their attention to more sustainable environments (Glaeser, 2011). Instead of emulating the unsustainable development pattern once followed by today’s advanced economies, developing nations could leapfrog to an age of green-competitiveness without first fully passing through the environmentally unfriendly interim phases.

The New Urban Agenda includes the goal of environmentally sustainable and resilient urban development (United Nations, 2017). This will require countries to be highly competitive in attracting domestic investment and FDI while ensuring that such investment not only facilitates employment creation and social equality but will also ensure a less-destructive impact on the environment.

In this context, the key environmental data for our study concerns EPI, a metric that ranks countries by their performance in the protection of human health and ecosystems. These categories are based on the variables health, air quality, water and sanitation, water resources, agriculture, forestry, fisheries, biodiversity, and climate and energy. Associated with these variables, are more than 20 indicators. The other important measure used in this study is the GCI, which quantifies the impact of a number of factors that contribute to creating conditions for country-level competitiveness, with a specific focus on the macroeconomic environment, the quality of institutions, and the state of technology and supporting infrastructure.

The current study tests how the concept of green competitiveness (GC), relates to the attraction of FDI at both the global and Africa scales, as well as establishing whether differences exist. Using statistical techniques, an overall index of green competitiveness was calculated out of the World Economic Forum’s (WEF) Global Competitiveness Index (GCI), the Environmental Performance Index (EPI) developed by Yale University (Yale Center for Environmental Law and Policy) and Columbia University (Center for International Earth Science Information Network) in collaboration with the WEF and the Joint Research Centre of the European Commission. The analysis is carried out in three stages. The first investigates whether GC, on its own, has a significant relationship with FDI attraction. The
The Effect of Green Competitiveness on FDI

The second stage tests the influence of sub-components of the GCI and EPI on FDI attraction, while the third stage explores in more detail the effects of the EPI sub-indicators on FDI. Population has been included in all models to control for country size.

FDI and green competitiveness in Africa

From a global perspective, the top destinations for total FDI are the US, followed by China, the UK, Canada, Russia, Belgium, Brazil, Singapore and Australia which reflects the general importance of a country’s physical and population size. However, the UK, Singapore and almost all European countries receive large amounts of FDI, despite their smaller territory and population sizes. Furthermore, large amounts of FDI also flow into emerging economies, especially in Asia and Latin America. Although Africa is not a top recipient of FDI in terms of volume, it does form one of the regions with the highest growth in investment (for number of investments as well as value of investments). Africa has a strong variation of investment across its regions and countries. At the regional level, Northern Africa receives the highest values of FDI, followed by Western and Southern Africa. Central and Eastern Africa receive relatively small values of investment (see also Online Appendix 9.6). Several African countries, particularly in the north, such as Algeria, Egypt and Libya, alongside Angola, Nigeria and South Africa, are clearly well integrated into the world FDI network (Map 10.1). There is little variation concerning the GC, GCI and EPI indexes across African regions, with Northern and Southern African moderately more competitive (see Online Appendix 9.8).

The findings for EPI show that Northern Africa does better than the other African regions in terms of...
environmental performance (environmental protection and human health) followed by Southern and Central Africa. Eastern and Western Africa lag in environmental protection and human health, although these two regions have shown relatively larger improvement in their performance between 2006 and 2016.

There are also clear and distinct country-level variations in EPI, as shown by Map 10.1. Africa appears to lag behind other continents in terms of environmental protection and human health, arguably because of the lack of appropriate governance and policies (Hsu, 2016). There is further clear variation across African countries with Northern and Southern African countries performing better than others in Africa. For instance, Tunisia scores highest in terms of EPI followed in descending order by Morocco, Mauritius, Namibia, Botswana, South Africa, Algeria, Gabon, Egypt and Zambia. These countries not only have high EPIs but also attract higher values of FDI. This indicates that economies prioritizing environment and human health tend to attract more investment.

Findings

Global analysis (see Online Appendix 9.9) reveals that GC has a positive and significant effect on attracting foreign investment when controlled for population size. It implies that the more a country develops towards “greeness” the more likely it will be able to attract FDI. This is confirmed by Northern European countries where greener policies have helped attract more FDI when compared to other countries. Population size also positively contributes to increases in FDI - the higher the population, the higher the FDI. Some authors suggest that countries and their population size are determinants of FDI because these aspects reflect market-size and production factors, which are of interest to investors (Checchi and Faini, 2007; Yu and Walsh, 2010).

The Africa specific analysis in Table 10.1 and Figure 10.1 also shows that GC has a significant and positive effect on attracting FDI to Africa. Hence, the more African countries improve their green competitiveness, the more FDI they can expectedly attract. This finding serves to emphasize that environmental sustainability can go hand-in-hand with economic competitiveness. Again, population levels in Africa have a positive and significant effect on FDI, as explained above.

At the country level, Mauritian, Morocco, Tunisia, South Africa and Botswana were found to be the top-five African countries in terms of GC and are also amongst the top recipients of greenfield FDI (see Figure 10.1). This scatter-plot also shows a strong positive relationship between African GC and FDI (see also Online Appendix 9.2). In Models 2 (column 3) and 3 (column 4), we see similar and even stranger results to the global scale (Online Appendix 9.9), i.e. that EPI and GCI are both positively significant to FDI attraction in Africa (Table 10.1). For Africa, this environmental performance (environmental protection and human health) followed by Southern and Central Africa. Eastern and Western Africa lag in environmental protection and human health, although these two regions have shown relatively larger improvement in their performance between 2006 and 2016.

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Because Africa is in the early stages of industrialization, it can achieve growth with alternative energy sources while preserving the environment.
outcome is less significant (see Table 10.1) showing that it has not reached the competitiveness level of most other countries in the world. Our results show that countries which have stronger “greenness” and “competitiveness” policies, and which are also endowed with better GC characteristics, will in turn attract more FDI.

The final part of this analysis tests the sub-indicators of EPI on FDI globally (Online Appendix 9.9) and for Africa (Table 10.1). Both revealed similar results albeit that worldwide this final model explains 50% of the variance of FDI attraction, whereas in Africa it explains 65%. Online Appendix 9.9 shows that access to sanitation has a positive significant effect on FDI and is equally important at both the global and African scales. Other studies also found that sanitation is an important factor for attracting FREI in African countries (Van Gils et al., 2018). In Africa (see Table 10.1), the availability of basic services is an important factor in determining FDI attraction into countries. This is probably better explained as: “the more a country has access to sanitation, the more developed it is which, in turn, is attractive to investors”.

Carbon intensity (i.e. CO₂ emissions) have a highly significant and negative impact on investment (see Model 4). This can be interpreted as: “the cleaner a country, the more liveable and, consequently, the more favourable to attracting investors”. This probably relates more to knowledge-intensive than manufacturing investments because knowledge-based industries tend to locate in cities with a better quality of life. Again, this indicator possibly serves more as a proxy for countries’ development levels. It means that countries should increase productivity in a sustainable way, without damage to the environment. Carbon intensity concerns both the ability to control carbon emissions and the degree of a country’s transition to alternative forms of energy. Benin, Sudan and Togo, for instance, have much higher levels of carbon intensity when compared to other countries, while receiving small amounts of FDI. They are in descending order Algeria, Tanzania, Angola, Niger and Zimbabwe in terms of carbon intensity, that all receive higher shares of FDI (see Online Appendix 9.5). This indicates the nature of the FDI received by these countries (with higher carbon intensity), which is likely in the extractive and heavy industries that are mostly not too friendly in terms of the environment or air pollution.
Conclusions
This study concludes that the impact of green competitiveness on attracting FDI is significant for countries across the world, in general, and for Africa in particular. Because Africa is still in the initial stages of industrialization, the continent can take this as an opportunity to industrialize and achieve higher growth with alternative energy sources while preserving its natural resources and environment. Similarly, at deeper levels it was found that both EPI and GCI importantly affect FDI attraction both across countries of the world and within Africa. This implies that the GCI index can be complemented with the EPI index and that they better explain investment attraction together rather than separately.

The results show that countries with stringent policies regarding environmental progress and economic competitiveness are more likely to secure foreign investment and are therefore more integrated within the global economy. The deeper analysis based on EPI sub-indicators shows that at the global level, countries’ access to sanitation strongly influences the attraction of investment. In other words, countries lacking basic amenities are less attractive to foreign investors. Another important negative factor for FDI attraction is CO₂ emissions because cleaner air is associated with liveable environments in the more advanced economies. These findings equally apply to the world and Africa. It reinforces the notion that in terms of investment attractiveness, Africa should adopt the same economic principles as the rest of the world.

This study further shows that Africa can achieve industrialization while protecting its environment. Efficient policies will be critical to achieving the three major objectives of sustainable growth, poverty reduction and mitigating climate change. Finance technology and renewable energy are the

Figure 10.1. FDI versus green competitiveness in Africa (2016)

Source: Wall and Nyamai, 2017, based on FDI Markets, World Economic Forum and Yale University data
two important sectors which provide opportunities for such green industrialization in Africa. Due to the late start of its industrialization process, Africa can leapfrog the highly polluting industrialization phases experienced by other major regions and adopt alternative strategies for green industrialization. These can yield sustained, sustainable and inclusive growth and employment generation without damaging the environment. National governments, through policy guidance, are the key players in achieving such green industrialization assuring the most efficient use of energy and resources. See also the chapter on how environmental policies attract renewable energy FDI.

**Recommendations**

Because 65% of the attraction of FDI to Africa is explained by green competitiveness (GC), African countries should adopt GC frameworks in their planning to evaluate, compare and improve their performance in all parameters of green competitiveness. Although the overall green competitiveness score is significant, its importance varies across sectors and locations. Places seeking FDI in services should focus on improving their greenness and environmental qualities. It is therefore urgent that African countries improve their environmental conditions and public health. Many countries have high air-pollution levels and lack safe drinking water, which is a major threat to public health (Hsu, 2016). The manufacturing and hi-tech sectors, which generally generate higher employment, need environmental regulations that limit the environmental parameters to benchmark levels. Appropriate regulations will not only protect the environment but also increase a location’s attractiveness for investment and stimulate innovation in green technologies, products and services.

Since population and the quality of human resources are also significant factors determining FDI attraction, countries should invest in education and skills-generating programmes. This will not only improve the quality of FDI coming into these countries but will also strengthen the local economy and, in turn, attract more domestic investment and FDI.