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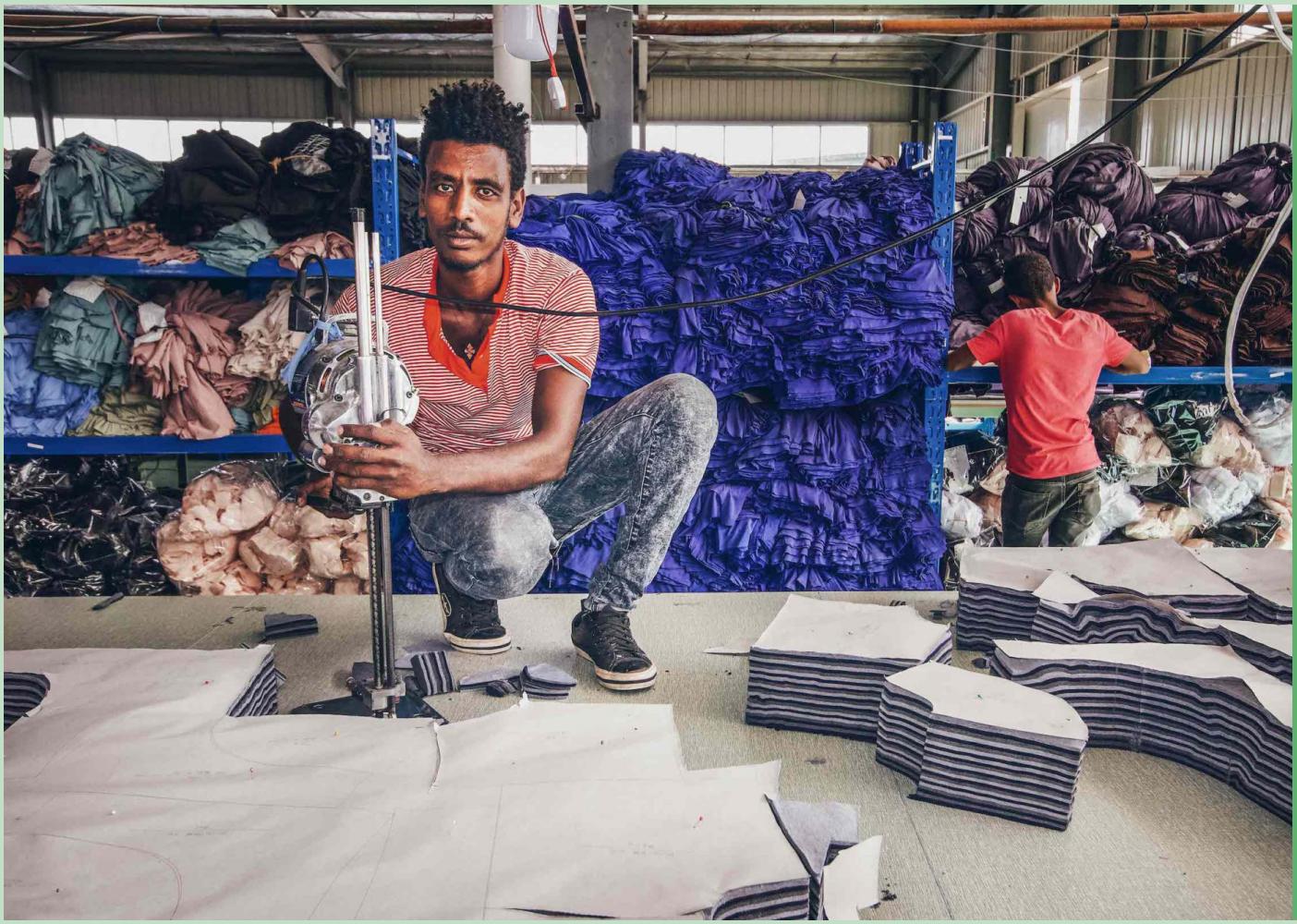
SYNTHESIS REPORT



Africa's economic transformation: the role of Chinese investment

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About the DFID-ESRC Growth Research Programme

The DFID-ESRC Growth Research Programme (DEGRP) funds world-class scientific research on inclusive economic growth in low-income countries (LICs). The programme's principal aim is to generate policy-relevant research on four key areas: financial sector development and growth; agriculture and growth; innovation and growth; and China's engagement in sub-Saharan African countries.

Cover image: Textile factory worker, Ethiopia, 2019 © Davide Scalenghe.

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Acronyms

CHINCA	China International Contractors Association
DEGRP	DFID-ESRC Growth Research Programme
FDI	foreign direct investment
IDCEA	Industrial Development, Construction and Employment in Africa
OECD	Organisation for Economic Co-operation and Development
SOE	state-owned enterprise
UN	United Nations

Summary

Since the early 2000s, China's presence in Africa has increased dramatically in terms of trade, investment and infrastructure financing. This raised expectations about the potential for Chinese engagement with Africa to reinvigorate economic growth in the continent, but also questions about the potential challenges that could arise. Research by the DFID-ESRC Growth Research Programme (DEGRP) took place in this context, looking to address issues and questions around China-Africa development relations and their impact on African economies and livelihoods.

This synthesis uses evidence from DEGRP research and beyond to assess whether and how Chinese trade, investment and finance contributed to economic transformation in Africa. We draw from a significant body of evidence produced under DEGRP, and frame it in the context of the wider literature. We look at China's engagement in Africa through the lens of economic transformation (McMillan et al., 2017: 66), considering increases of productivity within sectors as well as movement of resources between sectors.

A point to note: **the research drawn upon in this synthesis was conducted before the Covid-19 pandemic. However, the findings remain relevant to African governments as they think about how to recover from the economic shock caused by the pandemic and consider the role Chinese investment could play in that recovery**.

- The DEGRP research strengthens existing evidence that Chinese firms investing in Africa contribute to substantial job creation for African workers, with high localisation rates. Most of the jobs created are at the low- and semi-skilled levels. The research finds that the numbers of jobs created and the extent to which they are localised vary according to country- and sector-specific characteristics, but, overall, the contribution to job creation is considerable. In this respect, the DEGRP research brings in a strong comparative perspective, exploring these questions in relation to different countries, sectors and types of firms, and comparing Chinese and non-Chinese firms.
- Chinese companies are found to build the skills of host countries' workers. Chinese companies usually provide some form of training to local workers (to varying degrees of formality), but more complex technical and managerial tasks often remain with Chinese workers. Comparative research found no difference between Chinese and European firms in managerial knowledge transfer.
- Horizontal spillovers do take place, to a limited extent. For African firms, absorbing the technical and managerial skills of their Chinese counterparts remains a challenge. This is linked to the limited labour mobility of managers and skilled workers, and to limited access to capital.
- In terms of vertical spillovers, the DEGRP research shows that vertical knowledge transfer through building backward and forward linkages is more effective than horizontal transfer through demonstration and competition. While longer-term supply or subcontracting relationships would be highly beneficial in terms of increasing productivity of African firms, we see few examples of such relationships. Similarly, more established partnerships, such as joint ventures between African and Chinese firms, are the exception rather than the rule.
- In terms of remunerations and workers livelihoods, the DEGRP research shows that wages paid by Chinese firms are, on average, not different from those paid by other firms. In some cases, Chinese firms are found to offer non-wage benefits to workers.
- In the informal sector, the effects of foreign engagement on African livelihoods are not always positive. The negative impact does not emerge only in the relationship with Chinese investors, but also with other foreign and domestic firms, as well as with

local authorities. This indicates the presence of underlying weaknesses in the sectors, effectively failing to support livelihoods of those involved in it, and calls for solutions at the sector/host country level, rather than a targeted engagement of Chinese firms.

- At the macro level, the DEGRP research highlighted that Chinese investment tends to contribute to increased economic growth, in particular through investment in productive sectors (manufacturing). In some cases, it also contributes to the strengthening of existing sectors (construction material manufacturing) or the creation of new ones (rosewood in Zambia). While Chinese firms' contributions to Africa's industrialisation has been widely discussed (Qobo and le Pere, 2018; Lin and Xu, 2019), the DEGRP research highlighted how Chinese engagement can contribute to the creation of new sectors in unexpected ways.
- Many of the studies conducted under DEGRP confirmed that Chinese investments in African countries are, on average, predominantly market-seeking, rather than export-oriented; confirming earlier views on the matter (Kaplinsky et al., 2007). This suggests that African countries are not seen by Chinese investors as low-cost destinations to produce for third markets, but rather as viable markets in their own right. Therefore, the contribution of Chinese investment is not in boosting Africa's exports, but in providing wider access to cheaper goods for African consumers.
- Moreover, Chinese financing can contribute to unblocking the bottleneck to economic growth. By contributing to infrastructure building, it promotes the creation of further economic activity and generates spillovers. This includes the construction of digital infrastructure in many African countries, and the construction of transport and energy infrastructure and industrial parks.
- Trade with China seems to have mixed effects on economic transformation in African countries. Increased exports of commodities seem to have favoured commodity exporters, but also to have contributed to cases of 'Dutch disease' in certain parts of the continent (notably West Africa). Consumer goods imported from China have competed with, and negatively affected, African industries; but in some cases they have also spurred healthy competitions. Imports of machinery from China have also contributed to boosting economic activity in Africa.
- The DEGRP research contributed to showing that economic transformation is a complex process, requiring many components to work at the same time. The movement of resources, in particular labour, from low- to high-productivity sectors, is influenced by specific country and sector conditions that need to be addressed concurrently.
- Finally, the DEGRP research strengthened our understanding that the research findings are shaped by the context in which they take place, and by the characteristics of the stakeholders involved. This is two-fold: on the one hand, the local context of the specific African countries needs to be understood; on the other hand, the specific characteristics of the Chinese firms, investors and financiers, their drivers and their modus operandi should also form part of the analysis.

The research has major implications for policy:

- **Creation of linkages requires targeted support.** While job creation is taking place, African firms are finding it difficult to create linkages with Chinese firms. Policy-makers need to create mechanisms and policy tools to promote the creation of these linkages between African and Chinese firms, building their capacity to work with each other.
- **Foster development along the value chain instead of isolated projects.** Studies showed that vertical knowledge transfer through building backward and forward linkages is more effective than horizontal transfer through demonstration and competition. Therefore, policy attention should be focused on linking foreign direct investment (FDI) projects with upstream and downstream local businesses.
- **Consider supporting joint ventures and other longer-term partnerships.** The research has shown that, while joint ventures and

other longer-term forms of collaboration between Chinese and African firms have strong potential, these are rare occurrences. Supporting such partnerships could be a useful way to strengthen knowledge transfer.

- **Build managerial skills and encourage labour mobility.** Chinese firms support skills development for low- and semi-skilled workers, but higher technical and managerial skills are still not present. Of these, the latter seem a priority, as they would not only support business, but also lead to spillovers. In the case of Bangladesh, the rapid growth of the ready-made garment sector was due to the spread of skilled workers and managers, highlighting the importance of labour mobility. Similarly in African countries, labour mobility could be encouraged.
- **Regulation to avoid malicious competition.** As Chinese investors often disrupt existing market practices with new business models, fierce competition could lead to a 'race to the bottom' without corresponding regulation. Enhancing governance and regulation, for example, setting requirement for socio-environmental duties and adopting a sector-level minimum wage, will help maintain healthy market orders.
- **Understand and target investment from China**. Beyond creating a good investment environment for all FDI, some research suggests there are specific factors that are important to target attracting FDI from China. Targeting is a necessary complement to general enabling policies. The DEGRP research has shown that, in general, Chinese investment is seeking access to domestic markets rather than chasing low costs for exports. Targeted investment promotion should take this into account and consider opportunities in domestic markets.
- **Focus on aftercare and maintaining a good investment environment to keep investors in the country.** Chinese firms prove to have strong motivation to invest in Africa because of rising costs at home and/or interest in the local market, but the harsh investment environment and constantly changing policies have often frustrated Chinese investors in Africa. This has also contributed to a negative reputation that has kept other potential investors away. Being investor-friendly will help African countries retain investment.
- **Support livelihoods by targeting the informal sector.** The informal sector in many African countries provides livelihoods to many people and contributes to large shares of the national economies. Rather than focusing on the specific groups of foreign investors, measures to improve the livelihoods of those operating in the informal sector need to target the entire sector/value chain.

1. Introduction

Since the early 2000s, China's presence in Africa has increased dramatically. The political and economic conditions that shaped the Chinese context over this period, and that prompted the country to strengthen its outward engagement with other regions, including Africa, translated into growing trade with African countries along with increased investment flows and infrastructure financing.

The growing trade, investment and financial exchanges with African countries raised expectations about the potential for the engagement with China to reinvigorate economic growth in Africa, but also questions about the potential challenges associated with this engagement. At a time when many were pointing at China as the modern world's most extraordinary example of growth and poverty reduction (Lin et al., 1996; Fan et al., 2004; Heilig et al., 2006), and as a potential example for African countries to follow (Ravallion, 2008), academics, policy-makers and the media raised questions and doubts about the potential impact of Chinese engagement on Africa in terms of job creation, livelihoods, growth and other areas. Answering these questions required a more nuanced understanding of China's engagements with African countries, its drivers, modalities and impacts.

It is in this context that the DEGRP was established, looking to address these issues and questions around China-Africa development relations, and their impact on African economies and livelihoods. This synthesis uses evidence from DEGRP research and beyond to better understand the impact of China's engagement with African countries. We draw from a substantial body of evidence produced under DEGRP and frame it in the context of the wider literature. We refer to the concept of economic transformation (McMillan et al., 2017) to frame China's engagement with African countries. Accounting for increases of productivity *within* sectors as well as movement of resources *between* sectors, economic transformation considers not only growth, but also inclusive and sustainable job creation, alongside improvements in livelihoods and in the resilience of the economic system.

This synthesis is structured as follows: section 2 presents the DEGRP work; sections 3 and 4 present evidence of China's role in Africa's economic transformation at the micro and macro level; section 5 reviews the role of politics and institutions; and section 6 concludes the report by summarising findings, presenting policy recommendations and identifying research gaps.

A point to note: **the research used in this synthesis was conducted before the Covid-19 pandemic. However, the findings remain relevant to African governments as they think about how to recover from the economic shock caused by the pandemic and consider the role Chinese investment could play in that recovery**.

2. The DEGRP research

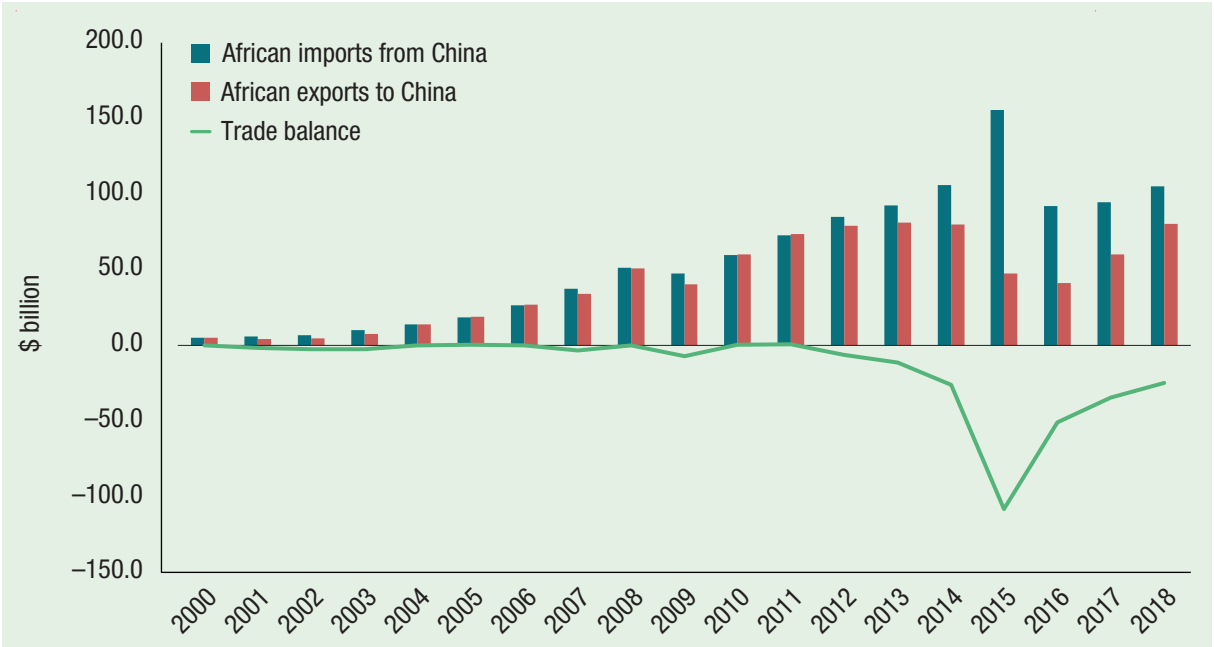
2.1 China-Africa relations: evidence and myths

China has been involved in African development since the 1950s, but the relationship between the two parties changed dramatically with the rapid transformation of the Chinese economy, most notably since 2000 (Power and Mohan, 2010; Shinn, 2019). The growth of the Chinese economy, and the launch of the Go Global strategy, inviting Chinese firms to invest abroad, brought significant changes to China's engagement with the African continent, which accelerated markedly from the 2000s. This section starts by reviewing the main trends in China's trade, investment and aid to Africa, to set the context for the findings that will be presented in the following sections.

China has been the main source of imports for African countries from as early as 2007, and in 2012 it became the main export market for the African continent. China-Africa trade relations are unbalanced in terms of volumes, composition and origin. African countries have run a trade deficit with China since 2012. Of African exports to China, 90% are fuels, minerals and metals, while imports cover a wide variety of goods. In 2017, the top four African exporters to China (Angola, South Africa, Republic of Congo and Ghana) were providing over 80% of the total exports, according to UN Comtrade data (UN, n.d.). This unbalanced trade relationship is potentially damaging for Africa's diversification and industrialisation prospects (Qobo and le Pere, 2018).

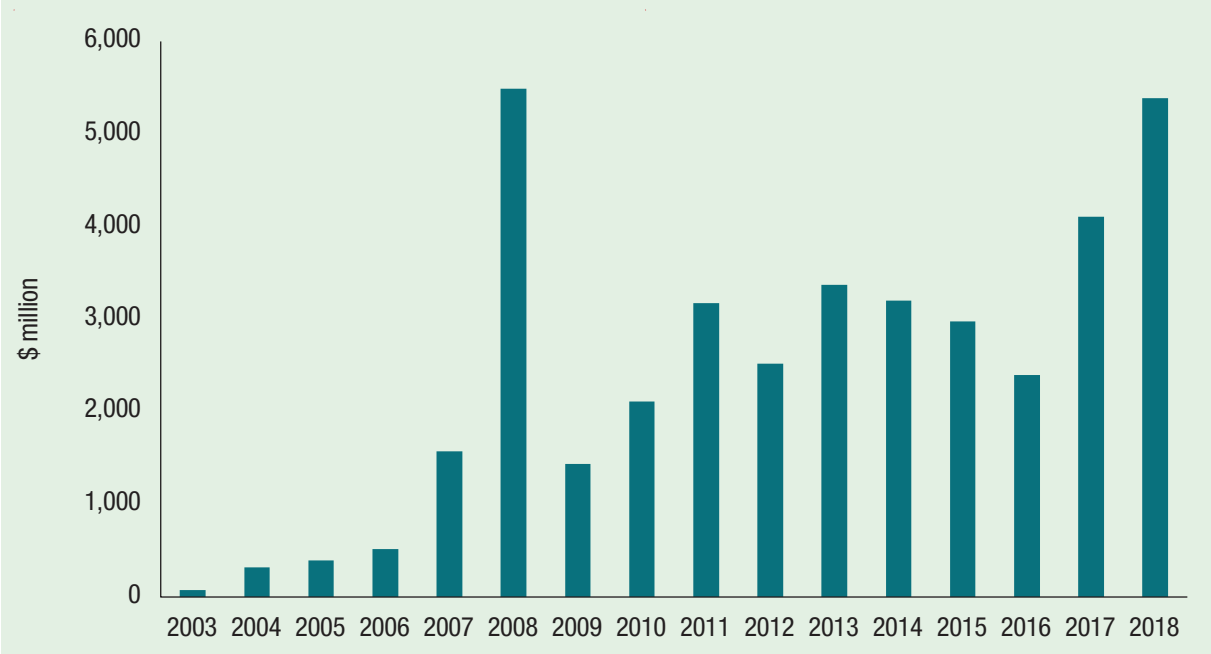
In terms of investment, Chinese companies are a growing presence on the African scene. China is the fifth largest foreign investor (after France, the Netherlands, the US, and the UK), with a $43 billion stock of FDI in Africa in 2017 (UNCTAD, 2019).

Figure 1
African imports from and export to China, and trade balance, 2000–2018



SOURCE: AUTHORS, BASED ON UN COMTRADE DATA (UNITED NATIONS, N.D.)

Figure 2
China's FDI flows to Africa, 2003–2018



SOURCE: AUTHORS' CALCULATIONS BASED ON DATA COMPILED BY THE CHINA-AFRICA RESEARCH INITIATIVE, BASED ON THE STATISTICAL BULLETIN OF CHINA'S OUTWARD FOREIGN DIRECT INVESTMENT (SEE WWW.SAIS-CARI.ORG/CHINESE-INVESTMENT-IN-AFRICA)

Chinese investment into Africa is notable in terms of the sectors it covers. While the US, UK and France are concentrated in financial services and extractives, Chinese companies invest in transport infrastructure, extractives and manufacturing (Calabrese, 2019). In manufacturing, many studies have highlighted the destructive impact of Chinese imports on African manufacturing (Morris and Einhorn, 2008; Edwards and Jenkins, 2015) and the footloose nature of Chinese investment (Rotunno et al., 2013), while others have pointed to the productivity-enhancing effects of Chinese investment through direct competition and higher quality of inputs (Darko et al., 2018). In African agriculture, while much attention has focused on fears of Chinese 'land-grabbing' (Smith, 2009), Chinese engagement also has potential for aiding the diffusion of productivity-enhancing technology (Brautigam, 1993; 1998).

Chinese investment in Africa's natural resources, and its socioeconomic and environmental implications, has also stirred much debate (Farooki and Kaplinsky, 2011). Chinese firms are often accused of exploiting Africa's natural resources, driving deforestation (EIA, 2012; Putzel et al., 2011), extracting minerals, including in conflict areas (Shinn, 2008), and raising social and economic challenges (Farooki and Kaplinsky, 2011; Human Rights Watch, 2011; Moyo, 2012). These challenges affect not only Africa's formal sectors, but also the informal economy, covering much of Africa's natural resources (Weng, 2015). Investment by Chinese oil companies, which is playing an increasing role in the African oil sector, has been referred to as China's 'oil diplomacy' (Power et al., 2012).

The Chinese government provides aid to African countries in the form of grants, interest-free loans and concessional loans (State Council, 2014), but these are limited compared to business cooperation: concessional loans account for approximately 20% of all the funding provided to Africa. Aid provided by China is smaller in volume than that provided by member countries of the Organisation for Economic Co-operation and Development (OECD) (Kitano, 2019), and is focused on infrastructure, but also covers agriculture, healthcare, capacity building and resilience to climate change (State Council, 2014).

In addition to aid, Chinese stakeholders provide loans and other forms of financing to African countries. The China Africa Research Initiative estimated this to be around $15.8 billion in 2017 (Brautigam et al., 2019), mostly allocated by the Export-Import Bank of China (Atkins et al., 2017).

Finally, one of the most visible forms of Chinese engagement in Africa consists of Chinese overseas contracted projects. These are infrastructure projects implemented by Chinese firms, financed either by Chinese institutions or by other sources. Africa is a big market for Chinese contractors. According to the China International Contractors Association (CHINCA), in 2017 Chinese companies undertook construction work in 54 African countries, and signed new contracts for a value of $76.5 billion (almost double the value of Chinese FDI stock on the continent), accounting for 28.8% of the total value of newly signed contracts for that year (CHINCA, 2018).

All forms of Chinese engagement in Africa discussed so far (trade, investment, lending and aid) are interrelated in a complex manner. Trade flows are bilateral, with African countries both exporting to and importing from China. The same holds for investment: African companies and individuals invest into China, though African investment to China is smaller in size than Chinese investment into Africa (Goldstein et al., 2006; Gelb, 2014). At the same time, the Chinese government and its institutions, including state-owned enterprises (SOEs) and policy banks, provide aid and lending to African governments. Overseas contracted projects, or infrastructure projects, are linked to all these. Infrastructure projects are commonly financed through loans or aid; in some cases, Chinese companies can also invest in these infrastructure projects, meaning that they own some equity in the project (Foster et al., 2009; Cheng, 2017). Trade is also part of this, as goods that are used in infrastructure projects (such as equipment and machinery) are often brought in from China (Foster et al., 2009).

As a relatively new phenomenon, Chinese engagement in Africa has generated much clamour, coupled with a sense of suspicion towards the newcomers, disrupting more established patterns of trade and investment. Moreover, the Chinese presence in Africa has fostered misconceptions and myths about the nature and impact of this engagement. Fuelled by the media and by political figures, these misconceptions include claims that Chinese companies generate few jobs, and mostly for Chinese nationals (Lee and Shalmon, 2008; The Economist, 2014; Mekonnen, 2015; The White House, 2015; Lahtinen, 2018; Paduano, 2020); that the working conditions in Chinese firms are exploitative, and characterised by low wages (Baah and Jauch, 2009; Human Rights Watch, 2011; Lee, 2017; Rounds and Huang, 2017; Sun et al., 2017; Jenkins, 2018) and that Chinese companies make limited contributions to skills development for African workers (Baah and Jauch, 2009). Other issues concern land grabs (Smith, 2009; Moyo, 2012) and, more generally, exploitation of Africa's natural and human resources.

2.2. Chinese engagement in Africa: risks and opportunities

While China's emergence as a global economic power and a major player in Africa can generate risks, it also creates opportunities for African countries that can leverage trade, investment and finance provided by Chinese stakeholders to promote productivity-enhancing activities and stimulate growth. Zambian economist Dambisa Moyo argued that China is a 'golden opportunity' for Africa, and that engagement with China can help Africa break away from aid and move towards a more business-oriented approach (Moyo, 2012).

Chinese stakeholders can play a productivity-enhancing role through several channels. Chinese firms could increase the productivity of African agriculture and manufacturing through investment, technology upgrading and knowledge spillovers.[1] Chinese financing of much-needed infrastructure could unlock further investment from African and other foreign firms. Furthermore, Chinese companies could generate employment creation in high-productivity sectors

1 Spillover effects (or externalities) occur when the activities of firms or people generate benefits or costs for others actors.

LOCAL AND CHINESE SUPERVISORS ON A CONSTRUCTION SITE IN KILAMBA, ANGOLA, 2019. PHOTO CREDIT: DAVIDE SCALENGHE

of the economy. But business-oriented approaches may be problematic as well, for example if they promote a 'race to the bottom' in terms of wages, working conditions or environmental protection.

China's increased presence in Africa can also create a degree of healthy competition for African firms (Darko et al., 2018) and for more established donors (Woods, 2008) and investors on the continent; though, again, the extent to which this is taking place remains uncertain (Zeitz, 2015). Overall, what matters are the opportunities that Chinese engagement can offer to the African continent while reducing the risks.

The DEGRP research sought to investigate whether, and under what conditions and modalities, China's engagement contributes to Africa's development. The research under the DEGRP China-Africa portfolio, discussed in Box 1, took place in 2015–2020.

In this synthesis, we frame the discussion in terms of economic transformation. The concept of economic transformation relies on two components. The first is the movement of resources from low- to high-productivity sectors, or structural transformation. This refers to changes in the structure and composition of the economy. The second component is the increase in productivity within sectors, which refers to productivity growth of the different firms and activities present in an economy (McMillan et al., 2017). As discussed above, Chinese stakeholders in African countries can contribute to both components through different channels. This will be explored in the following sections.

Drawing from DEGRP research findings and from the wider literature, this synthesis presents evidence of the role of Chinese investment and firms in contributing to Africa's economic transformation. The next sections in this report analyse the role Chinese investment plays in supporting economic transformation at the micro and macro levels, and the role of politics and institutions in this process.

While we recognise the importance of trade, aid, lending and infrastructure projects in China-Africa relations, and the risks these are generating, most notably in terms of financial sustainability, this synthesis does not go into great detail on these issues. These were not at the core of the DEGRP research, and are therefore beyond the scope of this synthesis.

Box 1 The DEGRP research

The DFID-ESRC Growth Research Programme (DEGRP) funds world-class scientific research on inclusive economic growth in low-income countries. The programme's principal aim is to generate policy-relevant, high-quality research and promote effective communication of that research to key policy decision-makers around the world. Over the years, DEGRP has funded research projects on agriculture, finance, innovation and China-Africa. This synthesis draws primarily from the five projects in the China-Africa portfolio:

- The project 'Chinese FDI and structural transformation in Africa: technology transfer, linkages, and learning' led by Deborah Brautigam (China Africa Research Initiative, Johns Hopkins University School of Advanced International Studies) investigated the potential for Chinese engagement in Africa to enhance transformation through direct training, technology dissemination, backward and forward linkages, subcontracting and personnel transfers.
- The project 'Chinese national oil companies and the economic development of African oil producers' led by Giles Mohan (The Open University) explored the interaction between China's oil interests and African state and non-state actors to assess how these can help to maximise the benefits to Africa's development. The research looked at the motivations, roles and impacts of Chinese national oil companies and the role played by Africa in shaping this engagement.
- The project 'Industrial development, construction and employment creation in Africa (IDCEA): a comparative analysis', led by Carlos Oya (SOAS University of London), investigated Chinese engagement in Africa through its impact on Africa's labour markets. Focusing on the construction and manufacturing sectors in Ethiopia and Angola, the project looked at the impact in terms of direct job creation, working conditions and skill development and upgrading for African workers, comparing these outcomes in Chinese and non-Chinese firms.
- The project 'Local government, economic growth and human development' led by Lina Song (University of Nottingham) considered whether China's experiences provide insights into how local governments in Africa may successfully contribute to economic growth and human development. The project explored the impacts of local governance on the economic and human development of China and two selected East African countries, Kenya and Uganda.
- The project 'Natural resources, rural poverty and China-Africa trade' led by Xiaoxue Weng (formerly of the International Institute for Environment and Development) looked at China's involvement in African natural resources sectors, and the challenges posed in terms of natural resources governance in Africa. The project focused on the impact of Chinese actors in informal agriculture, mining and timber trade along two fast-developing trade corridors connected to the Indian Ocean.

For this synthesis, we have also gone beyond the China-Africa portfolio, looking at other DEGRP projects that have contributed to building knowledge in the China-Africa field. In particular, Xiaolan Fu's project on 'The diffusion of innovation in low-income countries' contributed to a better understanding of the role of Chinese trade and investment as vehicles of innovation in sub-Saharan Africa.

3. Africa's economic transformation and Chinese investment: the micro evidence

This section focuses on the role that Chinese firms played in their host countries' economic transformation at the micro level, broadly corresponding to the 'within sector' component of economic transformation. We look at changes taking place within firms and sectors, including jobs and skills; productivity and technology; firm-level spillovers; wages and livelihoods. The findings suggest that the impacts are multi-dimensional and dynamic, depending on various conditions, such as host countries' socioeconomic context, regulations, investment sectors and firm operation time. Correspondingly, our study investigates Chinese investments, mainly by sectors like construction, manufacturing and trading.[2]

3.1. Jobs and skills

One of the main features of economic transformation is job creation in productive sectors. Employing people in high-productivity activities not only increases productivity in the economy, it also builds workers' skills, attracting further investment and growth.

The DEGRP research focusing on employment confirmed that Chinese firms have created large numbers of jobs in host countries, chiefly for African workers. For instance, Oya and Schaefer (2019) found that African employees made up on average 70% to 95% of the total workforces in the Chinese firms they studied.

The proportion of African workers in the total workforce of Chinese and other foreign firms ('localisation rates') are affected by several factors. Host countries' regulations countries had significant impact. For instance, Oya and Schaefer (2019) found that Ethiopia's strict regulation on work permits raised the percentages of local employees to over 90%, whereas those in Chinese firms of the same sectors in Angola were only around 75%. Another important variable was the sector of investment. Oya (2019b) and Tang (2019a) both indicated that Chinese investments in the manufacturing sectors were inclined to use more local workers than those in the construction sector, because manufacturing in Africa usually consisted of simple, labour-intensive, assembly-line jobs and construction sectors needed more skilful technicians and engineers. Firms that operated for a long time in a country also relied more on local workers than newcomers. Other factors included, inter alia, availability of vocational education, time and quality requirements of production, and need of machinery installation.

In order to improve African workers' productivity, the DEGRP research found that Chinese firms spent much effort in labour training. However, the forms and effects of training varied largely. Most companies reported learning-by-doing or on-site training, rather than formal training activities, as their main methods to improve the local employees' skills (Tang, 2019a; Xia, 2019a). Newly recruited workers were asked to shadow experienced workers – sometimes Chinese and sometimes more experienced African employees – in the work practice. While Chinese managers considered this method practical and cost-efficient, it ran the risk of not living up to Africans' expectations, and thus leaving the impression of a lack of training (Oya, 2019b). Additionally, the workers cannot absorb in-depth knowledge about sophisticated machinery operation through simple imitation.

Formalised training programmes were commonly offered by sizeable Chinese companies, especially in manufacturing and telecoms sectors. So that quality of work could be ensured, new

2 We note that the heterogeneity of ownership and size of Chinese investments influences the impacts of Chinese firms on local economies. Although this synthesis does not focus on heterogeneity, this is partly accounted for in the sectoral studies, because various types of Chinese firm concentrate in different sectors: for example, construction firms are usually large SOEs, manufacturing firms are mostly small- and medium-sized private firms.

workers got weeks-long training on sewing, cutting or machine operating before sitting on the production lines. Since most Africans employed by Chinese firms had no similar work experience before, large companies also gave formal inductions on topics like corporate rules, workplace safety and labour discipline to educate industrial culture (Tang, 2019a; Xia, 2019b). Some major Chinese companies invested in vocational training centres for more intensive and advanced skill teaching. Occasionally, African workers were sent to China for direct and relevant experience as well as for language training (Oya and Schaefer, 2019; Tugendhat, 2020). Chinese government's aid programmes also established a few centres to train African farmers to improve agricultural productivity (Chen and Landry, 2016; Tang, 2019c; Xia, 2019b).

The effects of these training methods on productivity in Africa were qualitatively evaluated by various research projects. Although Chinese managers regarded the training as helpful for assembly-line jobs and technical positions, they pointed out that the African workers' productivity remained low due to lack of practice on various product models and unfamiliarity with standards of international markets (Tang, 2019a). Improvements in both aspects required the accumulation of experience. However, the biggest challenge for skill training was the high turnover rate of local workers. Chinese employers complained that the workers would quit jobs at will for short-term higher-paying jobs or family issues, causing waste and repetitious training. It usually took several years for the workforce in a factory to become stabilised and skilful (Xia, 2019b). As a result, most of the jobs created by Chinese firms in Africa were low-skilled and semi-skilled. There were a few African managers in charge of production and administration, but their roles were largely confined to mediation between Chinese executives and African labour, few of whom had in-depth knowledge of sophisticated production systems (Auffray and Fu, 2015; Xia, 2019a).

Beyond the shop floor skills, increases in productivity are closely linked to the levels of managerial skills in a firm. A comparative study on the impact of Chinese and European multinational enterprises looks specifically at the transfer of managerial know-how, and finds no significant different between the European and Chinese firms (Fu et al., 2019). What affects managerial knowledge transfer is not the nationality of the multinational enterprise, but rather its structure, with more decentralised and 'flat' firms being more conducive to the transfer of know-how. The same study also finds that, when it comes to knowledge transfer, Chinese enterprises face more challenges than European ones, given the presence of linguistic and cultural barriers (Fu et al., 2019).

3.2. Firm-level spillovers

Firm-level spillovers refer to the (positive and negative) effects that take place in the complementary or competitive relationships between firms. Relations between firms are an important source of learning that stimulates productivity gains. Firms can compete with one another, learning from their competitors; or they can learn from their partners, buyers and suppliers.

DEGRP research used detailed case studies and interviews to assess the extent of knowledge spillovers from Chinese investments to African companies. One channel is horizontal skill transfer, namely through exchange and competition with companies in the same sector. One of the ways in which horizontal transfers can take place is through labour mobility, or the movement of workers from one firm to another. Labour mobility takes place to various extents in different firms. Xia (2019a) found that, when African workers left Chinese firms, some moved to local companies in the same sector. According to Chen (2020), firms in sectors that require complex production skills and longer-training process, e.g. the furniture industry, have shifted more skills and responsibilities to local staff than those in assembly-line industries.

However, most of the workers in construction sites and assembly lines were semi-skilled. Experienced local technicians were a scarce resource in Africa, and they were highly sought after by foreign competitors. Local companies could rarely afford to poach them (Auffray and Fu, 2015; Tugendhat, 2020). Therefore, even when

the turnover rate is high, labour mobility among competing companies had not contributed to significant knowledge exchange between Chinese and Africans firms.

African stakeholders acknowledged that a few large Chinese firms, such as Huajian in Ethiopia, China-Africa Cotton in Southern Africa and Twyford in East Africa, brought advanced production technologies and improved managerial skills to the host countries (Tang, 2019c; Xia, 2019a). These examples had 'demonstration effects' to stimulate local competitors to imitate the more productive practices, but few host country firms succeeded in absorbing the knowledge because the capacity gaps between the Chinese and African companies were too large (Auffray and Fu, 2015). Lack of capital was the biggest obstacle for local competitors to adopt better technology, invest in newer machinery and secure reliable supplies (Tang, 2019b). In addition, Chinese firms were found to have much tacit knowledge in their management practice instead of explicit codified rules. This makes it difficult for entrepreneurs from a different cultural background to replicate (Auffray and Fu, 2015).

Other Chinese firms, particularly the numerous small- and medium-sized ones, did not have any obvious technological lead vis-à-vis African competitors. Therefore, they competed on the same level more directly. Fu et al. (2015) revealed that such intensified competition did indeed push unproductive local firms out of the market by allocating resources more efficiently, thus raising total productivity, but suggested that it did not subsequently drive broad-based technology upgrading in related industries. In some sectors, such as mining in Tanzania and leather in Ethiopia, the Chinese and other foreign investors, constrained by the governments' regulations, could only work in a small range of value chains and thus had little influence on technological upgrading (Tang, 2019b; Weng et al., 2018). In other industries, such as plastic products in Tanzania and construction materials in Ethiopia, competitors did not invest heavily in acquiring more productive equipment due to limited market size, but instead expanded to other sub-sectors where there was less competition (Tang, 2019a; Xia, 2019c). The learning effects for local companies through horizontal channels turned out to be modest and partial.

Knowledge can also be transferred vertically along the value chain, namely through backward and forward linkages with local suppliers, subcontractors and clients. Many Chinese firms were found to source substantial supplies, primarily raw materials like leather, wood, minerals, etc., from local companies. Yet, many industrial supplies cannot be acquired in Africa and must be imported (Chen 2020; Tang 2019b). Encouraged by local authorities, Chinese construction companies regularly hired local subcontractors, but tended to give them tasks that were simple and labour-intensive, whereas work that required critical technologies was usually commissioned to Chinese subcontractors (Oya, 2019b). Several African countries have rules for foreign companies to subcontract a part of their work to local firms, but the results of these rules are mixed. While some Chinese firms established long-term partnerships with local subcontractors, other Chinese firms complained about difficulty of working with local subcontractors and tried to bypass the regulation.

Some Chinese companies provide technological and financial assistance to their local suppliers and subcontractors in order to secure good quality supplies and fulfilment of commissioned tasks. Sometimes, Chinese technicians were sent to work together with the suppliers and inspect their production. Occasionally, Chinese firms provided machines to long-time local suppliers to enhance ties and efficiency (Tang, 2019b; Xia, 2019c). Telecoms companies like Huawei need to give their subcontractors training in how to install and troubleshoot the sophisticated equipment as well as health and safety principles (Tugendhat, 2020). More commonly, Chinese clients just specify demands and select the most competitive suppliers available in host countries. This encourages local companies to improve their capacity and quality according to the market requirement (Tang, 2019a). Long-term supply or subcontracting relationships with frequent interactions are found to be most beneficial for knowledge transfer, as they provide financial stability and clear targets for the local firms to upgrade. Yet, because most local

suppliers and subcontractors are small and offer only simple services, their space for technological and managerial improvement is limited (Auffray and Fu, 2015).

Forward linkages were observed as well in telecoms, manufacturing, agricultural and construction sectors. Huawei lays emphasis on training customers and channel partners as part of its long-term business strategy to establish good relationships with local governments and big clients (Tugendhat, 2020). Chinese investments that manufacture machinery and process raw materials in Africa supplied local businesses with new varieties of equipment, accessories and ingredients at lower costs, thus boosting the production capacity of downstream industries (Tang, 2019c; 2019a; Wolf and Cheng, 2018b). Construction companies helped local customers train technicians to operate and maintain facilities, providing critical infrastructure for productive activities (Oya and Schaefer, 2019). According to these observations, the effects of vertical knowledge transfer were more obvious and widespread than those of horizontal spillover channels like demonstration and competition. However, the effects depend on the markets that Chinese firms serve. Companies exporting to advanced economies often use more imported supplies because of high-quality requirements, whereas those selling in local markets tend to source more supplies in the host countries to save costs (Tang, 2019a).

Chinese-African joint ventures were found to be relatively rare, on average amounting to less than 10% of the total Chinese investments, but the technical collaboration through joint ventures turned out to be more intense and effective than through other channels. Local managers were trusted with key responsibilities for all possible functions in the joint ventures, including sales, marketing, finance, human resources, research and development, and general management (Chen et al., 2016; Tang, 2019a). Chinese and Africans were able to exchange knowledge closely and equally over business strategy, management style and technological upgrading (Xia, 2019c). In several cases, large African manufacturers contracted Chinese firms to provide technical services. Like joint ventures, this form of collaboration was also efficient to merge Chinese knowledge with local business (Tang, 2019a).

Spin-offs set up by former local employees of Chinese companies constitute another possibility to transfer managerial and technological knowledge. Xia (2019b; 2019a) reported that a local manager got enough funds to purchase outlets of a Chinese motorbike assembly factory and these outlets became distributors in Tanzania. In other cases, local technicians established their firms to work as subcontractors or suppliers for their previous Chinese employers. Such spin-offs were welcomed and sometimes supported with technical assistance by the Chinese firms because local firms have unique advantages to access markets and resources (Schaefer and Oya, 2019; Xia, 2019c). However, lack of capital hinders more African employees from starting their own companies and putting their acquired knowledge into practice at a higher level (Auffray and Fu, 2015).

Several Chinese companies adopted the model of contract farming in Southern Africa to produce cotton, tobacco and rice, cooperating with hundreds of thousands of local small farmers (Chen and Landry, 2016; Kabwe et al., 2018). In comparison to companies from the US, Singapore and South Africa, Chinese firms were not particularly strong at providing systematic training for the out-growers or teaching them Chinese farming techniques, due to the huge difference in farming practices between China and Africa. However, Chinese companies offered cost-efficient supplies to the farmers and used pragmatic methods, such as cash payment and acid-delinted seeds, to bolster production. They also worked with China-aided, agricultural technology demonstration centres to develop new seed varieties (Weng et al., 2018; Tang, 2019c).

3.3. Productivity and technology

Beyond training their workers, firms can also increase their productivity by investing in capital goods and technologies. Wolf and Cheng (2018a) suggest that the expansion of the Chinese economy, together with other emerging economies, significantly reduces the price of capital goods for low-income countries where it has historically been too high. Consequently,

FACTORY WORKERS PRODUCE GARMENTS FOR ETHIOPIA'S TEXTILE INDUSTRY, 2019. PHOTO: DAVIDE SCALENGHE

China's growing investments in Africa can facilitate structural upgrading and empower building of industrial capacity. The collaboration also gives Africa increased bargaining power with other bilateral partners. However, they caution that the FDI-receiving countries should adopt robust and independent industrial policies to leverage for more technology transfer and capacity-building assistance.

In comparison to trading with the OECD economies, Fu et al. (2015) found that trade with China yielded greater productivity effects on manufacturing firms in Ghana. The authors argue that internationalisation via trade opens up effective channels for firms in African countries to achieve productivity progress. By engaging in the global production chain, local firms can better access advanced technologies, for example applying the imported machinery and equipment into local production, bringing technology embedded goods and services, getting technological assistance from foreign suppliers, as well as learning through disassembling the imported products. Therefore, high intensities of exports and imports between China and Ghana greatly contribute to the productivity increase of Ghanaian companies (Fu et al., 2015).

Moreover, Fu et al. (2015) prove that trading with countries that share similar production capabilities stimulates stronger productivity effects because of the closer technological distance. Firm-level and trade-based industry-level datasets from Ghana show that China and other emerging economies are likely to provide goods and services that are more accessible to local companies and thus allow them to upgrade their technological capability. Similar findings are highlighted by Darko et al. (2018). A smaller technological gap between China's capital goods and African production capacity would have the potential to make China's equipment more suited to the African market. Despite the technological gap being relatively small, as noted in the following sections, gaps between Chinese and African companies are still a major obstacle for knowledge transfer.

Other studies find that increasing trade openness with China does not appear to result in the transfer of technology that increases firm-level productivity. In some instances trade openness with China appears to have a negative effect on the total factor productivity[3] of African firms (Elu and Price, 2010). Chinese FDI, on the other hand, appears in some instances to have a positive and

3 Total factor productivity measures output per unit of total inputs (typically capital and labour).

significant effect on the growth of firm-level total factor productivity (Elu and Price, 2010).

3.4. Wages and livelihoods

Workers' wages and livelihoods constitute an important part of economic transformation, as these should reflect increases in productivity. This is also one of the critical points raised in relation to employment in African labour markets.

Wages paid to the African employees by Chinese firms are a main area of concern. Findings suggest that workers' remuneration is decided by multiple factors among the Chinese firms, too. Surveys by Oya and Schaefer (2019) showed that wages depended on the workers' skill levels, job tenure, work experience, socioeconomic status, and also the sector and location in which they worked. Once these were taken into account, the wages paid by employers from China and from other countries was quite similar. Depending on the socioeconomic context, Chinese firms offered additional benefits like dormitories and meals, which increased the African workers' real incomes. Such measures are not seen in companies of other origins. Several hi-tech companies like Huawei and ZTE pay very competitive salaries to attract local talent (Tugendhat, 2020). Performance-based pay was adopted by some Chinese companies to motivate African workers (Schoneveld et al., 2018; Tang, 2019b; Xia, 2019b). Yet, many employees still preferred steady income to a piece-rate scheme, as their productivity could not guarantee high bonuses. All the related reports consistently demonstrated that the wage of African workers is decided by the local labour market. In comparison to skills, work experience, job tenure, sector and other effects, the origin of a firm did not have a significant independent effect on employees' income.

Compared to other foreign firms or African local firms, the Chinese companies tended to employ poorer workers with less education and experience, often coming from rural areas. While the migrant workers got lower salaries, they were sometimes complemented with additional 'social wages' consisting of accommodation and food, which allowed these workers to keep their expenditure lower and save money for their family back in their villages (Oya and Schaefer, 2019). Xia (2019b) also found cases of Chinese employers providing micro-loans to their local employees for emergency assistance. All researchers confirmed that Chinese companies provided wages well beyond the poverty wage, but the relatively high living costs in urban areas posed challenges for African workers, especially migrants. In addition, new African workers were said to leave work easily after salary payment and spend all the money before coming back, according to Chinese managers. Therefore, the livelihood of many unskilled and semi-skilled employees did not see significant improvement.

Similarly, the income of contract farmers was also influenced by multiple factors, and did not demonstrate a clear trend upwards with increasing Chinese investments. Although Chinese firms brought in new varieties of seeds and reasonably priced chemicals, crop yields also depended on the weather and natural conditions. Further, fluctuating market prices rendered monetary income from product sales unpredictable. In this context, Chinese investors stressed the reduction of financial risks for both the farmers and the companies. They introduced technologies that 'produce more with less', such as delinted seeds and low-cost herbicide, instead of using expensive inputs to foster productivity (Tang, 2019c). Chinese firms also accelerated payment for the cotton farmers in Southern Africa. Hence, out-growers for Chinese companies were less indebted even though their overall income did not grow remarkably (Weng et al., 2018).

However, low-cost business models adopted by Chinese and other enterprises may have negative socio-environmental implications in the long run. Studies on agriculture, forestry and mining in Southern Africa (Cerutti et al., 2018; Schoneveld et al., 2018) concluded that less efforts were spent on ecological preservation and maintaining safeguards by the new foreign investors, causing gradual decline of the natural resource base and biodiversity. High occupational hazards and strenuous working conditions were also reported in Chinese enterprises, but were generally on a par with sectoral average (Weng et al., 2018; Oya and Schaefer, 2019).

4. Africa's economic transformation and Chinese investment: the macro evidence

This section focuses on the role that Chinese firms have played in their host countries' economic transformation at the macro level, broadly corresponding to the 'between sector' or 'structural transformation' component of the economic transformation equation. We look at whether engagement with China drives fundamental transformation in African countries' economic structures, contributing to the creation and growth of more productive sectors of the economy. We understand that the trends of Chinese investments vary in different African countries depending on their respective political-economic contexts. Therefore, some findings are limited to specific countries.

4.1. How macro-shifts in China influence economic transformation outside China

One of the driving forces of Chinese engagement in Africa, namely the outward movement of Chinese firms and capital from the early 2000s onwards, is China's economic and political context. Here we review how it shapes Chinese outward investment, and thus the role played by the country in economic transformation in Africa and other regions.

China's influence in Africa is closely related to China's own economic structure and transformation. Labour-intensive manufacturing sectors in China face pressures, mainly due to rising wages, informalisation of labour practices and weakening of labour's power (Hou et al., 2017; Qi and Pringle, 2019). Growing labour costs in a slowing-down economy is the main driver for Chinese enterprises to invest in other developing regions like Africa. A survey of 640 manufacturing firms within China (Xu et al., 2017) confirmed that rising wages pressurised the industry to seek change urgently. However, researchers have different opinions as to how China's industrial transformation will impact the African continent. While Lin and Xu (2019) are optimistic that the unparalleled scale of relocation of Chinese manufacturing could foster Africa's industrialisation, other studies contend that country-level constraints in Africa such as poor infrastructure are so daunting that most Chinese producers prefer other relocation destinations or alternative strategies like technology upgrading (Xu et al., 2017). Others point out that industrial relocation often takes place within China (Ang, 2018). DEGRP research also suggests that only a small portion of Chinese investments in Africa was motivated by relocating production capacity from China, and that most of the Chinese firms were new investments, often for the domestic market (Wolf and Cheng, 2018a; Tang 2019a; Xia, 2019a; 2019b). This confirms earlier findings by Kaplinsky et al. (2007).

Comparing empirical evidence worldwide, Fu and Buckley (2015) point out that Chinese investments in lower-income countries has a positive and significant impact on their long-term economic growth, but the growth impacts vary as they are based on multi-dimensional complementarity between Chinese investments and host country conditions, in terms of financing, knowledge, resources and the status of competition. Chinese investments contributed most significantly to economic growth in Africa and, to a lesser extent, in Asia, whereas the influence on Latin America was insignificant. As developing economies are often constrained by the lack of one or more inputs for production, complementary investments can bring necessary productive factors so that the host countries can make use of other factors, for example labour, land or resources, to create effective productive capacity.

The same study also looked at the impacts of Chinese projects in resource-rich and non-resource-rich countries. While the former can see an immediate fast growth created by collaboration with China in the short run, the growth effect of Chinese investments in the latter is even larger in the long run. This is because technologies and business models used by Chinese enterprises are more suitable for labour-

abundant countries than resource- or capital-rich ones (Fu and Buckley, 2015).

Lo (2018) suggests that Chinese investments, unlike speculation-oriented capital from the high-income economies, primarily aim to promote productivity both domestically and in other low- and middle-income countries. Thus, the arrival of Chinese enterprises does not lead to financial exploitation of Africa, but enhances production capacity in the host countries. Yet, the positive impacts eventually depend on the extent and pace of China deepening its industrial capabilities as well as diversifying into productive sectors and activities up the industrial value chain. However, some scholars are concerned that competition of Chinese imports is contributing to deindustrialisation of African countries, squeezing local firms out of the market (Edwards and Jenkins, 2015; Jenkins, 2018). The counter view argues that Chinese imports' competition positively impacts African firms' performance, stimulating them to increase productivity, upgrade skills and use higher quality inputs sourced from China (Darko et al., 2018; Fu et al., 2015).

Besides the direct impacts, China can exert an indirect impact by affecting global commodity prices. For example, China's increased demand for minerals, metals and natural resources can affect global prices. Higher prices and higher demand for natural resources can prompt the sharp inflow of foreign currency, leading to currency appreciation and making the country's other products less price competitive on the export market (a phenomenon known as 'Dutch disease'), leading to de-industrialisation. Signs of this are identified in West Africa, where the commodity boom linked to increased Chinese demand was accompanied by stagnation in the agricultural and manufacturing sectors (Pigato and Gourdon, 2014); but other studies challenge the idea of Dutch disease being prompted by trade with China (Berthélemy, 2011). If, however, the inflows of foreign currency are matched by an increase in imports because financing is tied to imports from the creditor country; and if foreign labour is brought into the country to perform work, the pressure on wages and inflation should be minimal (Christensen, 2010).

Zafar (2007) calculates the relative contribution of China to the growth in global demand and consumption growth for African export commodities from 2000 to 2005, and assesses China's overall impact on the terms of trade (ratio of export prices to import countries) for each country. The results show oil exporters and resource-rich countries such as Angola, Sudan and Gabon to be benefiting from China's increased demand; countries that are oil importers and agricultural or textile producers such as Madagascar, Ethiopia and Côte d'Ivoire are losing out; and countries that import oil but export other natural resources experience mixed results. Other impacts could come through foreign exchange channles: as China holds large US dollar reserves, it has an impact on the dollar, to which the currencies of several African countries are pegged (Zafar, 2007).

4.2. Sectoral transformations

One of the most relevant aspects of Chinese engagement in Africa's economic transformation is the impetus it can give to the creation or expansion of high-productivity sectors of the economy, thus contributing to structural transformation.

Wolf and Cheng (2018a) suggest that Chinese investments in Africa are mainly in construction, mining and manufacturing sectors. They play an important role in helping host countries accumulate foreign reserves and facilitating technology transfer in these sectors. They find that 'flying geese' type relocations of labour-intensive industries constitute only a part of Chinese manufacturing investments in Africa, Ethiopia being one example. In fact, the majority of Chinese firms in manufacturing and construction sectors are not about relocation from China, but rather are new investment targeting the domestic market in African countries. The case of Angola shows that Chinese investments contribute to the diversification of an economy heavily dependent on extractive activities. Wolf (2017) and Wolf and Cheng (2018b) further investigate how construction projects conducted and often financed by China have created profitable markets for building materials and spurred the production of building materials in African countries. They argue that the construction

LIGHT RAIL VEHICLE, ADDIS ABABA, ETHIOPIA, 2015.
PHOTO CREDIT: TURTLEWONG

boom in Africa has been gaining importance in the economic dynamics there, contributing to production capacity, generating business interests and inducing investment demand in backwardly linked building materials manufacturing, and thereby generating some opportunities for much-desired economic diversification in Africa.

Chinese firms do not only play a direct role investing in highly productive sectors. They also engage indirectly, contributing to filling Africa's infrastructure gaps and therefore helping to unblock supply-side bottlenecks. China has played a particularly formative role in developing the energy-generating capacity of the continent. Evidence suggests that Chinese funding bodies were financing critical infrastructure that other funding bodies were reluctant to finance. This is because Chinese funding sources employ a different method of cost–benefit analysis, which follows the logic of 'building ahead of time'. The growth of building materials manufacturing normally started with products that are costly to transport, such as cement and steel. Chinese firms are both clients and investors in these new sectors, driving strong industrial expansion during the past decade (Wolf and Cheng, 2018b). Likewise, Chinese investment and financing for telecoms projects substantially accelerated the construction of Africa's mobile networks and supported the fast-growing sectors of e-commerce, software and app development (Tugendhat, 2020).

Weng et al. (2018) demonstrate that the rural economy in Southern Africa experiences remarkable transformations with increasing Chinese activities in several primary sectors. According to Kabwe et al. (2018), the arrival of Chinese and other Asian investors caused disruptive structural changes in the cotton sector, favouring low-cost models and crowding out

traditional Western and local state-owned firms. In the forestry sector, Cerutti et al. (2018) reveal that the demand from China alone created the *mukula* (rosewood)-exporting business, which was non-existent in Zambia before, driving the development of the value chain from harvesting and processing to trading. Likewise, Schoneveld et al. (2018) show that small- and medium-sized foreign investors, often of Chinese origin, participate increasingly in Tanzania's artisanal and small-scale mining of gold and copper, bringing in much-needed capital, technologies and know-how. Not only did the investors improve performance of the mature gold-mining sector through production upgrading and formalisation, but the opportunities of the Chinese market also played a pivotal role in nurturing the new copper-mining sector.

However, in all cases, the sectoral transformations give rise to challenges to existing governance regimes. New business strategies used by Chinese and other actors require corresponding changes in regulation, inspection and supportive coordination. If relevant authorities do not make timely adjustments, the positive impacts on the sectors in the short run may increase social and environmental risks in the long term and potentially lead to industrial collapse (Weng et al., 2018).

4.3. Sector-level spillovers

Sector-level spillovers refer to the spillover effects of Chinese investment on the development of economic sectors, including clustering and agglomeration.

An important characteristic of Chinese investments in Africa is that the Chinese enterprises tend to invest in groups, either by sector or geographically. This unique pattern has generated impacts on sector-level development and industrial policies in Africa (Brautigam and Tang, 2014; Tang 2019a). Chen et al. (2016) identify a handful of Sino-Nigerian cooperation zones. Keyi Tang (2019) depicts how the Eastern Industrial Zone, which was established in 2007 outside Addis Ababa, provided an eye-opening experience for policy-makers in Ethiopia to observe the role of industrial parks in attracting FDI and promoting early-stage industrialisation. Consequently, the Ethiopian government launched its own zone programme. Chinese SOEs undertook most of the construction work of Ethiopia's newly established industrial parks and helped with their operations. Learning from China's development experience, the Ethiopian industrial zones concentrate first-class facilities, streamlined administration and preferential policy to attract investors to foster selected industrial sectors (Auffray and Fu, 2015; Xia, 2019b; 2019a). Labour-intensive manufacturing investments that can employ large numbers of local workers and earn foreign exchange through export, for example garment and footwear making, are particularly targeted. As China dominates these sectors globally, investors from China also make up many of the first tenants to settle in the zones. Similarly, Chinese investors have also become lead manufacturers in the zones in Kenya, Tanzania, Rwanda, Ghana and Nigeria (Auffray and Fu, 2015; Xia, 2019a; 2019b).

Apart from physical zones, Chinese investors often concentrate in certain industrial sectors when opportunities materialise. Investment concentration facilitates interconnections and competition between the enterprises and forges the build-up of value chains in host countries, thus reducing transaction costs and raising productivity of the entire sector more quickly (Tang, 2019a). Wolf and Cheng (2018a) show that Chinese firms are willing to incur short-term losses in order to become more cost-effective or to penetrate the domestic markets in Africa. This business strategy offers opportunities for African countries to boost both production capacity and consumer markets, which have been largely underdeveloped so far due to limited supply and high costs of imported products.

Fu et al. (2015) points out that the spillover effects may depend on industry heterogeneity in host countries. The learning effects tend to be greater in traditional industries to which more resources are allocated in relative terms. The traditional industries in Ghana, such as food, furniture, garment, textile and wood, were found to benefit more from trade with China than the non-traditional industries, which suffer from scarce technology and production resources.

4.4. Building a workforce for a transformed economy

This section has shown how Chinese investments in Africa have contributed to structural transformation by promoting the creation and expansion of productive sectors. However, attracting resources, in particular labour, to these sectors is not easy. Much of the discussion is driven by the idea that, once jobs are available, the unemployed or underemployed will be able to fill them. However, the DEGRP research shows that this is far from straightforward.

Oya (2019a) focuses on the role of Chinese investments in building Africa's industrial workforce. As African workers move from low-productivity agricultural or informal activities to standardised factory jobs, their transformation is not automatic. It depends on the interaction between local, national and global contexts. Hence, the arrival of numerous Chinese investments considerably shapes the process of incorporating the host countries into dynamic global production networks. Situated in the historical context of global industrialisation, Chinese firms belong to the capitalist drive that seeks productivity growth in Africa's underdeveloped markets. Similarly, Lo (2018) argues that Chinese investments in the low-income countries primarily aim to promote productivity rather than seek capital gains, therefore, they are more eager and effective to expand the labour force in these countries to meet the demand of growing industrial production.

Oya and Schaefer (2019) use studies from Angola and Ethiopia, which have received substantial Chinese FDI and contracted projects in recent years, to demonstrate concretely how workforces grew together with economic transformation and international collaboration. The surveys find that Chinese firms contributed the lion's share of newly created jobs between 2013 and 2018 in both countries, accounting for over 60% of new jobs in some years. As Chinese investments concentrated in high-productivity manufacturing and construction sectors, they were able to attract local labour from low-productivity subsistence activities. Corresponding labour regimes, such as labour recruiting methods, the organisation of labour in production and the provision of livelihoods need to be adjusted to ensure the stabilisation and productivity of these new workers from rural areas. Chinese enterprises significantly influenced these emerging labour regimes with their arrangements, for example dormitories for migrants, and work culture, such as their ethos of 'eating bitterness' (the capacity to endure hardship) and valuing 'collective asceticism' over individual careerism.

However, Oya (2019b) rejects the widespread claims of 'Chinese exceptionalism', which assumes one unique 'labour regime' of Chinese investors. It is crucial to take the diversity of 'Chinese capital' into account, such as ownership and sector difference, for a more precise understanding of their impacts on Africa's labour market. In addition, particularities in state/society-capital relationship and labour market conditions in each African country should also be considered. For example, the globally integrated Chinese manufacturers in Ethiopia required the creation of a more dynamic and formalised industrial workforce than that required by the factories oriented to the Angolan domestic market. No 'exceptionalism' regarding the origin of investors is discovered. Rather, various paths of building an industrial workforce are determined by the political economy of accumulation and African societies' response to the global capital drive. In addition, new labour–capital conflicts arose with expanding industrial capitalism. It is also a global pattern that the relocation of capitalist production systems is accompanied by the relocation of labour–capital tensions.

5. Politics and institutions

Sections 3 and 4 have shown that Chinese investment contributed to increasing productivity and developing linkages in existing sectors, although sometimes to a limited extent, and to the creation of new productive sectors. The findings highlighted in these sections need to be read in relation to the context in which they are situated. Many of the studies conducted under DEGRP found that local institutions shape the ways in which countries and stakeholders within countries benefit from foreign investment, determining 'winners' and 'losers'.

In some cases, the arrival of Chinese investors and firms does little to change existing relations, structures and sectoral conditions. In the mining sector in Tanzania and forestry sector in Zambia, African small-scale miners and loggers were already in a legal grey area prior to the arrival of the Chinese investors. The negative impacts that these communities faced were attributable to their pre-existing conditions and the general weaknesses of the legislations that were meant to support them rather than to the arrival of the Chinese investors (Cerutti et al., 2018; Schoneveld et al., 2018; Weng et al., 2018). Oya and Schaefer (2019) highlight that labour market outcomes in Ethiopia and Angola depend not only on the Chinese firms, but also on the government regulations around labour regimes.

In some cases, Chinese engagement just forms the backdrop against which action takes place. For example, in their analysis of the oil sector in Ghana, Mohan et al. (2017) discuss the conflict among the government and the political opposition revolving around the oil sector. While a potential deal with a Chinese oil company is part of the backdrop to this discussion, this is almost irrelevant – the most important factors in determining the outcomes of the dispute are the interests and ideas of the two political coalitions.

In other cases, the existing power relations and incentive structures, or the capacity constraints at government level, shape the outcomes of Chinese engagement. Studies looking at the mining, agriculture and forestry sectors observed that the regulatory agencies' monitoring and enforcement capacities were hugely constrained, especially on the ground, close to where rural production happened. Moreover, the incentive structures led many policy officials to incline towards sustaining the existing policy-practice gaps (Cerutti et al., 2018; Kabwe et al., 2018; Schoneveld et al., 2018; Weng et al., 2018). These studies show that not only national and local governments, but in some cases also traditional authorities, play an important role in determining who benefits from Chinese investment, and how. For example, in Zambia's forestry sector, traditional authorities have control over the land and wood resources, and they also act as financiers, traders and mobilisers of cutters from local communities (Cerutti et al., 2018).

While emphasising the importance of the host country context, the research also highlights the need to understand the Chinese context. China's 'state capitalism' (Musacchio and Lazzarini, 2016; Naughton and Tsai, 2015), domestic issues and policies shape the country's outward engagement in ways that are important for African countries. For example, Chinese models of financing infrastructure differ from those of Western countries in that the Chinese financiers (often government or state-owned entities) retain more control over the capital. In this way, Chinese capital does not seek short-term returns, and is more suited to longer-term development. Chinese financiers have a higher tolerance to risk, further aided by government subsidies. This model relies heavily on policy banks whose additional objective is to create markets for Chinese goods and services. In this sense, Chinese infrastructure deals are both economic and geopolitical, bringing together policy considerations while at the same time creating markets (Mohan and Tan-Mullins, 2019).

In some countries, political elites leverage Chinese-financed and -built infrastructure to bolster support for their own coalitions, as the projects are often quickly signed off and executed allowing these elites to gain consensus.

However, in some cases, the benefits of these infrastructure projects may be limited to those in power. Looking at two case studies in Ghana and Cambodia, Mohan and Tan-Mullins (2019) note that the infrastructure projects are spatially quite enclaved, with limited local content or exposed to limited competition. This may bring benefits to the elites, but not necessarily to the population.

Despite these differences, the DEGRP research also highlights that much of China's engagement with Africa follows similar trends and dynamics to that of other countries. This holds true for the private sector in particular. Research conducted in Angola and Ethiopia shows that, in terms of their labour market outcomes, Chinese firms behave in ways that are largely similar to other foreign firms, refuting claims of 'Chinese exceptionalism' (Oya and Schaefer, 2019). Similarly, a study on the mining sector in Tanzania highlighted that the behaviour of Chinese firms is similar to that of other new entrants in the market (Schoneveld et al., 2018). These case studies suggest that a company's nationality is not a useful predictor of its business behaviours.

In sum, the ways in which Chinese firms operate need to be read in conjunction with the political and economic context in China, which contributes to shaping the incentives of these firms to 'go out' and how they do so. On the other hand, how Chinese firms engage with actors in Africa is often very similar to other foreign firms, as are the outcomes of this engagement.

Finally, one important issue that much DEGRP research touches upon is that of corruption. Corruption manifests itself in different ways in each country and context (Gaggero et al., 2018). The weak monitoring and enforcement capacities of many African governments in rural areas also mean that the governance framework is prone to abuse by foreign investors and rent-seeking local political and economic elites. The issue of corruptive practices was often mentioned in research conducted in the mining, agriculture and forestry sectors, but it was not found to be specific to the Chinese investors. Chinese and other foreign investors, as well as local traders and fixers, were found to be engaging in bribery (Weng et al., 2018). The same studies found that what differentiates some Chinese companies is the speed and openness with which the Chinese investors offered bribes to settle issues related to non-compliance; Chinese firms interviewed for the studies feel that they are simply adapting (Schoneveld et al., 2018; Weng et al., 2018).

LOCAL AND CHINESE WORKERS ON A CONSTRUCTION SITE IN KILAMBA, ANGOLA, 2019. PHOTO CREDIT: DAVIDE SCALENGHE

6. Conclusions, policy recommendations and research gaps

Research commissioned under DEGRP has led to relevant and path-breaking analysis that has enabled a better, more nuanced understanding of – and has provided rigorous evidence for – China's role in Africa's economic transformation. DEGRP projects developed new and ground-breaking findings, and also shed light on and contributed to a better understanding of existing evidence. This synthesis has highlighted the following main findings.

- The DEGRP research strengthens existing evidence that Chinese firms investing in Africa contribute to substantial job creation for African workers, with high localisation rates. Most of the jobs created are at the low- and semi-skilled levels. The research finds that the numbers of jobs created and the extent to which they are localised vary according to country- and sector-specific characteristics, but overall, the contribution to job creation is considerable. In this respect, the DEGRP research brings in a strong comparative perspective, exploring these questions in relation to different countries, sectors and types of firms, and comparing Chinese and non-Chinese firms.
- Chinese companies are found to build the skills of host countries' workers. Chinese companies usually provide some form of training (to varying degrees of formality), but more complex, technical and managerial tasks often remain in the hands of Chinese workers. Comparative research found no difference in managerial knowledge transfer between Chinese and European firms.
- Horizontal spillovers do take place, to a limited extent. For African firms, absorbing the technical and managerial skills of their Chinese counterparts remains a challenge. This is linked to the limited labour mobility of managers and workers with technical skills, and also to limited access to capital.
- In terms of vertical spillovers, the DEGRP research shows that vertical knowledge transfer through building backward and forward linkages is more effective than horizontal transfer through demonstration and competition. While longer-term supply or subcontracting relationships would be highly beneficial to increase productivity of African firms, we see few examples of such relationships. Similarly, more established partnerships, such as joint ventures between African and Chinese firms, are the exception rather than the rule. This finding is very valuable in terms of our understanding of China's role in Africa's economic transformation, as vertical spillovers are among the main channels through which foreign investment can improve productivity in host countries (te Velde, 2019).
- In terms of remunerations and workers livelihoods, the DEGRP research shows that wages paid by Chinese firms are, on average, not different from those paid by other firms. In some cases, Chinese firms are found to offer non-wage benefits to workers, such as accommodation or financial support.
- The effects of Chinese engagement on African livelihoods, in particular in the informal sector, are not always positive. Here, the negative effects tend to emerge not only in the relationship with Chinese stakeholders, but also with other foreign and domestic firms, as well as with local authorities. The DEGRP research contributed to our understanding that the way Chinese firms engage in Africa is not unique, but rather shared with other emerging players. This points to the weakness of the sector in supporting livelihoods and calls for solutions at the sector/host country level, rather than targeting Chinese firms.
- At the macro level, the DEGRP research highlighted that Chinese investment tends to contribute to increased economic growth, in particular through investment in productive sectors (manufacturing). In some cases, it also contributes to the strengthening of existing sectors (construction material manufacturing) or the creation of new ones (rosewood in

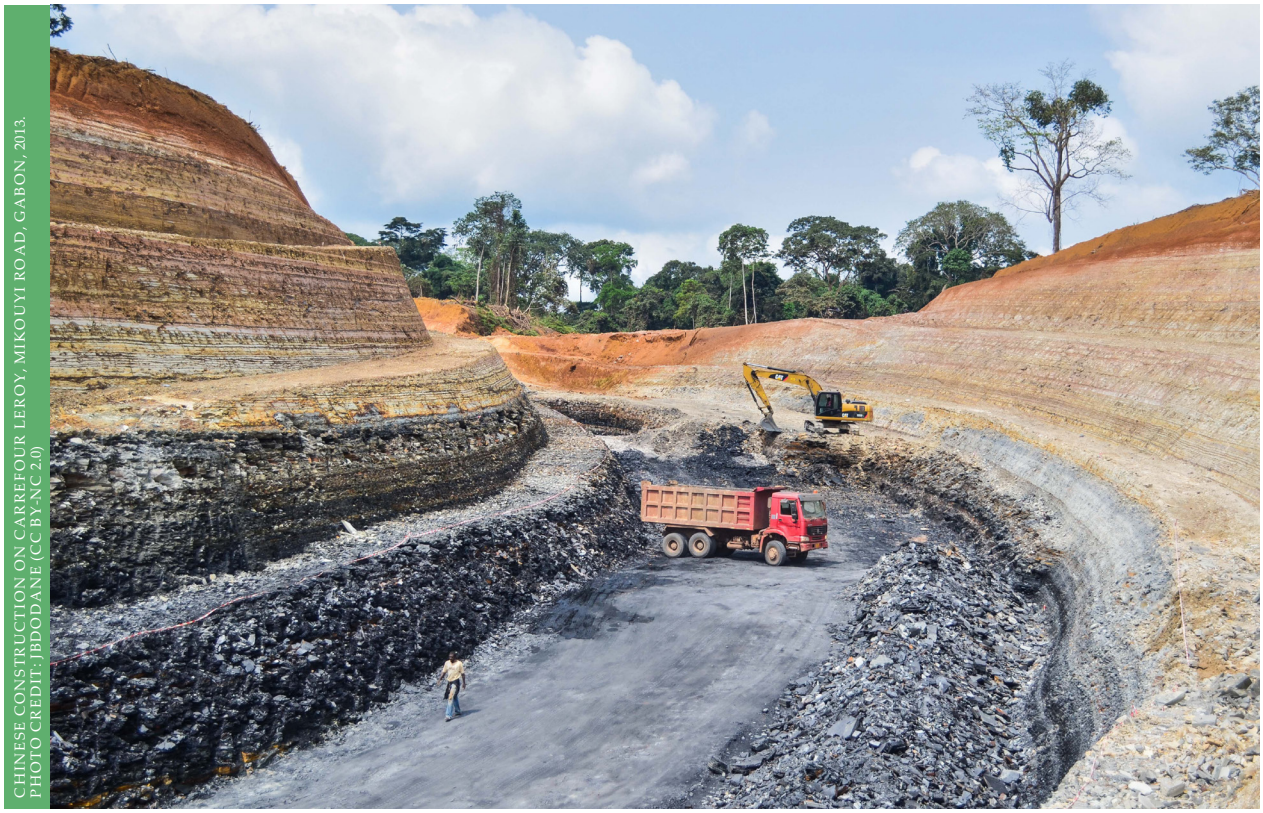
Zambia). While the contributions of Chinese firms to Africa's industrialisation has been widely discussed (Qobo and le Pere, 2018; Lin and Xu, 2019), the DEGRP research highlighted how Chinese engagement can contribute to the creation of new sectors in unexpected ways.

- Many of the studies conducted under DEGRP confirmed that Chinese investment in African countries is, broadly speaking, predominantly market-seeking, rather than export-oriented; confirming earlier views on the matter (Kaplinsky et al., 2007). This suggests that African countries are not seen by Chinese investors as low-cost destinations to produce for third markets, but rather as viable markets in their own right. Therefore, it seems that the contribution of Chinese investment is not in boosting Africa's exports, but in providing wider access to cheaper goods for African consumers.
- Chinese financing can contribute to unblocking the bottleneck to economic growth. By contributing to infrastructure building, it promotes the creation of further economic activity and generates spillovers. A good example of this is the construction of digital infrastructure in many African countries, as well as the construction of transport and energy infrastructure and industrial parks.
- Trade with China seems to have mixed effects on economic transformation in African countries. Increased exports of commodities seem to have favoured commodity exporters, but also to have contributed to cases of Dutch disease in certain parts of the continent (notably West Africa). Consumer goods imported from China have competed with, and negatively affected, African industries; but in some cases, they have also spurred healthy competition. Imports of machinery from China have also contributed to boosting economic activity in Africa.
- The DEGRP research contributed to showing that economic transformation is a complex process, requiring many components to work at the same time. The movement of resources, in particular labour, from low- to high-productivity sectors, is influenced by specific country and sector conditions that need to be addressed concurrently.
- Finally, the DEGRP research strengthened our understanding that the research findings are shaped by the context in which they take place, and by the characteristics of the stakeholders involved. This is two-fold: on the one hand, the local context of the specific African countries needs to be understood; on the other hand, the specific characteristics of the Chinese firms, investors and financiers, their drivers and their modus operandi also need to form part of the analysis.

Overall, the DEGRP research contributed to strengthening our understanding of the way Chinese stakeholders operate and engage in the African context, their differences and similarities with other firms. The ways in which Chinese firms operate need to be read in conjunction with the political and economic context in China, which contributes to shaping the incentives of these firms to 'go out' and the way in which they do that. On the other hand, how Chinese firms engage with actors in Africa is often very similar to other foreign firms, and so are the outcomes of this engagement.

The research has major implications for policy. We discuss the main points for consideration by policy-makers and donor agencies:

- **Creation of linkages requires targeted support.** While job creation is taking place, African firms are finding it difficult to create linkages with Chinese firms. Policy-makers would need to create mechanisms and policy tools to promote the creation of these linkages between African and Chinese firms, building their capacity to work with each other.
- **Foster development along the value chain instead of isolated projects.** Studies showed that vertical knowledge transfer through building backward and forward linkages is more effective than horizontal transfer through demonstration and competition. Therefore, policy attention should be focused on linking FDI projects with upstream and downstream local businesses, as it will contribute more to elevation of local capacity as well as help foreign investors to stay for a longer



CHINESE CONSTRUCTION ON CARREFOUR LEROY, MIKOUYI ROAD, GABON, 2013. PHOTO CREDIT: JBDODANE (CC BY-NC 2.0)

period in the country. There exist successful examples of this in the agricultural field, in particular in DFID's Working in Partnership for Agricultural Technology Transfer (AgriTT) project, focused on multilateral cooperation in technology transfer between the UK, China, Uganda and Malawi (Buckley, 2017).

- **Consider supporting joint ventures and other longer-term partnerships.** The research has shown that, while joint ventures and other longer-term forms of collaboration between Chinese and African firms have strong potential, these are rare occurrences. Supporting such partnerships could be a useful way to strengthen knowledge transfer.
- **Build managerial skills and encourage labour mobility.** Chinese firms support skills development for low- and semi-skilled workers, but higher technical and managerial skills are still not present. Of these, the latter seems a priority, as this would not only support business but also spillovers. In the case of Bangladesh, the rapid growth of the ready-made garment sector was due to the spread of skilled workers and managers, highlighting the importance of labour mobility (Balchin and Calabrese, 2019). Similarly, labour mobility could be encouraged in African countries.
- **Regulation to avoid malicious competition.** As Chinese investors often disrupt existing market practices with new business models, local authorities should enhance governance and regulation to maintain healthy market orders, for example, setting requirements for socio-environmental duties and adopting sector-level minimum wage policies. Without corresponding regulation, fierce competition may lead to a 'race to the bottom'.
- **Understand and target investment from China**. Beyond creating a good investment environment for all FDI, some research suggests there are specific factors that are important to target in attracting FDI from China. Targeting is a necessary complement to general enabling policies. The DEGRP research has shown that, in general, Chinese investment is seeking access to domestic markets rather than chasing low costs for exports. Targeted investment promotion should take this into account and consider opportunities in domestic markets.

- **Focus on aftercare and maintaining a good investment environment to keep investors in the country.** Chinese firms prove to have strong motivation to invest in Africa because of rising costs at home and/or interest in the local market, but the harsh investment environment and constantly changing policies have often frustrated Chinese investors in Africa. This has also contributed to a negative reputation that has kept other potential investors away. Being investor-friendly will help African countries retain investment.
- **Support livelihoods by targeting the informal sector.** The informal sector in many African countries provides livelihoods to many people and contributes a significant proportion towards national economies. Rather than focusing on the specific groups of foreign investors, measures to improve the livelihoods of those operating in the informal sector need to target the entire sector/ value chain.

The DEGRP research has also highlighted areas that require further investigation in the future:

- Resilience of the current economic models. Current modes of engagement through value chains, relying on (sometimes footloose) investment may leave countries vulnerable to shocks. One shock or crisis, such as the Covid-19 pandemic, may undo years or even decades of growth and progress. How will the pandemic affect value chain integration between China and Africa? What modes of engagement would create more resilient economic growth?
- The importance of creating linkages is well understood, but more evidence is needed on why this may not happen, and even more importantly, on what makes it happen. What are the policy, investment and sectoral conditions that stimulate the creation of linkages, and how can these be replicated? What are the factors that discourage Chinese firms from entering into joint ventures in the African context? Which countries can we learn from?
- The DEGRP research has achieved considerable progress in creating comparative evidence, highlighting how features that were thought to be unique to Chinese investors were in fact common to a wide array of investors. This suggests that further comparative research, for example on linkages, financing infrastructure, skills, etc., would be valuable in building evidence to inform policies. In particular, it could be interesting to identify comparable Chinese firms operating in different countries and geographies.
- Comparative research could also consider the role of industrial parks and special economic zones in Africa. Are Chinese special economic zones more successful than previous attempts to develop industrial parks in the region? If so, what are the factors of this success?
- China has been undergoing dramatic economic transformation with booming online businesses. The influence of the digital 'new economy' has reached Africa, as tech firms from Huawei and ZTE to Alibaba, OPay and Kilimall, are rapidly entering African markets. Not only do they bring millions of dollars of capital to improve telecoms infrastructure, they also create new business opportunities for numerous local small- and medium-sized enterprises and individuals.

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