

What Kinds of Chinese ‘Geese’ Are Flying to Africa? Evidence from Chinese Manufacturing Firms

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Abstract

This paper provides a preliminary analysis of the nature of Chinese manufacturing investments in Africa, focusing predominantly on four countries – Ethiopia, Ghana, Nigeria, and Tanzania – but also including examples as illustrations from other countries, when appropriate. Drawing on fieldwork conducted between 2014 and 2015, the paper explores the varieties of existing Chinese manufacturing investment and the sectors into which Chinese companies are investing. We demonstrate in this paper that Chinese manufacturing investment in Africa is indeed expanding rapidly, yet the official data on investment approvals, both in China and in African countries, significantly overstates the actual number of investments in operation. Several investors do fit the model of Akamatsu’s ‘flying geese’: large firms seeking new locations for production as part of global networks and value chains. However, we also identified three other kinds of ‘geese’: large, strategic, local market-seeking geese; raw material-seeking geese; and small geese travelling together in flocks. The different kinds of firms offer different kinds of development opportunities and challenges for structural transformation in Africa.

Key words: China, Africa, industrial development, structural transformation

JEL classification: F60, L21, L60, P2

1. Introduction

‘Manufacturing in Africa,’ *The Economist* wrote in 2016, ‘is only for the brave.’ Africa’s failure to industrialise has created a significant challenge to the continent’s sustainable development prospects. The impact of a rising China on African manufacturing has appeared to be an additional burden, as local firms struggled to compete with imports of cheaper manufactured goods. Around 2005, however, costs of production in China’s coastal factory belt began to rise. Pushed by costs and attracted by incentives for ‘going

global' provided by the Chinese government, China's labour-intensive companies began seeking production locations offshore. Several years later, as China's economy began to slow, overcapacity challenges created an additional incentive for companies to move to less competitive locations overseas. In late 2015, the Chinese government announced a series of new inducements to boost industrial cooperation between China and Africa.

While competition is clearly a factor, might Chinese firms also be catalysts for African manufacturing, transferring technology and diffusing skills much as Japanese and Western firms did when they shifted their factories overseas to cheaper Asian and Latin American locales? Japanese scholar Kaname Akamatsu described this shift as the 'flying geese' model: countries tend to be leaders or followers in particular parts of global value chains depending on their level of costs and skills (Akamatsu, 1962). Over time, however, a country's placement in the flock of geese relative to others shifts, and some low cost activities move permanently offshore, while the high value activities stay at home. In the United States, for example, Hollywood is a multibillion industry but the production of television sets moved overseas long ago.

There is some evidence that in the past, ethnic Chinese served as catalysts for industrialisation in Mauritius and eastern Nigeria (Bräutigam, 2003). Today, Chinese manufacturers could be a new generation of 'flying geese' or even, as Justin Yifu Lin puts it, 'leading dragons' (Lin, 2011). But have these Chinese factories begun to appear in Africa? What kinds of Chinese manufacturing investments are actually taking place? Are Chinese firms drawing Africa into global value chains and adding value to local raw materials? Or are they simply moving competition closer to Africa's own factory doors?

This paper provides a preliminary analysis of the nature of Chinese manufacturing investments, focusing predominantly on four African countries – Ethiopia, Ghana, Nigeria and Tanzania – but also including examples as illustrations from other countries, when appropriate. Drawing on fieldwork conducted between 2014 and 2015, the paper explores the varieties of existing Chinese manufacturing investment and the sectors into which Chinese companies are investing.

We demonstrate in this paper that Chinese manufacturing investment in Africa is indeed expanding rapidly. Several investors do fit the model of Akamatsu's 'flying geese': large, export-oriented firms seeking new locations for production as part of global networks and value chains. However, we also identified three other kinds of 'geese': large, strategic, local market-seeking geese; raw material-seeking geese; and small geese travelling together in flocks. The different kinds of firms offer different kinds of development opportunities and challenges.

2. Chinese firms and African manufacturing: what do we know?

What do we know about Chinese manufacturing investment in Africa? Some analysts and observers have argued that China's main role in African industry is likely to be through import competition. For example, in a 2008 paper, Kaplinsky stated that Chinese firms could start to set up factories in Africa, but '[so] far there is no evidence of this occurring' (Kaplinsky, 2008).

In fact, researchers have pointed to a long history of Chinese engagement in African manufacturing, through foreign aid projects but also direct investment (Bräutigam, 2003; Hong and Sun, 2004; Bräutigam, 2008; Song, 2011). These investments go back as far as

the 1960s, when several Shanghai and Hong Kong business families invested in Nigeria shortly after independence, later coming to dominate production of enamelware, plastic sandals, and building materials (Song, 2011).

In the early 1990s, Shanghai Textile Industry Bureau set up a company in Mauritius, Hong Kong-Shanghai Textile *Ltd.*, to export to the European Union, avoiding quotas that had been imposed on goods coming from China. By 1999, the market for black and white televisions in South Africa was dominated by products assembled locally by a Chinese firm, Shanghai Guandong Company (Wang, 2002). According to UNCTAD, which based its data on China's Ministry of Commerce, between 1979 and 2000, Chinese firms had already established 230 manufacturing investments in Africa (UNCTAD, 2007). South Africa received the highest share (83), but at least in the data, there was already a significant Chinese factory presence in Nigeria (33), Kenya (21), Mauritius (20), Ghana (17) and Zambia (17).

These investments accelerated after the turn of the millennium. A Chinese firm from Shanxi Province, Tianli, invested \$10 million in a Mauritius spinning mill in 2000. A private Zhejiang firm, Hazan Shoes, launched a new factory in Lagos in 2004 with a \$6 million investment; large Chinese tanneries opened in Uganda and Ethiopia (Brautigam, 2009). By 2005, 45% of Chinese firms with overseas investment plans surveyed in China for a World Bank study said that they were planning to invest in African manufacturing (Battat, 2006; MIGA-FIAS, 2007).

A small number of field studies of Chinese investment in Africa have also identified Chinese manufacturing firms. For example, a 2012 survey of Chinese companies operating in the construction, manufacturing and service sectors in Ethiopia found forty-five manufacturing enterprises out of a total of sixty-nine firms (World Bank, 2012). However, a similar study of forty-two Chinese enterprises in Uganda's capital Kampala identified only seven manufacturing firms (Warmerdam and van Dijk, 2013). Likewise, a 2014 survey of seventy-five Chinese firms in Kenya included only five manufacturing firms (Sino-African Center of Excellence, 2014).¹

Although Africa is clearly receiving investment from Chinese industrialists, it is difficult to obtain data on the value and scope of this manufacturing investment. While the Chinese government regularly publishes stock and flow data on the sectors of overseas investment globally (Figure 1), it does not publish this breakdown for particular regions. The data is sometimes released on an *ad hoc* basis. For example, an official Chinese publication noted that the stock of Chinese FDI in manufacturing in Africa by the end of 2012 amounted to \$3.43 billion, with over a third of this invested between 2009 and 2012 (State Council, 2013). A 2016 official report for the first time published data on sectoral breakdown of Chinese overseas FDI in different regions, which suggests that manufacturing is now the third largest sector of Chinese FDI in Africa, accounting for 13.3% of Chinese total FDI stock in the continent, or \$4,630 million in stock values (Table 1).

Both China's Ministry of Commerce (MOFCOM) and African investment approval agencies also have data on investment proposals and registered companies. Our review of MOFCOM data using United Nations Industrial Development Organisation (UNIDO) classifications suggested that 33% of MOFCOM registered companies investing in Africa

1 The survey team contacted 184 Chinese establishments in Kenya; 75 companies agreed to participate.

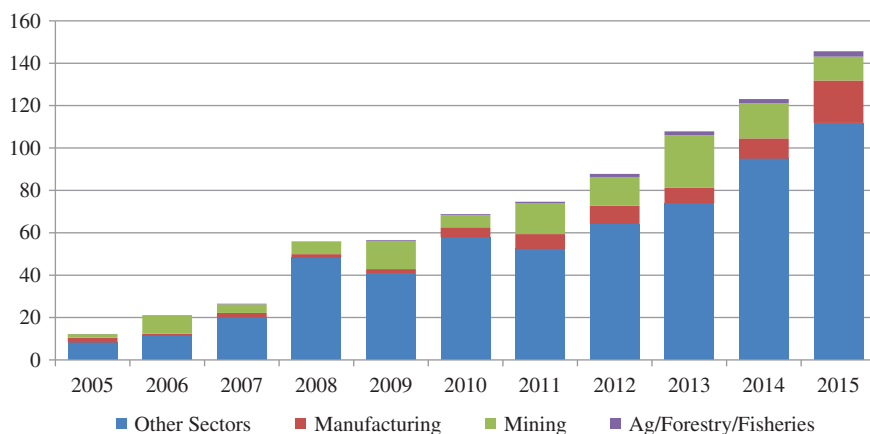


Figure 1: Chinese Annual FDI Outflows by productive sector (Manufacturing, Mining, Agriculture and 'Other'), \$billions, 2007–15.

Source: Based on data from National Bureau of Statistics of China (NBS) and Ministry of Commerce (MOFCOM), 2016.

Table 1: Top Five Sectors of Chinese FDI in Africa in Terms of FDI Stock by the end of 2015^a

Sector	FDI Stock (\$million)	Percentage in total FDI stock
Mining	9,540	27.5
Construction	9,510	27.4
Manufacturing	4,630	13.3
Financial Service	3,420	9.9
Science, Research and Technology Service	1,460	4.2
Total	28,560	82.3

Source: NBS and MOFCOM, Statistical Bulletin of China's Outward Foreign Direct Investment 2015.

^aMOFCOM, National Bureau of Statistics, State Administration of Foreign Exchange (SAFE), 2015 Statistical Bulletin of China's Foreign Direct Investment, September 2016, p. 22.

expressed interest in manufacturing activities (Xia and Brautigam, *forthcoming*). On the other hand, a study by Chen, Tang and Dollar using the same data coded only 20% as manufacturing (Chen et al., 2015).² However, a World Bank study of six African countries found that according to data provided by African investment approval agencies, 44% of all proposed Chinese investment projects were intended to be in manufacturing (Shen, 2015). These differences show the danger of using this data as anything more than preliminary and suggestive. As we show below, we found none of the databases to be at all accurate when it came to identifying Chinese firms that had actually made manufacturing investments in Africa.

What *kinds* of Chinese firms have set up manufacturing in Africa? What products are they producing? Are they targeting local (including regional) or export markets? Here the

2 The research assistant for this project searched the data for keywords, but apparently did not examine each investment in order to code using UNIDO coding.

evidence is very thin indeed. A survey conducted between 2006 and 2008 of forty-one Chinese firms investing in Nigeria, Ghana, Congo, Zimbabwe, South Africa and Zambia, identified twenty-one wholly-owned private manufacturing firms, and eight joint ventures (Song, 2011). Nearly all were producing for local markets: 'shoes, textiles and clothing, bags, medical salt water, beverages, and building and construction materials (e.g., steel, doors and windows)' (*ibid.*). By the end of the first decade of the 21st century, Chinese companies were producing polythene bags in Ghana, ethyl alcohol in Benin, assembling sewing machines in South Africa, motors in Angola, manufacturing plate glass in Ethiopia and Zimbabwe and batteries in Mozambique (Brautigam, 2009). Again, these were targeting local markets and those in neighbouring countries.

Finally, focusing only on Chinese firms misses out on another important group of investors. Higher costs in China should push not only Chinese-owned firms to relocate, but the foreign firms that originally came to China because of the low wages and other incentives. As a study on the 'push' factor in China published in 2011 reminded readers, foreign multinational firms were a key factor in China's industrialisation. Yet according to these researchers – who did not do fieldwork in Africa – 'none of those multinationals that run Chinese factories has so far shown any sign of moving to Africa,' (Ozawa and Bellak, 2011). Is this the case?

3. Methodology

The first step of our research involved locating African countries where Chinese companies appeared to have set up a significant number of manufacturing operations. As noted above, we obtained a database of overseas foreign direct investment (OFDI) registrations between 2000 and 2014 from China's Ministry of Commerce (MOFCOM). As of October 2014, investments above \$100 million are approved centrally, with provincial MOFCOM offices approving those above \$10 million but below \$100 million.³ Each investment in the database lists the name of the parent company and its African subsidiary, the scope of its business, and the date its application was approved by MOFCOM. We coded the entries as 'manufacturing' using the definitions in the International Standard of Industrial Classification (v.4), i.e., if the investing company stated an intention to enter into production, processing, assembly or smelting, etc. In this classification, many agro-processing activities such as cotton ginning, sisal decortication and brushing are treated as a stage of agriculture, while rice or flour milling is considered manufacturing (see Appendix for an explanation of our coding scheme.).

Our analysis of investment projects registered at MOFCOM found that the number of manufacturing proposals submitted by Chinese firms for investment approval in Africa began rising sharply in 2005.⁴ As Figure 2 shows, they reached a peak of 162 in one year

- 3 The 2009 Administrative Measures for Overseas Investment issued by MOFCOM also requires central approval for overseas investments in specific countries or regions, and provincial approval for investments in energy and mining sectors. This regulation was replaced by a new one in 2014: Measures for Overseas Investment Management, which substitute recordation for approval of all overseas investments except for those in sensitive countries or sensitive industries. The MOFCOM registration database we use in this paper includes overseas investment projects approved or recorded by MOFCOM and its provincial offices.
- 4 We have been unable to determine why exactly investment registrations dropped in 2014 and 2015. But it may be due to the changes in administrative procedures. Before the 2014 regulation, MOFCOM approval was one of the preconditions for obtaining clearance from customs and foreign

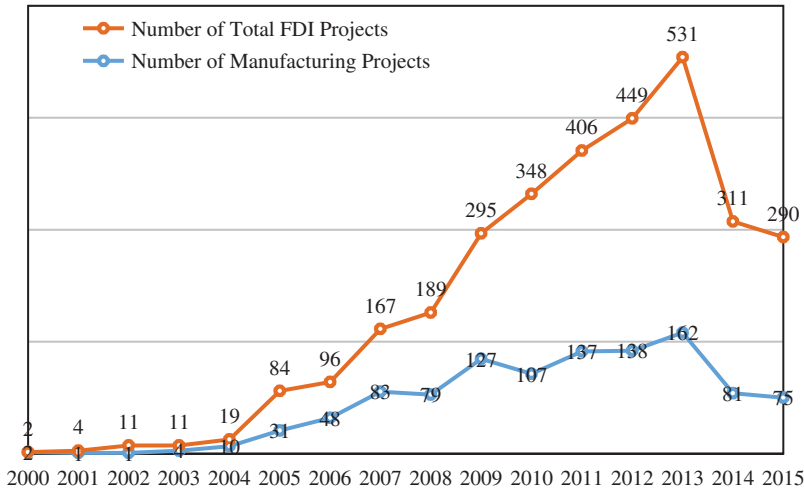


Figure 2: MOFCOM Registered OFDI Projects in Africa. Source: Based on data from MOFCOM, 2016

(2013), with over a thousand proposals having been registered between 2000 and 2015 (Xia and Brautigam, *forthcoming*). Not all of these firms will actually build a factory, but the timing of interest in exploring Africa as an industrial base likely reflects push factors (predominantly cost) (Table 1).

From this database, we selected the four low- and lower middle-income sub-Saharan African countries with the largest number of manufacturing investment registrations for further investigation: Ethiopia, Ghana, Nigeria and Tanzania. In 2014 and 2015, we conducted field-scoping studies to identify and visit Chinese manufacturers in those countries.⁵ In Ghana and Tanzania we tried to visit or at least confirm the presence of all Chinese manufacturers in the country. In Ethiopia, we interviewed only firms in the leather and textile sector in the area in and around the capital, Addis Ababa, while security concerns in Nigeria limited our field visits to the area around Lagos and the Calabar industrial zone, both in the south of the country.⁶ In all four countries, we identified the sector and products being produced, the ownership structure and age of the firm and its patterns of employment. Table 2 provides summary statistics on the firms we interviewed.

Identifying a universe of Chinese manufacturing firms in the four countries was not straightforward. Researchers used the MOFCOM OFDI registration database and were also able to obtain lists of Chinese investments that were registered with local investment authorities in all four countries. As with a similar World Bank study (Shen, 2015), we found a surprising degree of divergence between the MOFCOM registration data and that

exchange administration, but the new regulation cancelled this requirement. Therefore, investors now have an option not to record their investment projects with MOFCOM, especially when they are not expecting for any incentives provided by the Chinese government.

- 5 Our scoping studies in Ghana, Nigeria and Tanzania were conducted in the summer of 2014, and the Ethiopian scoping study was done in late 2014 and early 2015.
- 6 For most interviews we had face-to-face conversations with the interviewees, with the exception of some phone interviews when the researchers were unable to do site visits.

Table 2: Summary Data on Chinese Manufacturing Investments in the Four Countries

Country	# of Firms (b)	# of SOEs & JVs w/SOEs (a)	# 100% Private	# of Investment projects (b)	Chinese employees	Local employees	Average value of projects \$ mil [c]
Ethiopia	17	2	15	18	413	8,400	9.94
Ghana	33	1	28	34	94	1,898	4.68
Nigeria	18	0	18	19	154	3,041	12.15
Tanzania	20	1	17	27	697	6,815	14.30
TOTAL	88	4	78	98	1,358	20,154	10.26

Notes: (a) Some firms could not be identified as SOE or private.

(b) The number of firms includes all ethnically Chinese firms that have operating factories or factories in the final stages of construction. The number of investment projects is greater than the number of firms because some companies have more than one registered investment.

(c) We were unable to get investment value from all of the firms. For Ethiopia, we have data from 7 firms, Ghana 12, Nigeria 9, Tanzania 13.

collected by the local authorities. Table 3 summarises the differences between the various lists, per country, and shows how few manufacturing investments we were able to confirm from the Chinese and the host country lists.

4. Country overviews

4.1 Nigeria

Ethnic Chinese from Hong Kong began investing in Nigeria in the 1960s, producing textiles, shoes, bread and biscuits, plastic bags, steel and ceramics for the local market (Utomi, 2008). Two investors founded major Chinese industrial groups that are still active today: the Lee Group, and WEMPCO (owned by the Tung family). In 2013, the Tung family opened Africa's largest cold-rolled steel mill in Nigeria. Nigeria is also home to two Chinese-built and managed industrial zones: the Guangdong-Ogun Free Trade Zone and the Lekki Free Trade Zone. Chinese firms have also clustered in the Calabar Free Trade Zone in Cross River State, which was opened in 2000.

We were ultimately able to identify and visit nineteen ethnic Chinese manufacturers in Nigeria.⁷ The more recently arrived Chinese manufacturers were generally clustered in the industrial zones of Ogun State, Lagos State and Cross River State. We interviewed eighteen manufacturers from mainland China and one of the original Hong Kong investors (Federated Steel) in the southwest and southeast of the country. These firms were typically producing furniture, housewares (light bulbs, tissues and ceramics), building materials, plastics, and food and beverages. Several companies were involved in the assembly of light bulbs, electronic appliances and vehicles. We also identified a number of Nigerian firms

7 During our fieldwork, we found second-generation ethnic Chinese investors only in Nigeria. Second and third generation ethnic Chinese factory owners are also present in other African countries: Mauritius, South Africa, for example.

Table 3: Chinese Manufacturing Investments in Four Countries: Comparison of Databases and Fieldwork Findings, 2000–14^a

Country	MOFCOM registered total no. of FDI investments	MOFCOM registered manufacturing investments	Chinese total FDI projects registered with local authorities	Chinese manufacturing projects registered with local authorities	Chinese manufacturers interviewed during field studies	Chinese manufacturers confirmed during field studies	
Ghana	157	48	560	183	34	0	
Nigeria	314	128	221	92	19	N/A	
Tanzania	159	48	N/A	348	27	11	
Ethiopia	161	84	20 (Leather and garment/textile sectors only)	969 134 (Leather and garment/textile sectors only)	641	14 (Leather and garment/textile sectors only)	7
Total	791	308	1,529	1,259	94	18	

Note: ^aIn Ghana, Tanzania and Ethiopia, ‘confirmed’ includes all firms we interviewed and those we were unable to visit but were able to confirm through triangulation. Since our scoping study in Ethiopia was focusing on leather and related sub-sectors, the Ethiopian data presented in this paper is not a complete description of Chinese investment in all manufacturing sub-sectors in Ethiopia. Some Ethiopia interviews took place in January 2015.

that had 'technical partnerships' with Chinese companies, usually machinery export firms that had sent Chinese experts to install factory equipment and train Nigerian staff.

4.2 Ethiopia

In 1984, Ethiopia and China signed MOUs for the construction of several factories to produce thread, matches and pencils (Bartke, 1989). There is no evidence that these were ever built, most likely due to Sino-Soviet rivalry and Ethiopia's marked shift toward the Soviet Union during this period. China's aid programme also supported the expansion of Ethiopia's state-owned Awassa cotton mill in 2001, in conjunction with a commercial management contract signed with a Chinese company in 1999 (Bräutigam and Tang, 2012).⁸ Yet due to a prolonged period of political turbulence and an unfavourable investment environment in Ethiopia, there were very few Chinese companies in the country before 2004. One of the first was a joint venture in pharmaceuticals, Sino-Ethiopian Associate. In 2009, a Chinese steel maker, Qiyuan Group, developed the Eastern Industrial Zone, which was the first industrial zone in Ethiopia. In January 2015, there were twenty-two firms in the Zone, although many were service providers, not manufacturers.

Chinese factories in Ethiopia are now producing building materials, leather and shoes, plastics and other consumer products. In several visits between 2014 and 2016, we visited eighteen Chinese manufacturers in the leather and textile/garment sectors in Ethiopia. We also confirmed the active presence of Chinese firms producing building materials (cement, plate glass, gypsum board and recycled steel), air filters and wigs, as well as assembling automobiles, and interviewed a handful of these firms. Finally, we interviewed several non-Chinese firms that had relocated operations from China to Ethiopia; all of these had Chinese trainers and technical experts on staff.

4.3 Ghana

In the 1960s and 1970s, China's aid programme assisted Ghana in building the Juapong Textile Mill and a pencil factory in Kumasi; both survived for decades but are out of operation today (Bartke, 1989; Ogunsanwo, 1974).⁹ In contrast with the aid programme, Chinese equity investment in Ghana's manufacturing sector does not have a long history. With the exception of several companies from Taiwan and Hong Kong, the oldest Chinese manufacturing factories that are still in operation were set up in the early 2000s.

In the three areas of Ghana where we did fieldwork (Accra, Kumasi and Tema), we found a significant cluster of Chinese firms in the plastics industry (discussed below). We also learned that over a dozen Chinese businessmen had been assembling suitcases and making furniture, but most of them exited these sectors when the costs of imported raw materials rose due to the depreciation of the country's currency during an economic crisis that began in 2013. We only found large (over \$10 million) Chinese investments in steel, construction materials, paper/carton, pharmaceuticals and artificial hair wigs. With the exception of Rebecca Wigs, which exported some of its products around the region, the

8 'China Provides Loan to Ethiopian Textile Mill,' *China Daily*, 6 January 2001, accessible at: http://en.people.cn/english/200101/06/eng20010106_59734.html. According to Bartke (1989: 63) China and Ethiopia signed a protocol on the construction of the 'Awasa cotton mill' in 1977, but nothing more was recorded.

9 'China textile Partnership Begins,' *All Africa news*, 4 May 2007, accessible at: www.allafrica.com.

Chinese firms focused only on the Ghanaian domestic market. Six large Chinese factories chose to be located around the Tema Industrial Free Zone and subsequently formed a geographic cluster.

4.4 Tanzania

During the 1960s and 1970s, China built several state-owned manufacturing projects for the Tanzanian government as part of its aid programme. These included Friendship Textile Mill, Mahonda Sugar Cane and Ethanol Factory, Ubungo Farm Implements and United Pharmaceuticals (all of these are now moribund except the textile mill). Because of Tanzania's stable political environment and China's historic friendship with the nation, Chinese businessmen arrived in Tanzania quite early. In the 1990s, former aid staff and traders imported Chinese goods to Tanzania, and some later set up factories. We interviewed the managers or owners of thirty-three factory investment projects and confirmed the presence of an additional five projects.

Chinese factories in Tanzania were found in several entry-stage manufacturing sectors, including textiles and apparel; plastic (shoes, utensils, plastic recycling and bag production); construction materials (steel, glass, gypsum, aluminium tiles); and agri-processing (tannery, cashews, honey, sisal). Individual factories produced furniture, paint and bottled oxygen. Twelve Chinese investors made plastic shoes. Some were fairly large. As of July 2014, nine manufacturing projects were reported to have each invested over \$10 million in areas ranging from textile, leather and sisal processing to steel mills, and plastic production. A handful of agri-processing businesses scattered around the country operated tanneries and ginneries or processed local sisal, timber, honey and cashews close to the harvest locations. Most other factories were concentrated near Dar es Salaam. The agri-processing firms as well as Tooku (owned by J.D. Garments) were exporting almost all of their products, while other firms primarily sold in the domestic market. Many Chinese factory owners were from Fujian province and were connected to each other through familial or communal ties.

5. Scope of investment

The manufacturing firms interviewed for this study were all focused on relatively simple, entry-stage manufacturing, in a mix of export-oriented and import-substitution products. Table 4

Table 4: Main Sector Divisions and Products of Interviewed Firms

	Ethiopia	Nigeria	Ghana	Tanzania
Division 15: Leather and related products ^a	9	0	0	1
Divisions 13–14: Textiles and wearing apparel ^b	5	1	0	3
Divisions 22 and 38: Rubber and plastic products; Materials recovery ^c	1	2	16	7
Divisions 23–25: Non-metallic mineral products; basic metals; fabricated metal products ^d	1	6	5	5

^aProducts include leather shoes, finished and semi-finished leather.

^bProducts include textiles, garments.

^cProducts include plastic bags, bowls, plastic footwear, plastic pellets.

^dProducts include glass, steel pipes, aluminium window frames, cement, gypsum board.

provides an overview of the main sector divisions and products produced by these firms. We found relatively few firms in food and agro-processing, although this is a typical entry-level investment sector.

5.1 Rubber and plastic products (Division 22)

At least 15 Chinese firms interviewed for our study were producing plastics, making this the largest sector. Chinese plastics manufacturing involved three activities that are coded separately by the ISIC. A large number of the firms we interviewed were recycling plastics, sorting into various materials, and producing pellets, powders, or doing other kinds of minimal processing. Other entrepreneurs were moving up the value chain, producing new plastic products (plastic bags, buckets, chairs, etc.) from recycled materials. Among this group was a subset producing plastic footwear, which is coded by the ISIC under 'leather and related products.' We discuss all of the plastic products in this sector, including footwear.

Plastic waste recyclers were a significant set of small and medium-scale investors in Tanzania and especially Ghana, where a coordinator of the Ghana Plastic Manufacturing Association (GPMA) estimated that there were about twenty Chinese plastic recycling firms operating in the country. Although we did not interview any Chinese plastics firms in Ethiopia, there is some evidence of Chinese investment in these sectors.¹⁰ Some Chinese recycling firms produced ethylene vinyl acetate (EVA) pellets. Others ground recycled plastics into a powder that provides the raw material for plastic footwear, construction materials, chemicals, and medical supplies. Some sold these materials locally, others exported them back to China for further processing using technologies not yet available in these countries. Plastic waste recycling may now be a sunset industry in China. 'Operation Green Fence,' launched by the Chinese government in February 2013, restricted the import of containers filled with some kinds of recycling waste.¹¹ This could create opportunities for processing in Africa, although the costs and benefits of this would need to be carefully evaluated.

We found it interesting that a number of Chinese firms were producing plastic products and appeared to be competing successfully with Asian imports. Nigeria had several Chinese-owned plastics factories, including Shifa Plastics and Mark Sino (plastic construction materials). But Tanzania and Ghana appeared to have the most. Firms in these countries were following in the footsteps of Indian and Lebanese investors who had first invested in these sectors in the 1950s and now dominated the larger-scale plastics industry. In Tanzania, several Chinese firms began by producing simple moulded plastic sandals from imported raw materials and expanded into plastic utensils and bags. Some companies, like Verise Industry, had closed their plastic footwear factories in China and moved them to Africa.

The scale of production was quite different in Tanzania and Ghana. In Tanzania, investments ranged from \$1.5 to \$15 million, and local employment from 100 to 500 per factory.

10 Three Chinese firms are registered as doing plastic recycling in the Ethiopia Investment Commission list. Some Chinese recycling firms in Ghana also mentioned that they have collaboration or branches in Nigeria.

11 'China doesn't even want to buy our garbage anymore,' *The Washington Post* blogpost, 9 May 2013, accessible at <https://www.washingtonpost.com/news/wonk/wp/2013/05/09/chinas-crackdown-on-trash-could-make-it-harder-for-u-s-cities-to-recycle/>.

The Chinese plastics sector employed an estimated 5,000 Tanzanians. However, in Ghana investments ranged from \$150,000 to \$450,000 and local employment from 10 to 90 per factory.

5.2 Metal and mineral products (Divisions 23–25)

The pace of construction across Africa has provided strong demand for building materials, and Chinese firms are producing to meet some of this demand. About 20% of the Chinese investment projects we interviewed as being in operation during our fieldwork in 2014 and 2015 had invested in metal and mineral-based building materials, including glass, recycled steel, aluminium window frames, ceramics and gypsum board. This was also one of the highest value sectors.

We interviewed seven Chinese firms investing in recycled steel. These were among the highest value investments for Chinese companies. Hongyu Steel, for example, established in 2010 by a Zhejiang entrepreneur, is one of the most prominent companies in Tanzania's building materials sector. The entrepreneur had no previous experience in Tanzania but came to investigate investment opportunities and selected recycled steel as a promising sector.

Other companies were producing metal products out of steel and aluminium, and gypsum board was a popular product for Chinese factories in Tanzania and at least one in Ethiopia. Several Chinese factories imported aluminium ingots to produce window frames and other building materials, using Chinese moulds. Only one Chinese factory produced glass, although another imported ordinary glass and treated it to produce tempered and other specialised glass (including bullet-proof glass).

Although cement is a significant sector for Chinese investment in several other African countries, including Zambia, we were only able to identify Chinese cement investments in two of the four countries: Ethiopia and Tanzania.¹² Several other major Chinese building material investments were under discussion or in early stages but had not yet launched at the time of our field research. These included a proposed plant in Ghana to produce rebar, wire rods and welded pipe in Ghana and a \$1.3 billion iron ore–coal–steel joint venture under discussion between Tanzania's state-owned National Development Corporation (NDC) and a private Sichuan firm, Hongda in the south of the country. Given the overcapacity in China's own steel industry and related price cuts, it seems unlikely that smelting iron ore and producing new steel in Africa will prove competitive at any time soon.

5.3 Textiles and apparel (Divisions 13–14)

A growing number of Chinese firms are involved in textile processing (spinning, dyeing, weaving of fabric) while we found a surprisingly small number to be producing garments. One of the oldest Chinese manufacturing firms in Africa is Tanzania's Urafiki (Friendship Textile), a factory built by China's aid programme, and opened in 1968 on the outskirts of Dar es Salaam. At full operation, Friendship Textile consumed about a tenth of Tanzanian cotton production and had more than 2000 workers. It was partially privatised in 1997 to

12 Ghana had several Chinese firms registered as cement firms but we found no evidence that they were actually operating. Nigerian local firm Dangote and French Lafarge dominate the cement market in Nigeria. Chinese firm Sinoma was contracted to build cement plants for both Dangote and Lafarge, but Sinoma did not invest in this sector.

a Chinese company from Changzhou in Jiangsu province, which now owns 51%. The Chinese government has bailed out the factory on several occasions with soft loans, and the company is widely believed to stay afloat only because of its political importance to the two governments.¹³

Also, in Tanzania's textile and apparel sector is a large Changzhou firm, J.D. United (JDU), which in 2012 established a subsidiary, Tanzania Tooku Garments Company Ltd., in the William Mpaka Industrial Estate on the outskirts of Dar es Salaam. As of 2018, Tooku employed some 2,500 Tanzanians mainly producing cotton blue jeans and cotton/polyester shirts.¹⁴

We found almost no Chinese textile or garment factories in Ghana or Nigeria, but this is a growing sector in Ethiopia. Two Chinese factories have been producing fabrics, blankets and bed sheets for local and regional markets for over a decade. Between 2012 and 2015, ten new Chinese garment factories, dyeing, spinning and weaving mills were set up. Most of them were interested in producing for the lucrative Ethiopian and regional markets. As the Ethiopian government continues to promote export-processing garment industries, more and more foreign investors from Asia, including China, India, South Korea, Indonesia, Bahrain, Sri Lanka and other countries, are moving textile mills and garment factories to Ethiopia.

5.4 Leather and related products (Division 15)

Chinese firms have been importing sheep and goatskins from Ethiopia since the 1990s. As the Ethiopian government imposed up to 150% export tax on semi-processed leather (wet blue) 2008 and again on crust 2011 to encourage export of finished leather and leather products, a few Chinese tanneries decided to invest in Ethiopia to secure leather supply. From 2010 to 2014, seven ethnic Chinese-owned tanneries began operation in Ethiopia. Chinese investors began to set up shoe factories in Ethiopia in late 2012.

Ethiopia was the only country where we found significant investment in the leather sector. Xinghua, a cotton processing and agricultural trading company from Hubei province, opened an abattoir and tannery complex in Shinyanga, Tanzania. The company originally

13 Ching Kwan Lee in her article in 2009 compared two incidents of labour resistance, one in the Chambishi mine in Zambia owned by CNMC, and the other in Urafiki textile in Tanzania. She noted that divergent outcomes of these two incidents – the former being largely successful and the latter not – can be attributable to the nature of ownership of Chinese investments, among other explanations. Urafiki's owner as a local SOE, 'does not carry the same level of state economic and political mission' as CNMC – a centrally-owned enterprise – does. See Lee (2009). 'Raw Encounters: Chinese Managers, African Workers and the Politics of Casualization in Africa's Chinese Enclaves.' *The China Quarterly*, Vol. 199, p658. However, in interviews, we learned that the (Chinese) managers felt that the workers' union did not care about the economic efficiency of the company, assuming that the Chinese would not let this 'child of Mao and Nyerere' fail, that the political significance would outweigh the economic consideration. As a 'model enterprise,' the mill pays the equivalent of 16% of the workers' total income to cover the labour insurance and pension insurance of its workers. Because of the political importance and origins as a Chinese aid project, the company cannot act purely according to market rules. Consequently, the mill missed several chances to expand its size or its business areas. Therefore, despite good sales, it still suffers losses due to the high costs.

14 Phone interview with EPZA Director General Adelhelm Meru

Table 5: Different Categories of Chinese Geese

	Ethiopia	Nigeria	Ghana	Tanzania
Raw materials-seeking geese	6	0	0	2
Global supply chain geese	3	0	0	1
Local market-seeking geese	6	18	18	13
Small geese travelling together	3	0	15	4

thought of investing in the cotton sector in Tanzania but decided after a visit in 2010 that the value chain of meat and hides looked more promising.

6. Preliminary analysis: which geese?

While there is some overlap among investment projects and investors, we find that Chinese manufacturing ventures tend to fall into one of four categories of ‘geese’: (1) geese seeking raw materials; (2) large, global supply chain geese; (3) strategic, market-seeking geese; (4) small geese travelling together (Table 5).

6.1 Geese seeking raw materials

Although Chinese investment in Africa is often believed to be primarily resource-seeking, in these four countries we found only a few examples of manufacturing companies that were in Africa seeking raw materials to process and then export. Several firms in our four country scoping studies were active in the agribusiness sector, adding value to local agricultural raw materials that were then exported (sisal processing and honey in Tanzania). The most significant group of this kind of investment was the cluster of Chinese firms doing leather tanning and finishing in Ethiopia.

Most of Africa’s raw minerals (including petroleum) are exported without any refining or smelting to higher income countries where capital and energy-intensive processing takes place.¹⁵ Here, in countries outside of our sample, Chinese firms have made some inroads. In Zambia, a Chinese company in Chambishi is smelting copper ore into blister copper and ingots although plans to set up a copper semi-fabricates plant are still on hold.¹⁶

Although several Chinese firms have expressed interest in developing massive iron ore and steel complexes in Africa, none of these projects have materialised. To be sure, the production of steel from iron ore is not widespread in Africa, where most steel is either imported or produced from scrap. Although Nigeria and Zimbabwe have steel mills that process iron ore, South Africa is the only Sub-Saharan African country whose production is significant enough to be included among the 66 steel producers that make up 99% of global output (World Steel Association, 2016).

15 Fessehaie, J., Rustomjee, Z., and Kaziboni, L. ‘Can mining promote industrialisation? A comparative analysis of policy frameworks in three Southern African countries,’ WIDER Working Paper 2016/83.

16 Personal e-mail communication, Judith Fessehaie, 21 September 2016. At present, US-owned ZAMEFA (Metal Fabricators of Zambia Limited) appears to be the most significant Zambian producer of copper rods, wires and cables. Fessehaie *et al.* (2015) Growth Promotion through Industrial Strategies, IGC Working Paper F-41205-ZMB-1.

6.2 Large, global supply chain geese

The 'flying geese' model describes the migration of global production from higher to lower cost countries, with labour-intensive activities being the first to relocate. Here we saw a small but significant sample of Chinese firms that have relocated garment and shoe production to Tanzania and Ethiopia. We saw no examples of this kind of 'flying geese' in Nigeria or Ghana, although in other scoping studies our researchers identified a large-scale Chinese garment manufacturer in Madagascar (King Deer) and a Chinese company, Tianli, whose cotton contract farming operations in Madagascar supply its export-oriented cotton spinning mill in Mauritius (Chen and Landry, 2016).

Garment production for export is normally one of the earliest activities to offshore. In Tanzania, the garment firm Tooku is owned by a Chinese conglomerate, J.D. United (JDU). JDU's main production was in China and in Cambodia. Their website notes that Tanzania was chosen for its lower labour costs and its access to the US market through the African Growth and Opportunity Act (AGOA).¹⁷ 'As labour costs rose in [China and Cambodia], the company and its US clients—including Levi's and Russell Brands—sought a new place for production, ultimately choosing Tanzania.'¹⁸ In Ethiopia, two new firms, New Wide and C&H, produce garments for US and EU markets. However, both relocated to Ethiopia from Kenya, not from China.

Two large shoe factories, Huajian from China and New Wing from Hong Kong, decided to invest in Ethiopia to take advantage of the low labour costs and abundant leather supply, and incentives for duty-free entry into the United States under AGOA and also the EU under the 'Everything But Arms' arrangement (EBA). As production costs increased in China, another company, George Shoes, whose owner is from Taiwan but who has operations in China, also opened a new production base in Addis Ababa in 2014. All three factories export to the US through international shoe agents such Solano, Brown shoes and so on. Brown shoes were particularly influential in helping to pull these firms to Ethiopia (Bräutigam *et al.*, 2016). As with King Deer in Madagascar, these three large factories are located in industrial zones that bear some resemblance to export-processing zones in the first waves of 'flying geese'.

6.3 Strategic, local market-seeking geese

We found an important category of Chinese manufacturing that reflected entrepreneurs' decisions to risk their capital in substantial investments targeting the local market. The firms in this category were nearly all privately owned. Many had previously been involved in trade, usually, but not always, exporting a Chinese product that they eventually began producing in Africa. Others came up with product ideas through market studies and consumer surveys.

Although imports of Chinese goods are conventionally believed to have decimated African manufacturing firms, many of the Chinese firms making products in Africa that competed with imports believed that there was 'less competition' in Africa and that markets

17 <http://jdunited.com/en/strategic.html>.

18 'U.S. Apparel & Footwear Companies Ready For 'Source Africa'', Africa Strictly Business news, accessible at: <http://www.africatrictlybusiness.com/news-analysis/us-apparel-footwear-companies-ready-source-africa>.

were in fact expanding rapidly. Interviewed by *China Daily* in 2014, the deputy general manager of Hongyu Steel, a scrap metal recycler in Tanzania, noted:

Looking back at China, this industry there has a lot of competition and the market is also quite saturated. So there is a dire need to explore a new market. When you look at Africa's economic development in the past few years and its regional integration, you find the demand for this product and the market is developing quite fast.

Some of these strategic investors are not yet very large. Xin'an, a private Zhejiang firm that is one of China's largest agrochemical producers, purchased Sunrise, a small Ghanaian agricultural chemicals trading company – and one of Xin'an's customers – in order to use its sales channels, social network, and licenses. After the acquisition, Xin'an Sunrise invested in a filling factory in Kumasi in 2012. Although the factory mainly adds liquid to an imported, solid chemical base, and bottles the reconstituted pesticide, transport costs were significantly reduced. Xin'an Sunrise has captured 36% of the Ghanaian market and plans to expand into West Africa.

Yet others are quite substantial and employ large numbers of local workers. In 2004, Wang Nianyong, who had been a commodities trader in Nigeria since 2000, founded Viju Milk, a Chinese firm that is among Nigeria's most prominent bottled drink producers (Li, 2014).¹⁹ He decided to test the Nigerian market by importing yoghurt and milk beverages, products that soon became popular with Nigerian children and youth. Viju Industries began operating in Nigeria in 2004. Ten years later, his firm was said to employ nearly 2,000 Nigerian workers. Hongda Steel in Nigeria employs some 3,500 Nigerians in its recycled steel factory, while Rebecca Wig, manufacturing artificial hairpieces in Ghana, has some 900 local employees.²⁰

6.4 Opportunistic small geese, travelling together

Our final category we call 'small geese, travelling together.' These manufacturers usually remain small-scale, cluster together in the same sector or industrial zone, and are often related to each other or have similar regional origins. In Tanzania, for example, the original Chinese investor in plastics was a trader, Weng, who saw in the year 2000 that local production could be more profitable. In Tanzania, ten out of the twelve Chinese industrialists in the plastic recycling and products sector are from the coastal province of Fujian; many are related or know each other.

Being related does not necessarily mean that these firms help each other. Weng was the first Fujian company in Tanzania; his younger sister has a factory of similar size. His elder brother has a smaller one (over 100 workers) in Dar es Salaam. Then the friend of his cousin, the aunt of his son in law, and so on came to invest in a plastic footwear factory as well. Though they are relatives and friends, the competition about price is still intense. People 'do not care about familial relationships when it comes to business,' he noted.

Some small firms have moved beyond their original host country to neighbours in the region. Chen, a Chinese entrepreneur who had come to Ghana in 1997 as a trader, became

19 We did not interview Viju Milk in our field research. All quotations are from Li (2014).

20 They are also said to be manufacturing in Nigeria and have a website. We contacted them but received no reply.

head of a modest multinational company within two decades. After setting up a restaurant in 2003, Chen noticed that local people were simply burning plastic waste and saw an opportunity. In 2007, he opened the first plastic recycling operation, linking it to an injection-moulding factory. As recycled plastic is in high demand as a raw material in China, it is relatively expensive to import into Ghana, so Chen was easily able to compete with imports. A few years later, he opened a plastics factory in Benin, and two in Nigeria (Lagos and Abuja), with a third planned for northern Nigeria.

6.5 Not Chinese, but flying geese?

Bräutigam (2003) documented how Nigerian traders learned about manufacturing processes through site visits to Asian factories, later using their contacts and knowledge to become industrialists. During the course of this research, we found several African firms in Nigeria that had followed this pattern, contracting with Chinese experts to transfer technology and build skills in their own factories. In the town of Nnewi, for example, four Nigerian manufacturing firms employed Chinese experts at the time of our field study, with a total of 58 Chinese and 8,297 Nigerian workers. Others had earlier used Chinese experts for temporary training. Some Nigerian firms had also sent staff for training in China when opening new product lines and in one case, six staff were sent to learn Mandarin.²¹

In Ethiopia and Tanzania, we also identified several non-Chinese firms in the leather gloves, shoes, and garment sectors that had moved some labour-intensive production or expanded their global value chains from China to Africa. All of these investors brought in Chinese trainers and experts to help transfer technology and skills to Ethiopian workers. As one Italian factory director – with thirty Chinese trainers and 1,150 Ethiopian workers – told us: 'I never stop training. It is continuous. In the beginning I brought in two Italians, but they didn't like Ethiopia; they left.'²² In 2009, Mazava, a subsidiary of Winds Group, a global, high-end technical sportswear fabric and garment company, opened a factory in the Tanzanian city of Morogoro, which had over 2,000 workers in 2014. Winds Group hired dozens of Chinese to train their Tanzanian workers.

7. Challenges and opportunities for Africa

Below, we summarise a set of challenges and opportunities that we see arising from Chinese manufacturing investment in Africa.

7.1 Import substitution

One of the perhaps surprising findings of our study was that of all the firms we interviewed, forty-two were producing solely for the host country market, while another ten also exported only into the region. In most (but not all) of these cases, the companies produced products that substituted for imported goods. There are likely to be some tariff protections for these products. In plastic products, for example, the Chinese firms were responding to the slight advantage provided by protections, ranging from a 20% duty in Ghana to 25%

21 Chen *et al.* (2016) *Learning from China? Manufacturing Investment and Technology Transfer in Nigeria*, SAIS-CARI Working Paper 02/January 2016.

22 Interview, New Wing, Addis Ababa, Ethiopia, 23 January 2015.

in Tanzania and 35% in Ethiopia.²³ Yet these are not particularly high protections. This suggests that local African firms are not taking advantage of the local market potential in many of these countries.

7.2 Adding value to raw materials and local inputs

Some Chinese firms were adding value to raw materials through processing. In some cases they then exported most or all of the products. We found this pattern among the tanneries in Ethiopia and a Chinese-owned sisal farm in Tanzania and several textile factories using local cotton as inputs. If we count scrap steel and waste plastic as 'raw materials' we can also include the steel mills and plastic product factories as 'adding value.' None of these firms were using particularly complex technologies. The sisal farm's machinery dated back to the colonial period. Some local firms, particularly in Ghana's plastics industry, have also entered these sectors, after learning the ropes from working for, or supplying, Chinese firms, who in some cases also sold them the machinery. Other foreign firms have also invested in these sectors. In Ghana, for example, the production of recycled steel is dominated by Indian firms. Yet it is likely that other niche opportunities exist that Ghanaian entrepreneurs could exploit. We see some small evidence of this beginning to happen in the plastics sector.

7.3 Power and transport infrastructure

Although the cell-phone revolution has improved communications immensely in Africa, power and transport continue to be challenges for many firms in Africa and will continue to hamper relocation decisions by Chinese firms, not to mention raise costs for African entrepreneurs thinking about investing in factories.

Some Chinese firms have grown large enough to arrange for their own power grids. 'To ensure smooth production and maximise the life of our machines,' the head of Viju Milk noted in Nigeria, 'we have set up our own power grid with a local gas company to ensure stable power supply ... If transport, including road and rail, was in place, costs would fall greatly, and efficiency would improve. We expect to use rail in the next few years' (Li, 2014). Yet poor infrastructure outside Nigeria stymied Viju Milk's plans to expand into Ghana, Burkina Faso and Togo. To attract more foreign investment and to encourage domestic investors, these infrastructure challenges need to be overcome.

7.4 Industrial zones

Given the relatively poor infrastructure and lack of industrial services in many parts of Africa, and influenced by their own experience in China, where industrial parks are

23 Nigeria has a 20% import duty and 5% VAT for import of 'bags of polymers of ethylene' and 'ceiling coverings of plastics'. See CET TARIFF SECTION VII Chapter 09. Ghana has a 20% import duty and 12.5% VAT for import of plastic bags, boxes, household articles and builders' ware. See The Harmonised System and Customs Tariff Schedules 2012. Tanzania has a 25% import duty for plastic bags, builders' ware and plastic footwear. See East African Community Common External Tariff 2012. Ethiopia has a 35% import duty and 15% VAT plus a 10% surtax for importation of plastic bags as well as plastic footwear. See Ethiopian Revenues and Customs Authority, HS Code with Tariff detailed information, accessible at: <http://www.erca.gov.et/index.php/search-hs-code?view=hscode>.

ubiquitous, some Chinese companies have favoured investment in Chinese-run industrial parks. We saw this in particular in Nigeria, where we interviewed eight Chinese manufacturing investments in the Ogun-Guangdong industrial park, and six in the Calabar Park in Cross River State. Yet even in this case, as in Ethiopia, most Chinese industrial investments were located outside of the existing industrial parks and economic zones.

Still, industrial zones have benefits of security, mentioned by several interviewees, while some Chinese firms told us that co-locating increased their 'comfort level.' For example, Rider Steel, a firm from Shandong Province, invested over \$25 million in a steel factory in Ghana in 2008. The firm had also considered investing in Nigeria, but 'Shandong has a traditional relationship with Ghana,' the general manager said. 'The company likes to stay where other Chinese companies are.'

7.5 Economic instability and inefficiency

A number of the Chinese firms we interviewed told us that economic instability and changing prices created difficulties for production. Investors also believed that inefficiency in local government approvals and other delays exacerbated these problems. In Tanzania, for example, a Chinese steel company located its factory in the new Tanzanian government heavy industry zone in Kibaha, about 50 km from the commercial capital, Dar es Salaam. They commented that what would have taken six months in China took three years in Tanzania. Furthermore, the local market was not as stable as the company had expected. As the owner told us:

When we did market research in 2010, 12 mm steel rod was sold at \$1,100 per ton in the market, but last year the price dropped to \$760. And we estimate the price will come down to \$690 per ton by the end of the year ... So the only way we can ensure our operation in this country is to sustain our quality and increase the productivity.

In Ghana, a number of firms listed as 'Chinese manufacturers' in one database or another had exited the market when their input prices rose sharply during a period of economic instability.

7.6 Labour relations and safety

Safety problems and non-compliance with local regulations by some Chinese firms led to protests and strikes. For example, in Tanzania, Tooku experienced labour protests in 2014 and a labour strike in late 2015, which might have dissuaded them from further investment.²⁴ We heard some comments about local xenophobia toward Chinese. An industrialist in Nigeria told us that his company had experienced anti-Chinese sentiment: 'The governments involved need to work on getting locals to be more welcoming. When I first came, locals on the street would shout, 'Go back to China,' when I drove down the road.'

Local workers had their own complaints about safety and compliance with regulations that provide protections for permanent workers. Hongxing Steel in Nigeria was closed several times for safety and other violations and was castigated as a 'slave-driver' on Nigerian social media.

24 The Assistant General Manager of Tooku is Mr. Rigobert Massawe, who studied pharmacology in China (and may be fluent in Chinese).

7.7 Environmental issues

We see evidence that some Chinese firms bring more polluting technologies to Africa. This is not unexpected, as tighter environmental regulations are often a push factor for firm relocation, and China's environmental restrictions are being enforced more vigorously in some localities. Baoyao Steel in Nigeria bought the physical assets of an old steel plant in Shanghai which had been shut down by the Chinese government due to tighter environmental standards. We also saw that Ghana and Tanzania are still using plastics that are banned in China. For example, polypropylene bags are banned in China, because the black PP plastic bags cannot be recycled again. The Chinese government only allows firms to produce biodegradable plastic bags. The machines and technicians in the PP recycling sector thus found their way to Ghana, where PP recycling was still considered to be a progressive step.

7.8 Impact on African firms

From this early work, it appears that Chinese firms may be competing more with imports or other foreign firms in country, than with African manufacturers. In Ghana, for example, we asked firms about their main competitors. Of the 21 firms that answered this question, only eight (mainly small plastics companies) mentioned local African firms as competitors, with the others naming other locally-based 'foreign' firms (Chinese, Indian and Lebanese) or imports as their main competition.

7.9 Technology transfer and skill diffusion

We explored the horizontal and vertical linkages between our firms and African firms, workers, and institutions, and will be reporting our observations in a companion paper. We observed that employment in Chinese factories is significant, with some 20,000 jobs generated by the companies we interviewed. This translates into considerable diffusion of skills learned on the job, and the introduction of the culture of factory employment to young people, many of whom likely never worked in factories before. However, we can summarise other potential areas of impact of Chinese manufacturing investment as, so far, fairly limited in terms of technology transferred and skills diffused to African firms.

There are many reasons for the relatively limited linkages of Chinese factories. One is the relatively short time these firms have been in operation in most countries. A second is that firms are, in general, not forming geographic clusters in a sub-sector. We found only three significant clusters—plastics in Ghana and Tanzania, and leather in Ethiopia (textiles may be emerging as a cluster in that country as well).

At the same time, in Nigeria, we identified considerable technology transfer and training occurring through the market, with African firms contracting with Chinese suppliers to install machinery and train their workers. We also found that although Chinese firms do not show much sign yet of working directly with local suppliers to improve their quality, their demand for higher quality inputs has led to technology upgrading by local firms, in some instances. This may prove to be a more enduring phenomenon than inter-firm transfer in a competitive environment.

8. Conclusion

As we noted at the start of this paper, manufacturing is difficult for Chinese firms in these four countries. We encountered many tales where entrepreneurs opened factories in one business and then closed. The reasons for this varied. In the plastics industry in Tanzania, competition from other Chinese investors became intense and in one case, a plastic shoe firm closed its doors after its lease had risen by 300–400%. The entrepreneur then purchased his own land but had not yet resumed production. A businessman from Taiwan opened a shoe factory in Ghana in 2004, using imported raw materials (artificial leather). At its peak, he employed some 200 Ghanaians, but a decade later, due to cheaper competition from imports, employment had fallen to only 30.

In these four countries, Chinese manufacturing firms are a significant and growing presence. Chinese manufacturing investors seem to mainly be located in the fabled 'missing middle' – neither small, nor large. Yet so far, the firms in our study seem primarily to be replicating the experience of earlier foreign investors (Indians, Lebanese, even earlier generations of Chinese from Hong Kong). Most are targeting local markets, substituting for imports, and hoping that reduced transportation costs and local knowledge will allow them a higher profit margin. A small but significant group could, perhaps, be seen as the vanguard of the flying geese – relocating to Africa to take advantage of lower costs and integrating African producers into global value chains. But so far, these firms are few and far between.

Some might argue that firms substituting for imports are not going to be able to reap the economies of scale and productivity improvements that global production allows. Yet we would note that African countries are presently importing some \$100 billion in goods and services from China. Many of the Chinese firms in our study see capturing some of that market as feasible, even without the generous protections of an earlier era of import substitution.

On a final note, we expect Chinese investment in manufacturing to grow. At the December 2015 Forum on China Africa Cooperation (FOCAC) in Johannesburg, South Africa, the Chinese government officially committed to assisting in African industrialisation (Eom et al., 2016). In general, despite the challenges outlined above, Chinese firms were optimistic about the opportunities for production in Africa. For example, HSJQ invested heavily in Ghana for its two paper mills. Back in China, the company was operating steel plants, cement factories, wood processing plant and other business. With rising production costs, overcapacity, and a saturated market in China, HSJQ told us that they plan to close these factories down in the next few years and relocate them to Africa.

Supplementary material

Supplementary material is available at *Journal of African Economies* online.

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