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What kinds of Chinese "Geese" are flying to Africa? Evidence from Chinese manufacturing firms

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What kinds of Chinese "Geese" are flying to Africa? Evidence from Chinese manufacturing firms

Deborah Brautigam, Tang Xiaoyang, and Ying Xia

NO. 17 | AUGUST 2018:

“What kinds of Chinese “Geese” are flying to Africa? Evidence from Chinese manufacturing firms”

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ABSTRACT

**SAIS-CARI WORKING PAPER
NO. 17 | AUGUST 2018:**

“What kinds of Chinese
“Geese” are flying to Africa?
Evidence from Chinese
manufacturing firms”

by Deborah Brautigam,
Tang Xiaoyang, and Ying
Xia

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 2016, 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.

INTRODUCTION

"MANUFACTURING IN AFRICA," *THE ECONOMIST* wrote in 2016, "is only for the brave." Africa's failure to industrialize has created a significant challenge to the continent's sustainable development prospect.¹ 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, production costs in China's coastal factory belt began to rise. Pushed by costs and attracted by the Chinese government's "going global" incentives, China's labor-intensive companies began seeking offshore production locations. 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.² Akamatsu described a phenomenon already underway in Asia in the 1950s, where the "lead geese" were located in the West: leading the production of industrial goods (televisions, automobiles, even textiles) but companies in countries like Japan were catching up and would take over the lead goose position. Production would then eventually move from Japan (as costs rose) to other parts of Asia, and so on.

As China's own experience shows, foreign investment is one way that countries learn to produce the products that will eventually allow them to move to leading positions in value chains. Today, Chinese manufacturers moving out of an increasingly high cost China could be a new generation of "flying geese" or even, as Justin Yifu Lin puts it, "leading dragons."³ There is some evidence that in the past, ethnic Chinese served as catalysts for industrialization in Mauritius and eastern Nigeria.⁴ But have these Chinese factories begun to appear elsewhere 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 African factory's own 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 2016, 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 four kinds of firms each offer different kinds of development opportunities and challenges.

BACKGROUND

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."⁵

In fact, researchers have pointed to a long history of Chinese engagement in African manufacturing, through foreign aid projects but also direct investment.⁶ 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.⁷

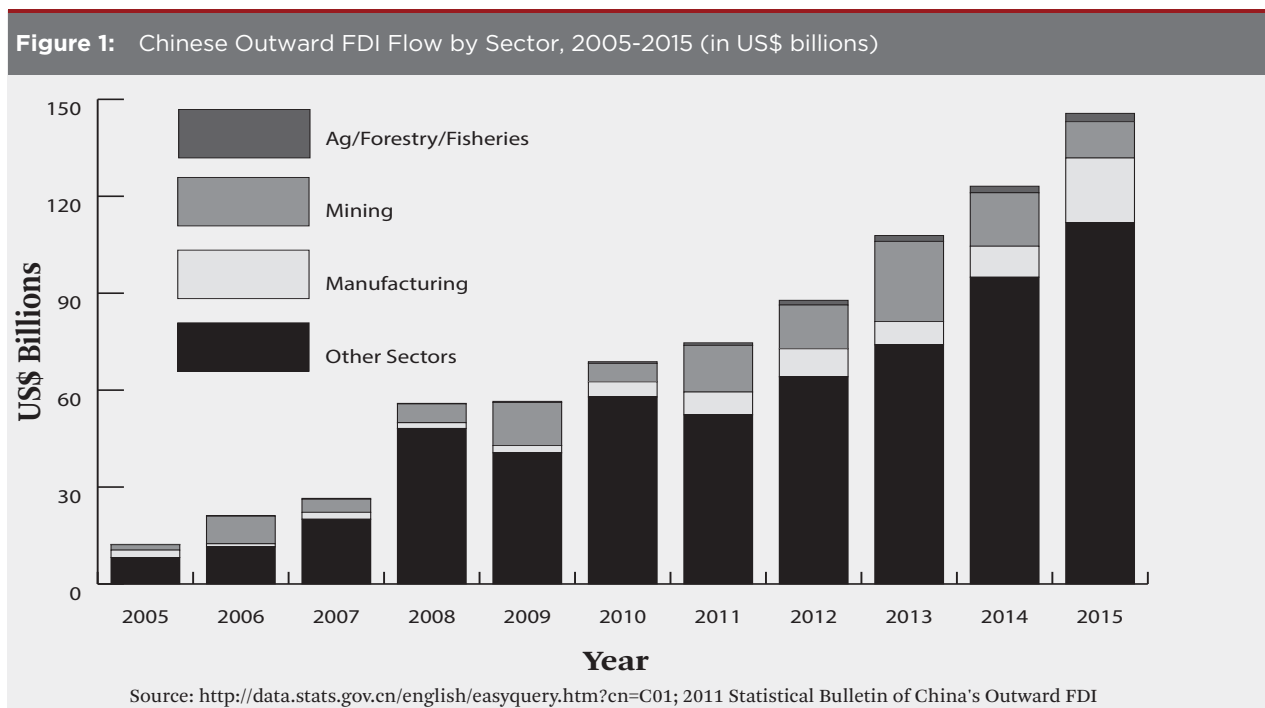
In the early 1990s the Shanghai Textile Industry Bureau set up a company in Mauritius, Hong Kong-Shanghai Textile *Ltd.*, to export to the European Union and in so doing avoiding quotas that had been imposed on goods coming from China. Elsewhere, by 1999 the market for black and white televisions in South Africa was dominated by products assembled locally by a Chinese firm, Shanghai Guangdian Company.⁸ 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.⁹ South Africa received the highest share (83), but the data suggests that 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 US\$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 US\$6 million investment; large Chinese tanneries opened in Uganda and Ethiopia.¹⁰ By 2005, 45 percent of Chinese firms with overseas investment plans, surveyed for a World Bank study, said that they were planning to invest in African manufacturing.¹¹

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 45 manufacturing enterprises out of a total of 69 firms.¹² However, a similar study of 42 Chinese enterprises in Uganda's capital Kampala identified only 7 manufacturing firms.¹³ Likewise, a 2014 survey of 75 Chinese firms in Kenya included only 5 manufacturing firms.¹⁴

Although Africa is clearly receiving investment from Chinese industrialists, it is difficult to obtain data on the value and scope of their manufacturing investment.

While the Chinese government regularly publishes stock and flow data on overseas investment sectors (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 US\$3.43 billion, with over a third of this invested between 2009 and 2012.¹⁵ For the first time, a 2016

official report published data on sectoral breakdown of Chinese overseas FDI in

Table 1: Top Five Sectors of Chinese FDI in Africa, in Terms of FDI Stock in 2015

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

Source: NBS and MOFCOM, Statistical Bulletin of China's Outward Foreign Direct Investment 2015¹⁷

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 US\$4.63 billion in stock values.¹⁶

Both China's Ministry of Commerce (MOFCOM) and African investment approval agencies have data on investment proposals and registered companies. Our review of

MOFCOM data using United Nations Industrial Development Organization (UNIDO) classifications suggested that 33 percent of MOFCOM registered companies investing in Africa expressed interest in manufacturing activities.¹⁷ On the other hand, a study by Chen, Tang, and Dollar using the same data coded only 20 percent as manufacturing.¹⁸ Yet a World Bank study of six African countries found that according to data provided by African investment approval agencies, 44 percent of all proposed Chinese investment projects were intended to be in manufacturing.¹⁹ These differences show the danger of using existing data as anything more than a preliminary and suggestive tool. As we show below, we found none of the databases were accurate in 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 evidence is very thin indeed. A survey conducted between 2006 and 2008 of 41 Chinese firms investing in Nigeria, Ghana, Congo, Zimbabwe, South Africa, and Zambia, identified 29 wholly owned private manufacturing firms and 8 joint ventures.²⁰ 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).”²¹ By the end of 2010, 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.²² These are all examples of industries targeting local and regional markets.

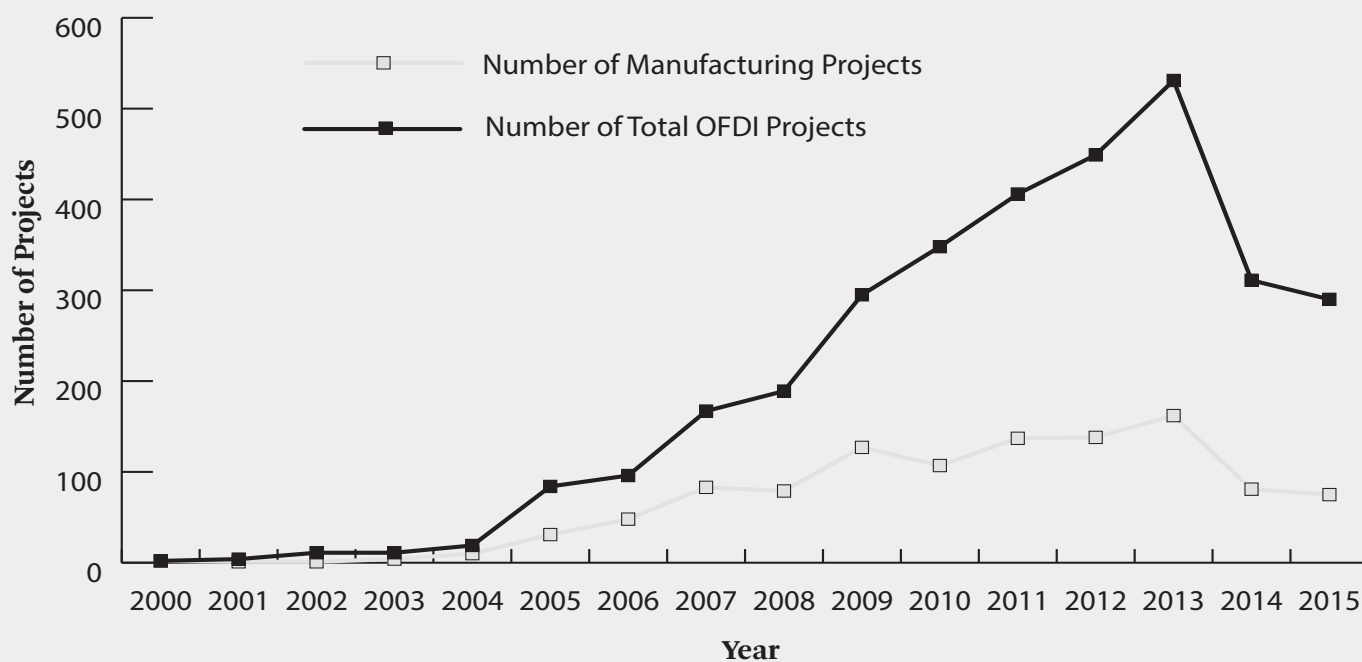
Finally, focusing only on Chinese firms misses out on another important group of investors. Higher costs in China not only push Chinese-owned firms to relocate, but also foreign firms that originally came to China attracted by low wages and other incentives. As a study on the “push” factor in China published in 2011 reminded readers, foreign multinational firms were a key factor in China’s industrialization. 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.”²³ Is this the case?

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 MOFCOM. As of October 2014, investments above US\$100 million are approved centrally, with provincial MOFCOM offices approving those above US\$10 million but below US\$100 million.²⁴ 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 the Appendix for an explanation of our coding scheme.).

Figure 2: MOFCOM Registered OFDI Projects in Africa



Source: Based on data from MOFCOM, 2016.

Our analysis of MOFCOM registered investment projects found that the number of manufacturing proposals submitted by Chinese firms for investment approval in Africa began rising sharply in 2005.²⁵ As Figure 2 shows, they reached a peak of 162 in 2013, with over a thousand proposals having been registered between 2000 and 2015.²⁶ Although not all of these firms will ultimately build factories, the timing of this heightened interest in exploring Africa as an industrial base likely reflects push factors (predominantly cost).

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 then visit Chinese manufacturers in those countries.²⁷ In Ghana and Tanzania we tried to visit or at least confirm the presence of all Chinese manufacturers in the country. In Ethiopia, we only interviewed firms in the leather and textile sectors located in and around the capital, Addis Ababa, while security concerns in Nigeria limited our field visits to the area around

Table 2: Summary of Interview Data on Chinese Manufacturing Investments in Ethiopia, Ghana, Nigeria, and Tanzania

Country	# of Firms (b)	# of SOEs & JVs w/ SOEs (a)	#100% Private	# of Investment Projects (b)	Chinese Employees	Local Employees	Average Value of Projects in US\$ Millions (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 (avg)

Notes:

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

(b) The number of firms include 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 obtain investment values from all firms. For Ethiopia, we have data from 7 firms, 12 from Ghana, 9 from Nigeria, and 13 from Tanzania.

Lagos and the Calabar industrial zone, both in the south of the country.²⁸ In all four countries, we identified the sector and products being produced, the ownership structure, age of the firm, and its patterns of employment. Table 2 provides summary statistics on the firms interviewed.

Identifying a universe of Chinese manufacturing firms in these 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, we found a surprising degree of divergence between the MOFCOM registration data and that collected by the local authorities.²⁹ Table 3 summarizes 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.

Table 3: Chinese Manufacturing Investments - Comparison of Databases and Fieldwork Findings, 2000-2014*

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	Manufacturers Interviewed during Field Studies	Other Manufacturers Confirmed during Field Studies
Ethiopia	161	84 (20 Leather/Garment/Textile)	969 (134 Leather/Garment/Textile)	641	14 (Leather/Garment/Textile)	7
Ghana	157	48	560	183	34	0
Nigeria	314	128	221	92	19	N/A
Tanzania	159	48	N/A	348	27	11
TOTAL	791	308	1,750	1,264	94	18

*Note: In 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 focused on leather and related sub-sectors, the Ethiopian data presented in this paper is not a complete description of Chinese investment in all manufacturing sectors in Ethiopia. Some Ethiopian interviews took place in January of 2015.

COUNTRY OVERVIEWS

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.³⁰ Two investors in particular founded major Chinese industrial groups, still active today: the Lee Group and WEMPCO (owned by the Tung family). In 2013 the Tung family also opened Africa's largest cold-rolled steel mill. Additionally, Nigeria is home to two Chinese-built and managed industrial zones: the Guangdong-Ogun Free Trade Zone and the Lekki Free Trade Zone. Since its opening in 2000 Chinese firms have also clustered within the Calabar Free Trade Zone, located in the Cross River State.

We were ultimately able to identify and visit 19 ethnic Chinese manufacturers in Nigeria.³¹ The more recently arrived Chinese manufacturers were generally clustered in the industrial zones of Ogun State, Lagos State, and Cross River State. We interviewed 18 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. Additionally, several companies were also involved in the assembly of light bulbs, electronic appliances, and vehicles. We also identified a number of Nigerian firms that had "technical partnerships" with Chinese

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

ETHIOPIA

IN 1984, ETHIOPIA AND CHINA SIGNED MOUs for the construction of several factories to produce thread, matches, and pencils.³² However, there is no evidence that these factories were ever built, most likely due to the Sino-Soviet rivalry and Ethiopia's marked shift toward the Soviet Union during this period. In 2001 China's aid program, in conjunction with a commercial management contract signed with a Chinese company in 1999, supported the expansion of Ethiopia's state-owned Awassa cotton mill.³³ Yet due to a prolonged period of political turbulence and an unfavorable investment environment in Ethiopia, there were very few Chinese companies in the country prior to 2004. In 2009, a Chinese steel maker, Qiyuan Group, developed the Eastern Industrial Zone, which was the first industrial zone in Ethiopia. As of January 2015, there were 22 firms doing business in the Zone, although many were service providers, not manufacturers.

Chinese factories in Ethiopia are currently producing building materials, leather and shoes, plastics, and other consumer products. During several visits between 2014 and 2016, we met with 18 Chinese manufacturers in the leather and textile/garment sectors. Furthermore, we confirmed the active presence of Chinese firms producing building materials such as cement, plate glass, gypsum board, and recycled steel in addition to other products like air filters, wigs, and automobile assembly. We interviewed a handful of these firms. Finally, we interviewed several non-Chinese firms that had relocated operations from China to Ethiopia; all of which had Chinese trainers and technical experts on staff.

GHANA

IN THE 1960s AND 1970s, CHINA'S AID PROGRAM assisted Ghana in building the Juapong Textile Mill and a pencil factory in Kumasi; although both survived for decades, neither remains in operation.³⁴ In contrast to the aid program, 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.

We interviewed 33 Chinese firms with active investments in Ghana. In the three areas of Ghana where we conducted fieldwork (Accra, Kumasi, and Tema), we found a significant cluster of Chinese firms in the plastics industry. 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 found large Chinese investments (over US\$10 million) in steel, construction materials, paper/carton, pharmaceuticals, and artificial hair wigs. With the exception

of Rebecca Wigs, which exported some of its products to the neighboring region, Chinese firms focused only on the Ghanaian domestic market. Additionally, six large Chinese factories chose to be located around the Tema Industrial Free Zone and subsequently formed a geographic cluster.

TANZANIA

DURING THE 1960s AND 1970s, CHINA BUILT several state-owned manufacturing projects for the Tanzanian government as part of its aid program. These included the Friendship Textile Mill, Mahonda Sugar Cane and Ethanol Factory, Ubungo Farm Implements, and United Pharmaceuticals, which, with the exception of the textile mill, are no longer in operation. 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 program staff and traders imported Chinese goods to Tanzania, some later setting up factories.³⁵ We interviewed the managers or owners of 20 Chinese companies that have invested in 27 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; plastics (shoes, utensils, plastic recycling, and bag production); construction materials (steel, glass, gypsum, and aluminum tiles);

Table 4: Main Sector Divisions and Products of Interviewed Firms*

Division Number**	Products Included	Ethiopia	Ghana	Nigeria	Tanzania
Division 15: Leather and Related Products	leather shoes, finished, semi-finished leathers	9	0	0	1
Division 13-14: Textiles and Wearing Apparel	textiles & garments	5	0	1	3
Divisions 22 and 38: Rubber and Plastic Products/Materials Recovery	plastic bags, bowls, footwear, plastic pellets	1	16	2	7
Divisions 23-25: Non-Metallic Mineral Products, Basic Metals, and Fabricated Metal Products	glass, steel pipes, aluminum window frames, cement, gypsum board	1	5	6	5

*Table does not include all interviewed firms, only those whose industry fell under these specific sector divisions

**Division coding is based on the UN International Standard Industrial Classification (ISIC) Revision 4

and agri-processing (tannery, cashews, honey, and sisal). Individual factories produced furniture, paint, and bottled oxygen. Of these, over a third (12) of Chinese investors made plastic shoes. As of July 2014, nine manufacturing projects were reported to have each invested over US\$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) comprised the four companies exporting almost all of their products, according to our field data. Meanwhile, the remaining firms sold their output in the domestic market. Many Chinese factory owners were from the Fujian province and were connected to each other through familial or communal ties.

SCOPE OF INVESTMENT

THE 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 provides an overview of the main sector divisions and products produced by these firms.

RUBBER AND PLASTIC PRODUCTS (DIVISION 22)

AT LEAST 26 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 recycling may now be a sunset industry in China, creating an opportunity for recycling firms to seek business elsewhere. We found plastic waste recyclers made up a significant part of small and medium-scale investors in Tanzania and especially Ghana, where a coordinator of the Ghana Plastic Manufacturing Association estimated that there were about 20 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.³⁶ Some Chinese recycling firms produce ethylene vinyl acetate (EVA) pellets while others ground recycled plastics into a powder that provides the raw material for plastic footwear, construction materials, chemicals, and medical supplies. While some sold these materials locally, others exported them back to China for further processing using technologies not yet available in these countries. Furthermore, in February 2013,

the Chinese government launched "Operation Green Fence", restricting the import of containers filled with some kinds of recycling waste.³⁷ This could create additional opportunities for processing of these restricted recycling wastes in Africa, although the costs and benefits 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 dominate the larger-scale plastics industry. In Tanzania, several Chinese firms began by producing simple molded 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.

Although the plastics industry was most well represented in Tanzania and Ghana the scale of production in each country was markedly different. In Tanzania, investments ranged from US\$1.5 to US\$15 million, and local employment from 100 to 500 per factory, with the Chinese backed plastics sector employing an estimated 5,000 Tanzanians. Meanwhile, in Ghana, investments ranged from only US\$150,000 to US\$450,000 with local employment ranging from 10 to 90 employees per factory.

METAL AND MINERAL PRODUCTS (DIVISIONS 23-25)

THE COMBINATION OF THE PACE OF CONSTRUCTION across Africa with the high value nature of the sector can help explain the larger presence of Chinese firms in the production of building materials. About 20 percent 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, aluminum window frames, ceramics, and gypsum board.

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 upon investigating investment opportunities he identified recycled steel as a promising sector.

Other companies were producing metal products out of steel and aluminum, while gypsum board seemed to be a popular product for Chinese factories in Tanzania with at least one in Ethiopia as well. Several Chinese factories imported aluminum ingots to produce window frames and other building materials, using Chinese molds. Only one Chinese factory produced glass, although another imported ordinary glass and treated it to produce tempered and other specialized 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.³⁸ Several other major Chinese building material investments were under discussion or in early stages of construction but had not yet been launched at the time of our field research. These included a proposed plant in Ghana to produce rebar, wire rods, and welded pipe and a US\$1.3 billion iron ore-coal-steel joint venture between Tanzania's state-owned National Development Corporation and Hongda, a private Sichuan firm, in the south of the country. But given the overcapacity of 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 any time soon.

TEXTILES AND APPAREL (DIVISIONS 13-14)

A GROWING NUMBER OF CHINESE FIRMS ARE INVOLVED in textile processing (spinning, dyeing, and fabric weaving) although we found a surprisingly small number to be producing actual garments. One of the oldest Chinese manufacturing firms in Africa is Tanzania's Urafiki (Friendship Textile), a factory built by China's aid program in 1968 located on the outskirts of Dar es Salaam. At full operation, Friendship Textile consumed about a tenth of Tanzanian cotton production and had more than 2,000 workers. It was partially privatized in 1997 by a Chinese company from Changzhou in Jiangsu province, which now owns 51 percent. The Chinese government has bailed out the factory on several occasions using soft loans, and the company is widely believed to stay afloat only because of its political importance to the two governments.³⁹

Tanzania's textile and apparel sector is also home to another large Changzhou based firm, J.D. United (JDU). In 2012 JDU established a subsidiary, Tanzania Tooku Garments Company Ltd., within the William Mpaka Industrial Estate on the outskirts of Dar es Salaam. As of 2014, Tooku employed some 2,500 Tanzanians mainly producing cotton blue jeans and cotton/polyester shirts.⁴⁰

We found almost no Chinese textile or garment factories in Ghana or Nigeria, although it is a growing sector in Ethiopia. In Ethiopia two Chinese factories have been producing fabrics, blankets, and bed sheets for both 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 these investors 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, and Sri Lanka among others, are moving textile mills and garment factories to Ethiopia.

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 a 150% export tax on semi-processed leather (wet blue) in 2008 and again on the next stage of processing (crust) in 2011 to encourage the export of finished leather and leather products, a few Chinese tanneries decided to invest in Ethiopia to secure their leather supply. From 2010 to 2014, seven ethnic Chinese-owned tanneries began operation in Ethiopia and Chinese investors began to set up leather shoe factories in Ethiopia in late 2012. Although most of the tanneries export their products to China, some have begun to supply these new shoe factories.

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

ANALYSIS

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 traveling together.

Table 5: Different Categories of Chinese Geese*

	Ethiopia	Ghana	Nigeria	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	15	0	4

*Table 5 measures number of total firms, *not* number of total investments.

GEESE SEEKING RAW MATERIALS

DESPITE THE BELIEF THAT CHINESE INVESTMENT in Africa is primarily resource-seeking, in these four countries we found only a few examples of manufacturing companies 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, such as sisal processing and honey cultivation in Tanzania. But the most significant group of raw material-seeking investment was found in the cluster of Chinese firms tanning, finishing, and ultimately manufacturing leather 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.⁴¹ 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 remain on hold.⁴² Although several Chinese firms have expressed interest in developing massive iron ore and steel complexes in Africa, none of these projects have materialized. 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 percent of global output.⁴³

LARGE, GLOBAL SUPPLY CHAIN GEESE

THE “FLYING GEESE” MODEL DESCRIBES THE MIGRATION of global production from higher to lower cost countries, with labor-intensive activities being the first to relocate. Here we found a small but significant sample of Chinese firms that have relocated such labor-intensive activities as garment and shoe production to Tanzania and Ethiopia. Although we saw no examples of this kind of “flying geese” in Nigeria or Ghana, other scoping studies outside our countries of focus 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.⁴⁴

Because of its labor-intensive nature, garment production for export is normally one of the earliest activities to offshore when labor costs begin to rise during structural transformation. Thus, garment producers are the first “flying geese” to migrate abroad. JDU (owner of Tanzanian subsidiary, Tooku) produced mainly in China and in Cambodia prior to Tooku's founding in 2012. Their website notes that Tanzania was chosen for its lower labor costs and its access to the US market through the African Growth and Opportunity Act (AGOA).⁴⁵ “As labor 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.”⁴⁶ In Ethiopia, two new firms, New Wide

and C&H, produce garments for American and European 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 labor costs, abundant leather supply, and incentives for duty-free entry into the United States under AGOA and also into the EU under the "Everything But Arms" arrangement (EBA). As production costs increased in China, George Shoes, whose owner is from Taiwan but with 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 as Solano and Brown Shoes. Brown Shoes was particularly influential in helping to pull these firms to Ethiopia.⁴⁷ 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".

STRATEGIC, LOCAL MARKET-SEEKING GEESE

WE FOUND AN IMPORTANT CATEGORY OF CHINESE manufacturing in which entrepreneurs are designating capital for substantial import substitution investments targeting local markets. 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.

Competition from imports of Chinese goods is conventionally believed to have decimated African manufacturing. Yet clearly, a number of the Chinese firms we interviewed moved to Africa because they found the import substitution opportunities quite attractive. Interviewed by *China Daily* in 2014, the deputy general manager of Hongyu Steel, a scrap metal recycler in Tanzania, explained why his firm had moved:

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.⁴⁸

Some of these strategic investors are not yet very large in terms of employment. Sometimes this is because their markets are still small. Xin'an, one of China's largest private agrochemical producers, purchased Sunrise, a small Ghanaian agricultural chemicals trading company and former customer, in order to use its sales channels, social network, and licenses. After the acquisition in 2012, Xin'an Sunrise invested in a filling factory in Kumasi. Although the factory mainly adds liquid to an imported solid chemical base and bottles the reconstituted pesticide, transport costs were significantly reduced. With only 180 employees, Xin'an Sunrise has captured 36 percent of the relatively modest Ghanaian market but plans to expand into the rest of West Africa.

Yet others are quite substantial as they employ large numbers of local workers. In 2004, Wang Nianrong, 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.⁴⁹ He decided to test the Nigerian market by importing yogurt and milk beverages, products that soon became popular with Nigerian children and youth. As of 2014, his firm was said to employ nearly 2,000 Nigerian workers. Similar in size, Hongda Steel in Nigeria employs some 3,500 Nigerians in its recycled steel factor while Rebecca Wig, manufacturing artificial hairpieces in Ghana, has around 900 local employees.⁵⁰

OPPORTUNISTIC SMALL GEESE, TRAVELING TOGETHER

OUR FINAL CATEGORY WE CALL “small geese, traveling 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, the original Chinese investor in plastics was a trader from Fujian. In 2000 he noticed that local production could be made more profitable and went on to open the first Fujian company in Tanzania. His younger sister has a factory of similar size and his elder brother has a smaller one (over 100 workers) in Dar es Salaam. Later a friend of his cousin and then the aunt of his son in law came to invest in a plastic footwear factory. Flash forward to today and ten out of the 12 Chinese industrialists in the plastic recycling and products sector are from the coastal province of Fujian. Being related does not necessarily mean that these firms help each other, however. Though they are relatives and friends, price competition remains tied to market forces. People “do not care about familial relationships when it comes to business,” the trader noted when interviewed.

Some small firms have moved beyond their original host country to neighbors in the region. A Chinese entrepreneur, who had come to Ghana in 1997 as a trader, is one such example. 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-molding 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.

NOT CHINESE, BUT FLYING GEESE?

BRAUTIGAM DOCUMENTED HOW NIGERIAN TRADERS learned about manufacturing processes through site visits to Asian factories, later using their contacts and knowledge to become industrialists themselves.⁵¹ During the course of this research, we found several African firms in Nigeria that had followed such a pattern, contracting with Chinese experts to transfer technology and build skills in their own factories. In

the town of Newi, 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. Other firms had also previously employed Chinese experts for temporary training purposes. Some Nigerian firms had also sent staff to China for training when opening new product lines and in one case, six staff members were even sent to learn Mandarin.⁵²

We also identified several non-Chinese firms in the leather gloves, shoes, and garment sectors in Ethiopia and Tanzania that had moved some labor-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 African workers. As one Italian factory director--with 30 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."⁵³ 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 by 2014 had over 2,000 workers. The Winds Group employed dozens of Chinese specialists to train their Tanzanian workers.

CHALLENGES AND OPPORTUNITIES FOR AFRICA

BELOW, WE SUMMARIZE a set of challenges and opportunities that we see arising from Chinese manufacturing investment in Africa.

A. IMPORT SUBSTITUTION

ONE OF THE PERHAPS SURPRISING FINDINGS of our study was that of all the firms interviewed, 48% (42) were producing solely for the host country market with an additional 10 firms also exporting only within the region. In most, but not all, of these cases the companies manufactured 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% in Tanzania and 35% in Ethiopia.⁵⁴ 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.

B. ADDING VALUE TO RAW MATERIALS AND LOCAL INPUTS

SOME CHINESE FIRMS WERE ADDING VALUE to raw materials through processing. In some cases they went on to export most or all of the products. We found this pattern among the tanneries in Ethiopia, a Chinese-owned sisal farm in Tanzania, and several textile factories that use 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 era, for example. Particularly in Ghana’s plastics industry, local firms have 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, Indian firms dominate the production of recycled steel. Yet it is likely that other niche opportunities exist for Ghanaian entrepreneurs to exploit. We see some trace evidence of this beginning to occur in the plastics sector.

C. POWER AND TRANSPORT INFRASTRUCTURE

ALTHOUGH THE CELL-PHONE REVOLUTION has improved communications immensely, power and transport continue to be challenges for many firms in Africa. The difficulties of power and transport logistics 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 maximize 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.”⁵⁵ 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.

D. INDUSTRIAL ZONES

GIVEN THE RELATIVELY POOR INFRASTRUCTURE and lack of industrial services available in many parts of Africa, and influenced by their own experience in China where industrial parks are ubiquitous, some Chinese companies have favored 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 offer security benefits, mentioned by several interviewees as a reason why co-locating increased their “comfort level.” For example, Rider Steel, a firm from Shandong Province, invested over US\$25 million in a steel factory in Ghana’s Tema Export Processing Zone 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.”

E. ECONOMIC INSTABILITY AND INEFFICIENCY

A NUMBER OF THE CHINESE FIRMS INTERVIEWED told us that economic instability in the region and changing prices, mainly due to shifts in commodity prices as well as local exchange rate shifts, 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 dealing with local bureaucracies was very slow: 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 millimeter steel rod was sold at US\$1,100 per ton in the market, but last year the price dropped to US\$760. And we estimate the price will come down to US\$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, several firms still listed on official lists as "Chinese manufacturers" in the country had exited the market when their input prices rose sharply during a period of economic instability.

F. LABOR RELATIONS AND SAFETY

SOME CHINESE FIRMS ENCOUNTERED SAFETY PROBLEMS and were non-compliant with local regulations, which in turn led to protests and strikes. For example, in Tanzania, Tooku experienced labor protests in 2014 and a labor strike in late 2015, which might have dissuaded them from further investment. We heard some feedback pertaining to 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 Chinese non-compliance with regulations created to provide protections for permanent workers. Hongxing Steel in Nigeria was closed several times for safety and other violations, and was even castigated as a "slave-driver" on Nigerian social media.

G. ENVIRONMENTAL ISSUES

WE FOUND EVIDENCE THAT SOME CHINESE FIRMS have brought technologies that produce more pollutants to Africa. This is not to be unexpected, as tighter environmental regulations are often a push factor for firm relocation, and China's environmental restrictions are in general being enforced more vigorously. For example, Baoyao Steel in Nigeria bought and imported the physical assets of an old steel plant in Shanghai that had been shut down by the Chinese government due to tighter environmental

standards. We also noted that both Ghana and Tanzania continue to use plastics that are banned in China. For example, polypropylene bags, which are banned in China because they cannot be recycled, remain in production for local use in Africa. Conversely, the Chinese government only allows firms to produce biodegradable plastic bags. The machines and technicians in the polypropylene recycling sector thus found their way to Ghana, where PP recycling was still considered to be a progressive step.

H. IMPACT ON AFRICAN FIRMS

BASED ON OUR PRELIMINARY FINDINGS, it appears that Chinese firms may be competing more with imports and other foreign firms in country than with African manufacturers themselves. 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.

I. TECHNOLOGY TRANSFER AND SKILL DIFFUSION

WE EXPLORED THE HORIZONTAL AND VERTICAL LINKAGES between Chinese 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 interviewed. This translates into considerable diffusion of skills learned on the job, and the introduction of factory culture as a source of employment for young people, many of whom had likely never worked in factories before. However, we can summarize 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 (although textiles may be emerging as a cluster in that country as well).

Meanwhile, 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 yet show many signs of working directly with local suppliers to improve quality, their demand for higher quality inputs have in some cases led to technology upgrades by local firms. This form of learning may prove to be a more enduring phenomenon than inter-firm transfer in a competitive environment.

CONCLUSION

AS WE NOTED AT THE START OF THIS PAPER, manufacturing is difficult for Chinese firms in these four countries. We encountered many tales of entrepreneurs opening factories in one business and then having to close their doors. 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 to 400 percent. Although this entrepreneur was able to purchase his own land, production has yet to resume. A businessman from Taiwan opened a shoe factory in Ghana in 2004, using imported raw materials (artificial leather). At its peak, he employed about 200 Ghanaians. A decade later, due to cheaper competition from imports, employment had fallen to only 30 with a similar shrinkage in both production output and profit.

In Ethiopia, Ghana, Nigeria, and Tanzania Chinese manufacturing firms have a significant and growing presence. Chinese manufacturing investors seem to be mainly located in the fabled "missing middle" – neither small, nor large. Yet so far, the firms in our study seem to primarily be replicating the experience of earlier foreign investors (Indian, Lebanese, and 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 US\$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.

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 industrialization.⁵⁶ In general, despite the challenges outlined above, Chinese firms were optimistic about the opportunities for production in Africa. To close with an optimistic example of what could be the future of Chinese manufacturing in Africa we can look to HSJQ. HSJQ has invested heavily in Ghana for its two paper mills. Back in China, the company was operating steel plants, cement factories, wood processing plants, 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 as they have already done with their paper mills. ★

APPENDIX

CODING METHODS

The definitions and standards we use for coding in this paper are based on the international standard of industrial classification adopted by the UN (International Standard Industrial Classification of All Economic Activities, Rev.4, or ISIC Division) with a few modifications. According to ISIC, manufacturing refers to “the physical or chemical *transformation* of materials, substances, or components into *new products*,” including “*substantial alteration, renovation or reconstruction* of goods”. Therefore, production, processing, assembly of manufactured products, smelting and refining are considered manufacturing. Ready-mixed concrete production, leather tanning and operation of slaughterhouses are also considered manufacturing. However, we depart from the ISIC classifications in these specific activities.

- ISIC considers “maintenance and repair of industrial and commercial machinery and equipment” (Division 33) to be manufacturing, but we do not include these activities as such.
- ISIC does not classify the production of plastic pellets and other raw material from recycled plastics to be manufacturing, but we do include this as manufacturing.
- ISIC considers some agricultural processing activities to be manufacturing (such as rice milling, Division 10) but does not consider cotton ginning or sisal processing to be manufacturing. We classify all post-harvest, mechanized, value-addition agricultural processing as manufacturing.

To elaborate we continue with the following examples. Shandong Jichai New Energy Tech Co. Ltd. registered with MOFCOM for opening a subsidiary in Algeria in 2004, and the business scope of the subsidiary includes production and assembling of gas and oil power generation equipment, import of parts and components, maintenance of power plant and after-sale service, etc. This is categorized in our data as manufacturing (at least in intention) as it includes *production* and *assembling* of equipment. Xiangtan Shenzhoulong Industry Co. Ltd. established a steel company in Algeria, and its business scope is described as steel smelting and sale of steel products, which is also considered as manufacturing as it involves *smelting*. Other key words to determine manufacturing projects includes *processing* (shengchan) and *spinning* (fangzhi), etc.

In comparison, the business scope of project no. 3200201000100 states as “transportation of large equipment, loading, offloading and installation of large equipment, car repair, sale and maintenance of car components and equipment.” This project is NOT considered as manufacturing because without production process, *installation* and *maintenance* alone are not considered to be of manufacturing status. Similarly, in project no. 1000201400308, oil drilling and remedial well treatment and service are not considered as manufacturing.

INTERNATIONAL STANDARD INDUSTRIAL CLASSIFICATION REVISION 4

MANUFACTURING :

Division	Products
10	Manufacture of food products
11	Manufacture of beverages
12	Manufacture of tobacco products
13	Manufacture of textiles
14	Manufacture of wearing apparel
15	Manufacture of leather and related products

16	Manufacture of wood and of products of wood and cork, except furniture; articles of straw and plaiting materials
17	Manufacture of paper and paper products
18	Printing and reproduction of recorded media
19	Manufacture of coke and refined petroleum products
20	Manufacture of chemicals and chemical products
21	Manufacture of basic pharmaceutical products and pharmaceutical preparations
22	Manufacture of rubber and plastics products
23	Manufacture of other non-metallic mineral products
24	Manufacture of basic metals
25	Manufacture of fabricated metal products, except machinery and equipment
26	Manufacture of computer, electronic and optical products
27	Manufacture of electrical equipment
28	Manufacture of machinery and equipment n.e.c.
29	Manufacture of motor vehicles, trailers and semi-trailers
30	Manufacture of other transport equipment
31	Manufacture of furniture
32	Other manufacturing
33	Repair and installation of machinery and equipment

Source:

International Standard Industrial Classification of All Economic Activities, Rev.4 (2004), available at: <http://unstats.un.org/unsd/cr/registry/regcst.asp?Cl=27>. In addition, classification of specific activities under ISIC Rev 4 can be found at: <http://unstats.un.org/unsd/cr/registry/regcia.asp?Cl=8&Lg=1&Co=G&p=8>.

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25. We have been unable to determine why exactly investment registrations dropped in 2014 and 2015, but it may be due to the above-mentioned changes in administrative procedures. Before the 2014 regulation, MOFCOM approval was one of the preconditions for obtaining clearance from the customs and foreign exchange administration, but the 2014 regulation canceled this requirement. Therefore, investors now have the option not to record investment projects with MOFCOM, which may especially be the case when government incentives are not expected.
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38. Ghana had several Chinese firms registered as cement firms but we found no evidence that they were actually in operation. A local Nigerian, Dangote and French firm, Lafarge dominate the cement market in Nigeria. Although the Chinese firm, Sinoma, was contracted to build cement plants for both Dangote and Lafarge, Sinoma did not invest in this sector itself.

39. In interviews, we learned that (Chinese) managers felt 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 and that the political significance would outweigh the economic consideration. As a "model enterprise," the mill pays the equivalent of 16 percent of the workers' total income to cover the labor 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 and business areas. Therefore, despite good sales, it still suffers losses due to high costs.
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