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Estimating the Scale of Relocation of Labor-Intensive Manufacturing from China: Facts and Potentials

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Acronyms

BGD	Bangladesh
BRI	Belt and Road Initiative
CHN	China
CIED	China Industrial Enterprises Database
CPTPP	The Comprehensive and Progressive Agreement for Trans-Pacific Partnership
CNTAC	China National Textile and Apparel Council
ETH	Ethiopia
EU	European Union
FGP	Flying-Geese Paradigm
GDP	Gross Domestic Product
GNI	Gross National Income
IDN	Indonesia
KHM	Cambodia
LPG	Labor productivity growth
MMR	Myanmar
MOFCOM	Ministry of Commerce of the People's Republic of China
NBS	National Bureau of Statistics of China
NSE	New Structural Economics
OBM	Original Brand Manufacturer
ODM	Original Design Manufacturer
OEM	Original Equipment Manufacturer
OFDI	Outward Foreign Direct Investment
PRD	Pearl River Delta
PTA	Preferential trade agreement
RMB	Renminbi
SEA	Southeast Asia
SSA	Sub-Saharan Africa
SSS	Social Security Scheme
TCF	Textile, Clothing and Footwear
UNCTAD	United Nations Conference on Trade and Development
USD	United States Dollars
VNM	Vietnam
WTO	World Trade Organization
YRD	Yangtze River Delta

Executive Summary

THE miraculous economic development over the past forty years has transformed China from a poor and backward country into a prosperous and industrialized nation. As China will soon join the ranks of high-income economies classified by the World Bank, mass production of labor-intensive manufacturing may no longer be viable and industrial upgrading to higher value added economic activities is needed to carry forward China's growth in the future. The challenge of a successful structural transformation posed for China also presents a golden opportunity for other developing economies, as they are, given abundant supply of labor, well suited to take over low-skill labor-intensive manufacturing from China. Due to the scarcity of data, the current state of manufacturing relocation from China remains underexplored. By looking through a wide array of "outcome variables" of relocation based on publicly available data and first-hand information gathered through field research, this report evaluates the scale of overseas relocation of Chinese manufacturing production, both from a conceptual point of view and an empirical point of view.

This report finds that the ongoing relocation of labor-intensive manufacturing from China is mainly led by clothing and footwear industries. More specifically, about 25%-35% of clothing manufacturing (in terms of the value of exports) have shifted from China to other countries and regions. Although the scale of relocation is somewhat smaller for footwear, it is estimated to be no less than 15%. Countries that have benefitted most so far are those from Southeast Asia, in particular Vietnam, Cambodia and Myanmar. Africa is in the picture as well, but the scale remains far smaller. Nigeria and Ethiopia are the prime destinations in Africa for Chinese manufacturing relocation. Among the firms that have relocated production capacities abroad, Original Equipment Manufacturers (OEMs) for foreign brands (i.e., firms that are export-oriented) are the most common denominator. Due to the rise of Chinese fashion brands in clothing and footwear, a large number of domestic-serving OEMs have also appeared. Rather than relocating productions offshore, these firms tend to opt for relocation within China to inland regions. Thus, dual-relocation of labor-intensive manufacturing from China's coastal regions has taken place, namely inward relocation to inland regions and outward relocation to other countries.

In accordance with the prediction of the Flying-Geese Paradigm, rising labor costs is one of the key driving forces behind China's manufacturing relocation abroad. It should be stressed that not only has wage rate increased significantly in China in the past 10-15 years, but non-wage labor costs (e.g., the obligation to pay for the social security scheme for the employees) have also surged and inflicted great cost pressure on Chinese labor-intensive manufacturers. The other key driver that is repeatedly mentioned by business owners and experienced industry practitioners is the pressure of the increasingly stringent regulations of environmental protection. It is no secret that the fast-pace industrialization in China has been achieved, to some extent, at the expense of environmental degradation. Strict measures have been put in place since the early 2010s to mitigate pollution resulted from industrial production and greater emphasis is placed on sustainable and green development since then. Due to differences in environmental protection standards in other countries or regions, this has provided another incentive pulling firms to shift their productions offshore. As most of the relocating firms are export-oriented OEMs, favorable tariff rate enjoyed by

the recipient countries is also an important driver of the past and ongoing manufacturing relocation from China.

As opposed to clothing and footwear industries, the relocation of other labor-intensive manufacturing industries, such as household appliances, did not take place at a noticeable scale for three key reasons. First, the reliance on labor is much lower and the costs of labor as a share of total production costs are very small. According to on-site interviews with business owners (both large and small household appliances producers), labor costs account for merely 7% to 8% of total production costs. Thus, the impact of rising labor costs on the household appliances industry is quite limited. Second, the complexity and the length of the supply chain of the household appliances industry have made offshore relocation all the more difficult. It is typically the case that 50% or more of the components of household appliances production are sourced externally and by hundreds of (multi-tier) suppliers. Third, the cost of establishing an appliance factory is too high to justify relocation based on labor cost advantages provided in potential recipient countries.

While production automation technologies have advanced at an unprecedented rate and scale, the impacts on clothing and footwear industries are still quite limited and this is especially true if cost-benefit analysis is taken into account (i.e., it may not be economical even if certain production stages or tasks can be automated by machines or robots). Based on in-depth interviews with business owners, the use of machinery or automation technologies in clothing and footwear production is not meant to replace workers, but to equip them with better 'tools' such that labor productivity and product quality can be improved. Even if the installment of machinery could reduce a certain number of workers, this is more of a 'side-effect' rather than a preset goal. Moreover, according to the projections of business owners and industry practitioners, the vision of having apparel or footwear production fully or largely automated (within a viable cost range) is not yet in sight. Thus, as the Chinese economy keeps on growing and upgrading, industrial relocation from China is expected to continue and SE Asia is likely to remain the most popular destination in the near future. This is because (1) wage rates in SE Asia are still quite competitive vis-à-vis the wage rates in China; (2) favorable tariff rates enjoyed by SE Asian countries is a key factor that will keep motivating (export-oriented) firms shifting productions outside China. The fact that Vietnam has officially signed the CPTPP in January 2019 and the hazy outlook of trade frictions between China and the US would further catalyze China's manufacturing relocation abroad. Large-scale relocation to Africa has not materialized yet, but the potential looms large in the long run, as Africa is projected to host the world's largest pool of labor by 2050, making the continent the most competitive region for labor-intensive manufacturing production. Having said that, international industrial transfers are not manna from heaven. The extent to which the relocation of Chinese manufacturing could reach the African continent depends on various locally-determined binding factors, such as socio-economic stability, business environment and labor discipline. After all, the cost competitiveness of a country hinges on the summation of factor costs of production and transaction costs. Low-cost labor is only a necessary but insufficient condition in attracting production relocation. A successful large-scale transfer of labor-intensive manufacturing from China would require African countries to keep the transaction costs in check such that their latent comparative advantages in labor-intensive manufacturing can be turned into competitive advantages.

1
Introduction

Ever since the implementation of economic reforms and the opening-up policy in the late 1970s, the Chinese economy took off and embarked on a remarkable growth path. According to data compiled by the World Bank Group, the gross domestic product (GDP) of China, measured in real value terms, has been growing at a compound growth rate of 9.3 per cent per annum in the past forty years. Such a high rate of growth sustained over a time span of forty years is unprecedented in human history.[1] This miraculous growth performance has also allowed China to lift hundreds of millions of people out of poverty and quickly climbed up the ladder to join the ranks of upper-middle income countries in 2010.[2] According to the latest data from the World Bank (2018b), GDP per capita in China has reached over 9,600 US dollars in 2018 and is expected to surpass the threshold of high-income economies in just a few years.

As the economy keeps on advancing or even leapfrogging, factor endowments, industrial and economic structure in China have also experienced unceasing adjustments, changes and upgrading over time. Some of the industries that have helped China to ignite its engine of growth and industrialization, such as labor-intensive manufacturing industries, are quickly losing or have already lost their comparative advantages vis-à-vis the other (catching-up) developing economies, such as Vietnam, Cambodia and Ethiopia. It is argued that China is on the verge of graduating from labor-intensive manufacturing production (e.g., Lin, 2012a) and industrial upgrading to higher value-added economic activities are required to carry forward China's growth in the future. The challenge of a successful economic transformation and upgrading posed for China also presents a golden opportunity for other developing economies that are longing for the kick-off of industrialization and sustained growth, as

[1] A few other countries have also exhibited high growth rates over an extended period of time. For instance, Japan in the period of 1950s-1970s and the Four Asian tigers (i.e., South Korea, Taiwan, Hong Kong and Singapore) in the period of 1970s-1990s. Nonetheless, the growth performance of China is even more miraculous. For one, China maintained high growth for a longer period of time (i.e., over a time span of forty years). For two, China did not follow the mainstream economic theories in developing its economy. Instead, China had chosen a so-called dual-track approach, which was deemed as worse than no reform. For more detailed discussions on the dual-track approach adopted by China in its early stages of development, please refer to Lau, Qian, and Roland (2000).

[2] According to estimation, about 850 million people in China have been lifted out of poverty. The classification of different income groups is introduced by the World Bank in 1978 based on a measure of national income per person (i.e., GNI per capita). Currently, four different income groups are identified: low-income, lower-middle, upper-middle, and high-income countries. The thresholds used to distinguish between the income groups are time variant and adjusted for prices over time. According to the thresholds used in 2010, countries with a GNI per capita between $3976 and $12195 were classified into the upper-middle income group. China's GNI per capita (calculated based on the Atlas method) was $4260 in 2010.

these countries (given their abundant supply of surplus labor) are well positioned to take over low-skill labor-intensive manufacturing production from China.

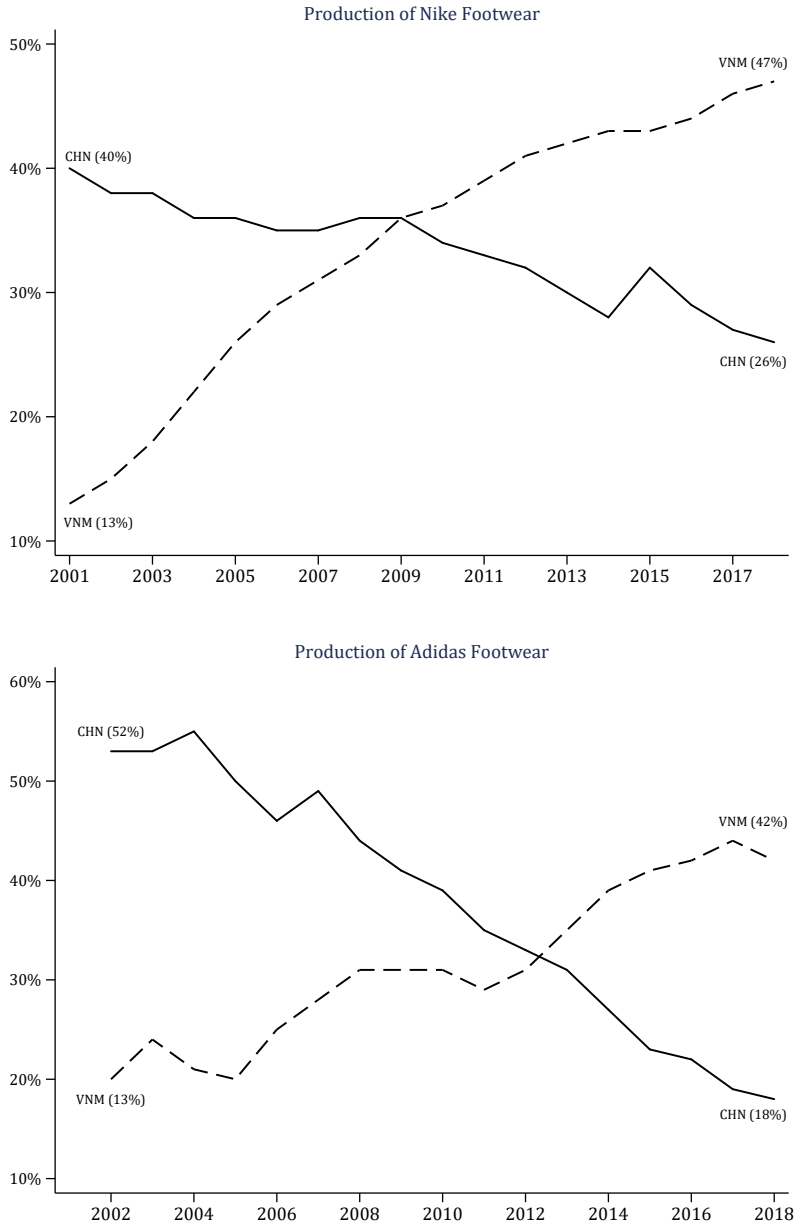
Fragmented evidences have already surfaced that many labor-intensive manufacturing activities have shifted from China to other countries and China's status as the world's factory is facing increasing challenges.[3] One salient feature of this ongoing shift is that it is primarily led by light manufacturing industries, such as textile, clothing and footwear, and the places that have been the beneficiaries of these transfers are uniformly characterized by lower wages and abundant supply of labor. Take footwear manufacturing as an example, the production of shoes of two leading global brands (i.e., Nike and Adidas) has kept on relocating out of China. As of 2013, the largest producer of footwear for both companies is Vietnam (see Figure 1 below). These observations are well in line with the international industrial transfer dynamism portrayed by the Flying-Geese Paradigm (FGP), a development theory pioneered by the Japanese economist Kaname Akamatsu in the mid-1930s and gained wider popularity in the 1960s (Akamatsu, 1962). The key idea behind the FGP is that in the pursuit of (higher-quality) industrial development, the 'leading goose' starts to move from labor-intensive manufacturing to higher value-added capital-intensive manufacturing (i.e., upgrading from consumer goods production to capital goods production), while the 'follower geese' seize the opportunity to emulate and take over the production of lower value-added labor-intensive manufacturing from the 'leading goose'. Both development dynamics are working according to each country's own comparative advantage, determined by the factor endowments, at a given specific point in time.[4] Thus, the orderly industrial transfer from one country to another has a long historical root and the world had already witnessed a multitude waves of these transfers (see Table 1 below for a comprehensive overview of the past international industrial transfers).

While the phenomenon is neither new nor unique to China, a thorough analysis and understanding of this ongoing industrial transfer is much needed and arguably even more important and policy-relevant than any of the preceding waves of transfer. The performance of the world economy as a whole has been laudable for the past few decades. The number of people living in extreme poverty has declined from a startling 1.9 billion in 1990 (36% of the world population) to 730 million in 2015

[3]The rise of global value chains is another reason why China is losing the label as the world's factory, as the final stage of production may take place in China but the production of intermediates used in final assembly come from a wide array of other countries. If one splits the manufactured products by values added across different production stages, final product can be more aptly described as Made in the World.

[4]This development mechanism is formally coined as New Structural Economics by Lin (2012b) and it is regarded as the third generation of development economics.

Figure 1: Outward relocation of footwear production of Nike and Adidas



Source: Annual Reports of Nike Inc. and Adidas AG

(9.9% of the world population).[5] This large-scale reduction, however, is predominantly contributed by poverty reduction in countries from East and South Asia. On the contrary, the number of people in poverty has increased in Sub-Saharan Africa (SSA) from 278 million in 1990 to 413 million in 2015 (an increase of nearly 50% in 25 years). This problem is likely to be exacerbated as SSA is projected to experience explosive population growth in the next thirty years. If the number of jobs is not keeping pace with the rise in (working) population, poverty in SSA will be even more

[5] According to the report on Poverty and Shared Prosperity 2018 by the World Bank (2018a), the number of people living in extreme poverty is projected to further decline to 470 million by 2030.

Table 1: Overview of international industrial transfer since WW-II

No.	Time	Industry	Transferred from (home country)	GDP per capita of the home country	Transferred to (host country)	GDP per capita of the host country	Share
1	1950s	Textile	USA	14572	JPN / DEU	2620 / 4708	18% / 32%
2	1960s	Textile, apparel	JPN	12912	KOR / TWN	1986 / 4708	15% / 36%
3	1970s	Apparel, footwear and household appliance	KOR / TWN	12049 / 19194	CHN	2548	21% / 13%
4	2010s-	Apparel, footwear	CHN	6229	SE Asia / SSA	1914 (KHM) / 2887 (VNM)	31% / 46%

Note: Data on GDP per capita are obtained from the Penn World Table version 9.1 (Feenstra, Inklaar, & Timmer, 2015), which are denoted in 2011 PPP-converted US dollars (numbers correspond to GDP per capita in 1950, 1970, 1990 and 2005, respectively). The last column 'Share' denotes the ratio of GDP per capita of the host country to that of the home country. The last row is shaded in gray, emphasizing the fact that this wave of industrial transfer is still ongoing and the full extent of relocation is yet to play out.

rampant, posing the greatest challenge to achieving a world without poverty. If the outward shift of Chinese labor-intensive manufacturing production could reach the African continent, this may go a long way towards alleviating poverty in Africa, through job creation and even igniting the engine of industrialization at large. Rather than being a leading-goose as portrayed in the FGP, China can be more aptly described as a leading-dragon (Lin, 2012a; Chandra, Lin, & Wang, 2013). This is because the number of jobs and production capacities that are *exposed* to relocation from China are unparalleled in economic history. To be specific, a figure of 85 million manufacturing jobs is often cited as the potential of this ongoing wave of international industrial transfer (Lin, 2012a).[6] By contrast, the number of jobs *exposed* to relocation in the last two waves of industrial transfer are of a much smaller magnitude (i.e., 9.7 million and 2.3 million, respectively). Thus, the impact of manufacturing relocation from China is likely to be far more profound that any of the preceding transfers.[7] Moreover, revolutionary progress in science and technology in the twenty-first century, especially the rise of industrial robots and artificial intelligence, has also made this new wave of industrial transfer unique and of imperative importance to study. Routine and repetitive tasks have been increasingly automated and substituted by machines and robots. This can be widely seen in the automotive industry where the use of robotic arms is pervasive in automobile production.[8] Now, this automation trend has seemed to find its way to transforming or even upending the production norms

[6]The manufacturing sector in China employed over 120 million workers in 2010 (National Bureau of Statistics of China, 2010), of which about 80 million workers can be classified as working in labor-intensive manufacturing industries. The figure of 80 million labor-intensive manufacturing workers is derived according to the dichotomous split of industries between labor-intensive and capital-intensive by Qu, Cai, and Zhang (2013).

[7]Please refer to Figure A1 for a direct comparison of manufacturing employment between China and the potential recipient countries of China's industrial transfer.

[8]In a recent study by Acemoglu and Restrepo (2017), it is estimated that the use of robot arms has a quite sizable negative impact on the employment in car manufacturing.

of traditional manufacturing industries, such as clothing and footwear. As a result, firms' reliance on labor for production is on decline and the impact of rising labor costs on firms' performance and profitability is diminished. Instead of searching for cheap production bases, firms could stay put by substituting workers with (smart) machines or robots.[9] Thus, to what extent the shift of Chinese labor-intensive manufacturing production has taken place and will continue to take place hinges on the extent to which the production processes haven been and can be further automated in the future within a viable cost range.[10]

The goals and contributions of this report are threefold. First and foremost, this report aims to estimate the scale of relocation of Chinese manufacturing production that has already taken place and examine which countries have been the main beneficiaries of this transfer. Second, in addition to identifying the industries and regions that have taken the lead in relocating production capacities abroad, this report also explores the underlying causes behind these patterns. As there are multiple manufacturing hubs located in different parts of China, this report also compares and contrasts these hubs in terms of their varying degrees of production relocation. Third, against the backdrop of the Belt and Road Initiative (BRI) advocated by China since 2013, this research also attempts to inform policy makers about the current state of manufacturing relocation and provides policy implications to facilitate future relocation and cooperation of production capacity among countries located along the route of BRI as well as those in Africa. To the best of our knowledge, this is the very first study to examine these issues altogether.[11]

As there is no data directly available, this research relies on two major sources of information that function as complements to one another to *indirectly* gauge the scale of relocation from China. One major source of information is based on publicly available data, which can be seen as the outcome variables of production relocation. For instance, changes in the number of workers employed in the relocating industries. As overseas relocation takes place, workers would be negatively affected

[9]Due to the rise of automation or labor-replacing technologies, there is increasing attention on their impacts on employment outcomes. In particular, some of the early offshored production activities from industrialized nations may now be reshored back (Artuc, Christiaensen, & Winkler, 2019).

[10]The term, *viable cost range*, refers to the fact that the latest technologies could fully automate the production of manufactured goods, such as shoes using 3D printing technology. However, the cost of 3D printed shoes is too high to be commercialized and mass production of manufactured goods using 3D technology remains far-fetched.

[11]To note, other studies have also shed light on production relocation from China. For instance, using China's Industrial Enterprise Database (CIED), Qu et al. (2013) examined whether labor-intensive manufacturing production has shifted from coastal regions to inland regions within China. Based on a survey sample of 640 manufacturing firms, Xu, Gelb, Li, and Zhao (2017) found that about 6 per cent of the surveyed firms would choose to relocate their production facilities to cope with the rising costs of production in the Yangtze River Delta and Pearl River Delta regions. In a more recent study by Brautigam, Tang, and Xia (2018), they also examined the 'flying-geese' from China in Africa and distinguished four different types.

and the employment level is likely to decline. The other major source of information is gathered through on-site interviews with highly experienced industry practitioners, business owners as well as comprehensive field research that cover a wide range of representative labor-intensive manufacturing industry clusters in China. In short, this report approaches the issue of relocation from two different angles that are complementary to each other: (1) informative evidence summarized from publicly available data, and (2) direct evidence on relocation gathered through field research.

The key findings of this research are as follows. First, the relocation of manufacturing production from China has taken place at a non-negligible scale and it is primarily led by clothing and footwear manufacturing industries. Based on evidence gathered through public data and our field research, the scale of relocation of clothing manufacturing is estimated to be between 25% to 35% in terms of the value of exports. The magnitude of relocation of footwear is estimated to be somewhat smaller, but no less than 15%. The impact of relocation on employment is much smaller relative to production, this is because employment is a 'sticky' variable due to employment protections in China and the expansion of domestic-serving companies (primarily original brand manufacturers) has absorbed some of the workers that were negatively affected by relocation. Second, given uneven levels of economic development, the manufacturing relocation from China's coastal regions can be characterized as dual-relocation, that is, both inward (i.e., within the country) and outward (i.e., across national borders) relocations have taken place. Third, among the firms that have relocated production capacities abroad, Original Equipment Manufacturer (OEM) for foreign brands seems to be the common denominator. Of which, foreign-invested OEM firms seem to have led the way of relocating production capacity abroad, while home-grown Chinese firms tend be the followers. Fourth, unlike clothing and footwear, the relocation of household appliances and furniture are much less observed and the motivation of relocation for these industries tend to be market-driven or resource-driven, rather than being pushed by the rising labor costs. Fifth, countries from Southeast Asia (SE Asia) have benefitted most so far and the shift to SE Asia is projected to continue in the next few years. Sixth, there is enormous potential for African countries to take over labor-intensive manufacturing from China and perhaps even from SE Asia, but this is more likely to materialize in the medium to long run and it would also depend on a range of other 'locally-determined' binding factors (e.g., socio-economic stability, labor discipline and the quality of infrastructure). Since some of the data and evidence that we find are *indirect* measures or proxies for the scale of manufacturing relocation, it is important to emphasize upfront that the estimated magnitude of

relocation for clothing and footwear industries should be seen as *suggestive*. Future research could build on our efforts to examine the scale of relocation in a more quantitatively rigorous manner or from another perspective, such as carrying out field research among the recipient countries of China's industrial relocation.

The rest of the report is organized as follows. Section 2 discusses the key conceptual issues related to relocation and labor-intensive manufacturing as well as the approach adopted in this report to gauge for the scale of relocation. By looking at a wide array of economic indicators based on public data, Section 3 documents a long list of stylized facts about the changes in Chinese labor-intensive manufacturing production. All the indicators shown in this section should be seen as the outcome variables of relocation and are *indirect* measures or proxies for the scale of relocation. Section 4 approaches the issue of relocation based on the information and data gathered through on-site interviews with industry practitioners and business owners during field research. Findings shown in this section serve as complements to those presented in Section 3. Section 5 delves deeper into the causes of manufacturing relocation from China as well as the rationale why certain types of firms and industries are more prone to relocation. The future outlook of further manufacturing relocation is discussed in Section 6. Concluding remarks are provided in Section 7.

2

Definitions and Methods

In this report, relocation is defined as the shift of production capacity from China to other countries or regions.[12] This shift can be understood as physically relocating production plants (in partial or full extent) and/or shifting production orders from China to production sites established abroad. In the latter case, relocating firms may still operate and produce in China (either in smaller scale due to relocation or the scale of production may even remain unaffected or increase), but production capacity is outsourced and employment opportunities are generated in foreign countries. Through field research and interviews with industry practitioners, we found that relocating firms rarely shut down their operations completely in China. Instead, a more common practice is to shift certain labor-intensive fabrication activities to other countries, while sales, design, management and even the supply of raw materials are kept in China. This arrangement suggests that among the traditional labor-intensive manufacturing industries, China is gradually climbing up the ladder of the value chains by moving towards the two ends of the smiling curve.[13]

Given this working definition of relocation, the next question or challenge is how to gauge for the scale of relocation? A straightforward approach would be to survey a representative sample of Chinese labor-intensive manufacturing firms and then count how many firms have shifted production capacity abroad in the past. Based on a sample of 640 labor-intensive manufacturing firms, Xu et al. (2017) found that 62 firms (9.7%) responded to have invested abroad or plan to do so in the next three years.[14] While it is informative to evaluate the likelihood of relocation aboard by Chinese light manufacturing firms as aimed in the report by Xu et al. (2017), this approach may not be suitable for the present purpose of estimating the scale of relocation. The approach counts the number of firms assigning equal weight to all firms, no matter large or small, so it may underestimate the scale

[12] To be precise, relocation can also take place within China from one city to another. Given that the central focus of this report is on overseas relocation from China, we confine the definition of relocation to be outward overseas relocation, unless otherwise noted.

[13] The smiling curve is a graphical representation of value-adding potentials of different components along the value chain. Both ends of the value chain command higher value-added to the product (e.g., R&D, design) than the middle part of the value chain characterized by fabrication. In a diagram, Y-axis is denoted by value-added and X-axis depicts the value chain across different stages of production, and the resulting curve appears like a "smile".

[14] It is noted in their report that the modest share of relocation may suffer from a significant downward bias, as it cannot capture firms that have already relocated their production and operation in their entirety prior to the survey.

of relocation by large firms.[15]

To illustrate this point, think of a scenario where a country has one super-sized firm that accounts for 40% of the nation's total output and the remaining 99 firms account for the rest of the 60% (see Table 2). Suppose that only the super-sized firm had relocated its production capacity abroad and 50% of its production is shifted offshore. If each firm is counted as equal in size, then only 1% of production relocation would be found to have taken place. Whereas, the actual scale of relocation in terms of production capacity should be 20% (a significant downward bias by 20 times). Although this is a hypothetical example, it well resembles the realities and economic structure in China. Among the labor-intensive manufacturing industries, such as TCF, super-sized firms are well represented and they are also the leading players of China's manufacturing relocation. Take footwear manufacturing in Houjie (Guangdong) as a real-life example. In about 100 (above-scale) footwear manufacturers located in Houjie, the production of the top ten largest firms account for approximately half of its total production and 5 out of the 12 largest footwear producers in the region have relocated productions abroad.[16]

Table 2: A hypothetical example on the scale of relocation

	Super-sized firms	Average-sized firms
Number of firms	1	99
Share of output	40%	60%
Whether productions have been relocated abroad	Yes	No
The scale of relocation (firm-level)	1/2	none
The scale of relocation (country-level)	20%	0%
Total scale of relocation (counting by firms)	**1%**	
Total scale of relocation (actual)	**20%**	

In an ideal world, one should survey the universe of Chinese labor-intensive manufacturing firms asking *whether*, *when*, *where* and *to what extent* the firm has shifted productions abroad. This is, however, very difficult to implement, if not impossible. For one, firms are not obligated to take part in the survey and not all firms can be expected to cooperate. Second, firms that have shifted their

[15]Note, this is not intended as a critique to discredit the contribution of Xu et al. (2017), as the goal of their report is to identify the attributes of firms that are more prone or exposed to relocation. Instead, this point aims to illustrate why the survey sampling methods may not be best suited to examine the issue of the scale of relocation, which is the prime goal of this report.

[16]According to data provided by the local bureau of statistics, the exact range of the output share accounted for by the ten largest footwear manufacturers are between 42% and 59% in the past ten years. In addition, another good case in point to illustrate the presence of super-sized firm is Shenzhou International, a tycoon in textile and clothing manufacturing headquartered in Ningbo. The company has a market value of over 20 billion USD and produces about 400 million pieces of knitwear per year. At the moment, about half of its production capacity have been shifted to Cambodia and Vietnam.

operations and productions entirely abroad would still be missing from the survey. This point is also stressed in the report by Xu et al. (2017). As export-oriented firms are, ceteris paribus, most prone to offshore relocation, we take exports of labor-intensive manufacturing goods as a fair indicator to gauge for the scale of relocation. In other words, if relocation has taken place in China and is driven by exports-oriented firms, it must show up in exports statistics. More specifically, exports from China should decrease and exports from the recipient countries of China's manufacturing relocation should increase accordingly.

There is a multitude of reasons why export-oriented firms are most prone to relocation. First, relative to firms serving the Chinese domestic market, export-oriented firms do not need to incur additional transportation costs of shipping goods back to China and can fully enjoy the benefits of low-cost labor in the host country. Second, favorable tariff arrangements (i.e., preferential trade agreements) are common among the recipient countries of relocation, such as Vietnam and Cambodia, which face extremely low or even zero rate of customs duty when exporting to Japan, the EU and the US. This tariff advantage provides another strong cost incentive for export-oriented firms in China to shift productions offshore. Third, export-oriented firms are more exposed to global market risks. The establishment of production bases in different countries helps to strengthen the risk-resilience of the firms in the global marketplace as production activities and operational risks are diversified across different countries. Fourth, the recipient country of production relocation may be the destination of the firm's exports. Thus, export-oriented firms may choose to relocate in order to be closer to the market, thereby decreasing transportation costs and transaction costs involved in trade.[17]

Besides exports, which is taken as a key indicator for relocation in this report, a list of other indicators or variables are also of interest to examine, such as changes in gross output and the level of employment in China. If cross-border relocation had taken place at a sizable scale, these indicators are likely to be on decline as well, as productions would take place abroad and workers may be displaced due to the shift of production activities. It is important to emphasize that while it is indicative to look at these variables, we are fully aware of the fact that these are "outcome" variables of relocation, which means that relocation would inevitably lead to changes in at least one of these variables, while changes in any of these outcome variables may not *necessarily* imply

[17]The report by Xu et al. (2017) also discussed a few other reasons why export-oriented firms are likely to relocate productions abroad. To remain concise, these reasons are not listed here.

relocation. Thus, in addition to looking at the outcome variables of relocation, we also made great efforts to gather direct and hard evidence on relocation through (1) information disclosed in firms' annual reports; (2) extensive field research on labor-intensive manufacturing industry clusters; and (3) in-depth interviews with experienced industry practitioners and business owners. In total, eleven representative industry clusters are surveyed in the report, covering four different labor-intensive manufacturing industries (see Table 3 for more details or Figure A3 for geographical representation). The coverage of a wide range of industry clusters helps us to uncover the prime origins of relocation (both within the country and abroad) as well as the underlying causes (e.g., why certain region is more prone to offshore relocation than others). Each different piece of evidence gathered in this report should be seen as a piece of the puzzle, which complements one another in forming a clearer picture of relocation patterns.

Before proceeding, it is also helpful to define the notion of labor-intensive manufacturing. This is a relative concept and depending on how labor intensity is measured, different sets of manufacturing industries may be considered as labor intensive.[18] Without losing sight of the big picture, this report focuses on three specific labor-intensive manufacturing industries, namely Textile, Clothing and Footwear (TCF). This narrow focus might be somewhat restrictive, but it is not without good reasons. First, these industries are arguably the most labor-intensive ones and hence less sensitive to different measures of labor intensity. Second, the TCF industries have much better data availability relative to other manufacturing industries. This is a highly desirable feature as it allows us to examine the outcome variables for these industries through different sources and angles, bolstering the robustness and reliability of the findings. Third, as revealed by our field research on eleven representative industry clusters, the current production relocation of Chinese manufacturing is mostly driven by clothing and footwear industries, making these the most relevant ones to examine at this stage. Note, it would have been ideal to show the size of each industry cluster in terms of its production, employment, the number of firms, or exports. Data on these key indicators, however, are not readily available. Nonetheless, these industry clusters are considered as representative or particularly relevant for examining the issue of relocation, as they are either traditionally and widely known as (one of) the largest industry clusters in China or they are recommended by experienced industry experts as an important industry cluster to study. Please refer to Table 3 for remarks on the key features of each industry cluster covered in the report.

[18] It can be measured as a share of labor compensation in total value-added or the inverse of capital-labor ratio (see e.g., Qu et al., 2013; Wang, Xia, & Xu, 2020).

Table 3: The coverage of field research on labor-intensive manufacturing industry clusters

Industry	Province	City	County	Feature / Remarks
Footwear	Zhejiang	Wenzhou		The first-batch of China's footwear manufacturing cluster formed in the Yangtze River Delta (YRD) region in the early 1980s; specialized in leather shoes.
	Fujian	Quanzhou	Jinjiang	The largest sports shoe cluster in China; home to three of China's four largest sports shoes makers (e.g., ANTA).
	Guangdong	Dongguan	Houjie	The first batch of China's footwear manufacturing cluster formed in the Pearl River Delta (PRD) region; famous for medium-high-end shoes manufacturing.
Textile/ Clothing	Jiangxi	Ganzhou	Yudu	Recipient of textile and clothing industrial relocation from coastal regions, in particular from the PRD region.
	Guangdong	Zhongshan & Foshan	Shaxi	The first-batch of China's textile and clothing manufacturing cluster formed in the PRD region.
	Zhejiang	Ningbo		The first-batch of China's textile and clothing manufacturing cluster located in the YRD region.
Household Appliances	Anhui	Hefei		Relatively newly emerged cluster of household appliances production in central China.
	Zhejiang	Ningbo	Yuyao	Production hub for small appliances and electric products located in the YRD region.
	Guangdong	Foshan	Shunde	The first-batch of China's household appliances manufacturing cluster located in the PRD region.
Furniture	Guangdong	Zhongshan	Dachong	Production center of mahogany furniture in China.

3

Stylized Facts

This section provides a thorough review of all the indicators that are considered relevant to production relocation of Chinese labor-intensive manufacturing. To be more precise, these indicators are the outcome variables of production relocation. This means that if relocation has taken place it will show up among those indicators that we examine, while the reverse may not necessarily be true. For illustration purposes, suppose half of the production of the clothing industry was shifted outside China (either in the form of physically relocating the production plant or the shift of production orders), then output, employment and/or exports of the clothing industry in China would be, presumably to varying degrees, negatively affected.[19] Among these performance indicators, exports are likely to be affected the most.[20] Therefore, we provide an extensive discussion on China's exports at the product level in subsection 3.2 and take changes in exports as a key indicator for relocation.

3.1. Structural transformation in China

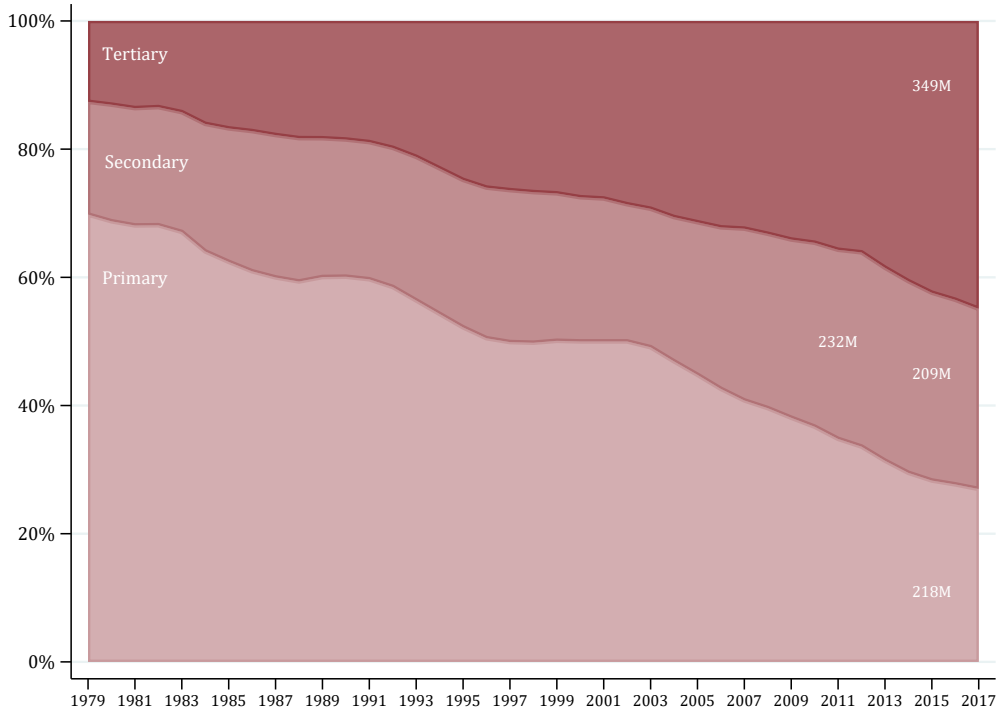
Before getting into the discussion of relocation of labor-intensive manufacturing, we first highlight the evolving features of the Chinese economy at the aggregate level. As can be seen from Figure 2, the structure of employment classified by three broad sectors went through significant changes in China. The country has transformed from an agriculture-based economy to an industrial- and service-based economy.[21] What is particularly interesting and relevant to note from this figure is that the level of employment in the secondary sector rose steadily after 1979 and reached its peak in 2012 with 232 million workers. Since then, the trend is reversed and the number of employment declined steadily to 209 million in 2017 (a decrease of 10%). The secondary sector is comprised of

[19] The only exception to this would be a scenario where global demand for goods produced by the clothing industry is increased in the same or greater magnitude such that the production capacity shifted from China serves to satisfy this extra demand.

[20] The impact of relocation on output and employment will be somewhat more limited, as labor productivity of Chinese workers is likely to be higher as better access to more efficient machine tools is provided, offsetting the negative impact on output. As for employment, it can be seen as a 'sticky' variable. Contracted workers cannot be easily dismissed due to the protection of the New Labor Contract Law enforced in 2008.

[21] Due to differences in productivity across these three sectors, changes in the Chinese economic structure is even more striking if one looks at the contribution of value-added by these three sectors. According to the NBS of China, the share of GDP accounted for by the primary sector is only 7.6% in 2017, while the share accounted for by the secondary sector is over 40%.

Figure 2: Share of employment by three broad sectors



Source: National Bureau of Statistics of China

four industries (i.e., Mining, Manufacturing, Production and Supply and Electricity, Heat, Gas and Water, and Construction) of which manufacturing accounts for the largest share of employment.[22] Thus, the declining trend observed at this more aggregated level may well indicate that this is driven by the decline of employment in manufacturing industry. As a note of caution, we only present this key stylized fact and remain silent on the causes of this decline in manufacturing employment. It may well be a standard industrial-upgrading process as the economy becomes more service-based and workers are pulled into the tertiary sector characterized by higher levels of labor productivity. Alternatively, (part of) the decline could also imply that some workers have been crowded out from the labor market due to relocation.

To zoom in on labor-intensive manufacturing, we rely on China's Industrial Enterprises Database (CIED), which provides time-series company accounts data classified by detailed manufacturing industries. While only large firms with an annual turnover above 20 million RMB are covered in CIED,[23] the dataset is representative of the entire Chinese manufacturing industry (please see Figure A2 for more details). As shown in Figure 3, besides a dip in 2009 due to the breakout of the

[22] According to the 2010 Population Census collected by the NBS of China, manufacturing accounts for nearly 70% of total employment of the secondary sector.

[23] Note, the definition of large firms or firms above the 'designated-scale' is changed in 2011. Prior to 2011, the CIED includes firms with an annual turnover larger than 5 million RMB. In addition, some analysts have also casted doubts on the quality of the CIED (Nie, Jiang, & Yang, 2012; Brandt, Van Biesebroeck, & Zhang, 2014).

Figure 3: Changes in employment of labor-intensive manufacturing

Source: China Industrial Enterprises Database

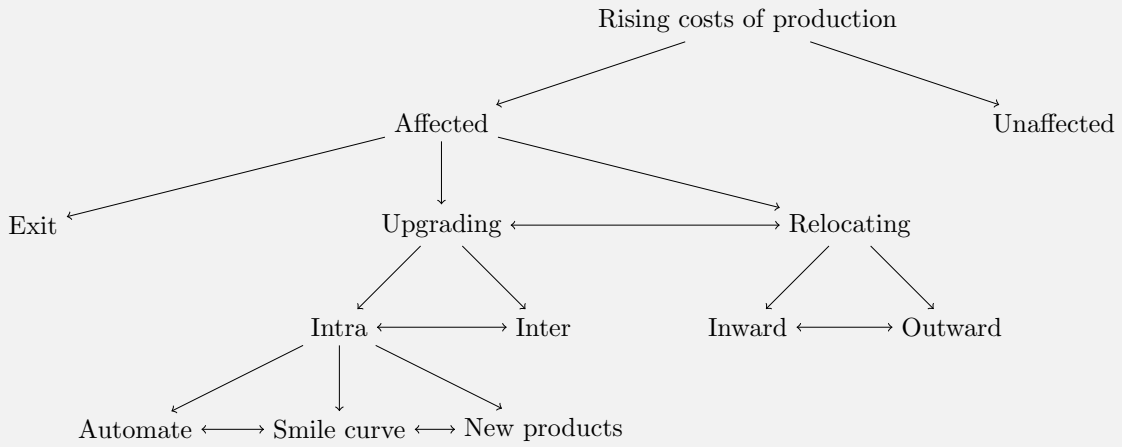
global financial crisis, the level of employment in labor-intensive manufacturing is, by and large, on a stable rising path until 2012 and started to decline afterwards. This trend is well in line with what is observed at the more aggregated level shown in Figure 2. Another interesting point to note from Figure 3 is that the share of labor-intensive employment in total manufacturing already reached its peak in 2004 at 20%. This declining share suggests that a disproportionately larger amount of workers has been attracted to non-labor intensive manufacturing since the mid-2000s, (partly) due to China's industrial upgrading into higher value-added manufacturing industries.[24] As mentioned before, this is an outcome variable of relocation. The fact that the level of employment has been decreasing since 2012 does not necessarily imply workers are negatively affected due to the relocation of labor-intensive manufacturing. Nonetheless, this is a comforting piece of evidence, as relocation would inevitably result in lower levels of employment in labor-intensive manufacturing.

Prior studies have also noted that production relocation may have taken place within the Chinese territory (e.g., Qu et al., 2013; Xu & Hubbard, 2018), as China is a vast country with highly uneven levels of economic development. Before relocating production capacities offshore, due to rising labor cost in coastal regions, firms could relocate their production to inland regions first where the supply of land and labor are relatively more abundant and at a lower cost (please see Box 1 for

[24] This pattern is even more pronounced if we look at the share of output produced by labor-intensive manufacturing.

a more formal discussion on how firms could respond to rising costs of production). The evolving trends shown in Figure 4 are highly indicative to the claim of inward manufacturing relocation from coastal regions to inland regions, since the share of output and exports produced by TCF industries is increasing in inland regions and decreasing in coastal regions.[25]

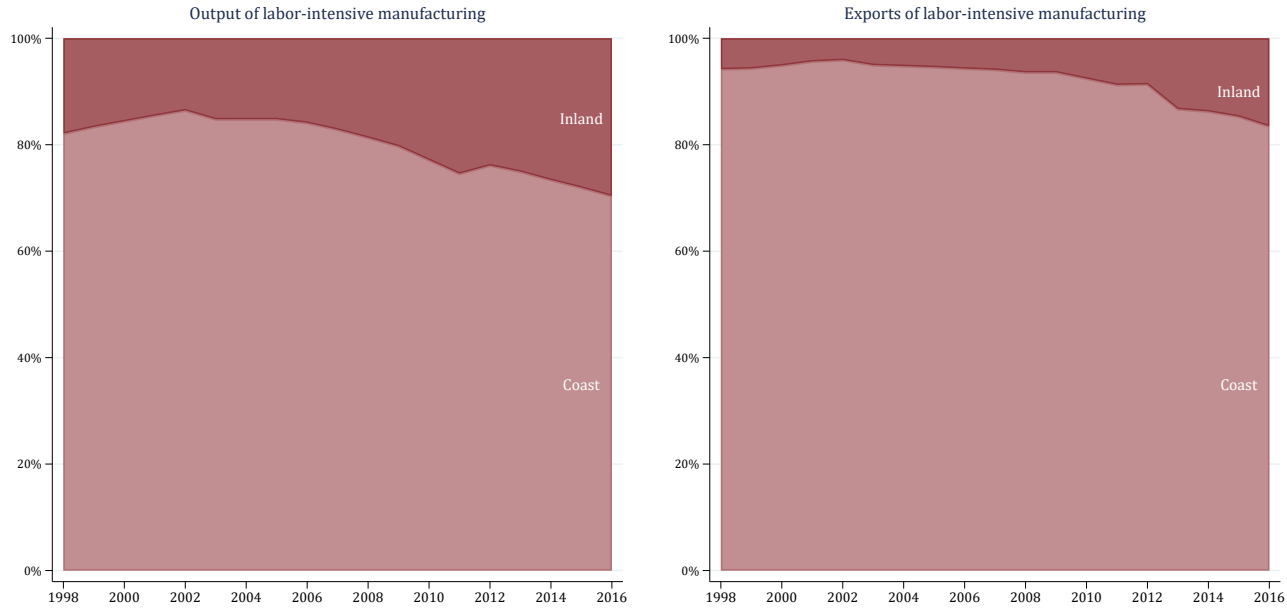
Box 1: Sequential responses of firms facing rising production costs



As shown in the sequential response map above, when firms are confronted with rising costs of production (be it labor, rent or land), the impacts on firms can be classified into two groups. One that remains unaffected (i.e., firms not taking any action) and the other that is affected and firms will take actions to respond to the rise in production costs. Firms in the latter group could either exit the market, upgrade and/or relocate production to places characterized by lower costs of production. Note that there is a two-direction arrow between upgrading and relocating, signifying the fact that these two strategies are not mutually exclusive and can be employed simultaneously by the firm. For relocation, the option boils down to relocating within its own country's territory to other cities or regions (i.e., inward) or to other countries (i.e., outward). As for the strategy of upgrading, firms could choose to cross over to other higher value-added industries (i.e., inter-industry upgrading) or upgrade within the same industry by (1) deploying more machinery and automation technologies in the production process so that the reliance on labor can be decreased; (2) moving along the smiling curve of the manufacturing value chain towards the two-ends (e.g., design, research and development, marketing); (3) producing differentiated new products. All these strategies are not mutually exclusive, firms may employ one or more strategies to cope with the rise in production costs.

[25] Following the convention, the coastal regions include Beijing, Fujian, Guangdong, Hainan, Hebei, Jiangsu, Liaoning, Shanghai, Shandong, Tianjin, Zhejiang. Inland regions consist of Anhui, Chongqing, Gansu, Guangxi, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Inner Mongolia, Jiangxi, Jilin, Ningxia, Qinghai, Shaanxi, Shanxi, Sichuan, Tibet, Xinjiang and Yunan.

Figure 4: Shift of labor-intensive manufacturing from the coast to inland

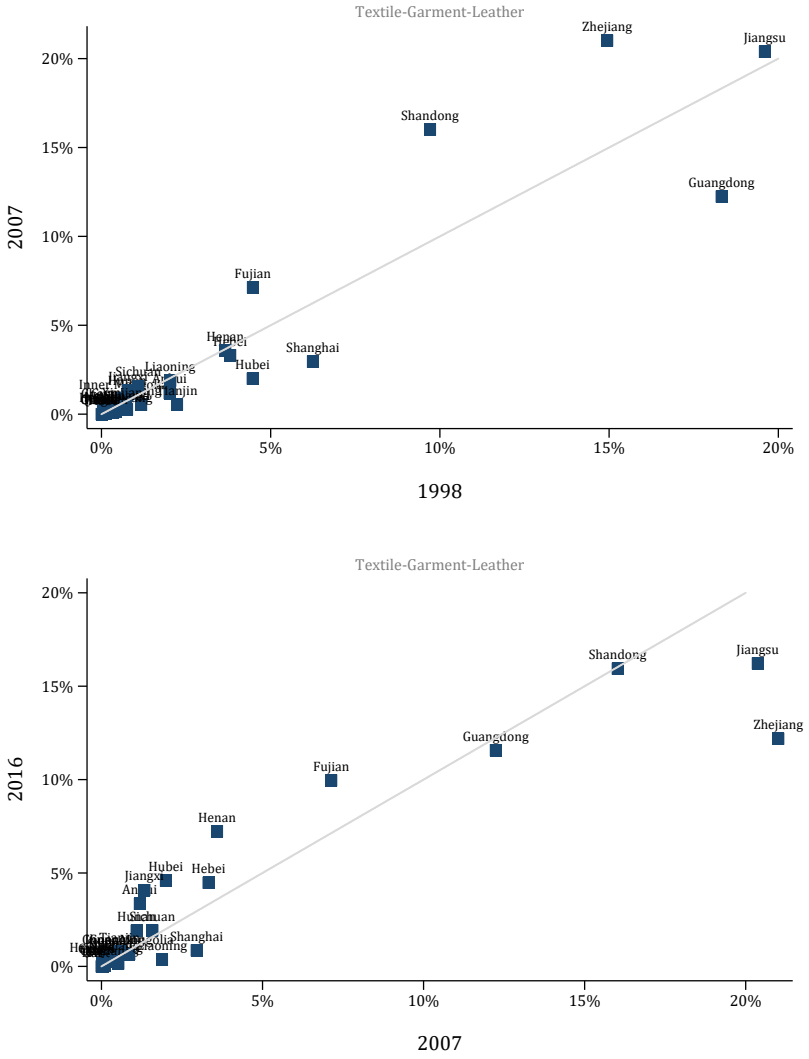


Source: China Industrial Enterprises Database

This coast-to-inland shift seems to be particularly evident after 2012. In addition, relative to the share of output produced by inland regions, the export share of labor-intensive manufactured products is much smaller among inland regions. This suggests that inward relocating firms are mainly focused on serving the domestic market. To further identify which regions or provinces have been the main recipients of labor-intensive manufacturing from the coast, we plot the output share of labor-intensive manufacturing industries by 31 Chinese provinces between the period of 1998-2007 and 2007-2016.[26] As shown in the upper panel of Figure 5, labor-intensive manufacturing is dominated by four coastal provinces, namely Jiangsu, Zhejiang (both provinces are part of the Yangtze River Delta region), Guangdong (the Pearl River Delta region) and Shandong. Taken together, these four provinces accounted for over 60% of China's labor-intensive manufacturing production in TCF, while the output share of Jiangsu, Zhejiang and Shandong have increased between 1998 and 2007 (i.e., lying above the 45-degree line), Guangdong experienced a rather sizable drop (i.e., lying below the 45-degree line). A different pattern has emerged over the period of 2007-2016. As can be seen from the lower panel of Figure 5, the output share accounted for by those four coastal provinces have, to varying degrees, declined in this period. On the contrary, a number of inland provinces have appeared to show significant increase in their output shares of

[26] One could also plot the changes in output shares over a longer time span between 1998 and 2016. The main reason to have it split into two sub-periods is to gain more insights. For instance, most coastal provinces have experienced an increase in output shares of labor-intensive manufacturing in the first period of 1998-2007, an insight that would have been overlooked otherwise.

Figure 5: Inward relocation of labor-intensive manufacturing



Source: China Industrial Enterprises Database

TCF manufacturing, such as Henan, Jiangxi, Hubei, and Anhui (see Box 2 for a case study of inward relocation of textile and clothing manufacturing to Jiangxi province). This is a clear piece of evidence echoing the prior studies finding industrial transfers have taken place within China to inland regions (e.g., Qu et al., 2013).

Box 2: Large-scale inward relocation of clothing manufacturing

Located in southern Jiangxi, Yudu is a county with a long history of textile production, in particular the production of fine-quality quilt. It is said that the chief architect of China's reform and opening-up policy, Deng Xiaoping, started the Long March in 1934 with a finely-made quilt from Yudu. Despite the long historical root and the craftsmanship in textile, industrial transfer of labor-intensive manufacturing from the Asian Tigers did not reach inland Chinese regions. Coastal

Box 2: Large-scale inward relocation of clothing manufacturing (continued)

provinces, such as Guangdong, is the pioneer in hosting these transfers in the early 1980s. Due to its proximity to Guangdong, a large number of workers left the county for newly emerged manufacturing jobs in textile and clothing factories in Guangdong. An estimated 300,000 migrant workers in textile and clothing manufacturing in Guangdong come from Yudu county.

As a forerunner of China's early industrialization, the economy of Guangdong expanded at breakneck speed, causing a subsequent rapid rise in labor wages. According to data published in China Labor Statistical Yearbook, manufacturing wage in Guangdong has been growing at a compound growth rate of 10.2 per cent per annum over the period of 1998-2017 and labor-intensive manufacturing firms are one of the industries that suffered most from this high labor cost. In conjunction with the new development strategy of Guangdong, termed "Emptying the Cage and Changing the Birds" which is meant to facilitate the transfer of low value-added manufacturing to outside of Guangdong so as to pave the way for developing medium-high technology manufacturing, the living space has been further squeezed for labor-intensive manufacturing firms. As a result, labor-intensive firms started to look for other places for production. Given the wide presence of workers from Yudu as well as lower cost of labor, the relocation to this county seemed to be an obvious choice. Established in Shenzhen in 1994, EEKA Fashion is a Chinese garment manufacturer with its own fashion brands and is one of the first batch of firms relocating to Yudu in 2012. Currently, over 80% of production has been shifted from Shenzhen to Yudu. Based on an in-depth interview with the business owner, the abundant supply of skilled workers as well as low labor cost are among the key reasons of relocation.

As more and more firms are moving from the coastline to Yudu, the local government seized the momentum in the early 2010s to further facilitate investments in textile and clothing manufacturing in the county (e.g., favorable tax incentives, provision of standard production plants for incoming firms, setting up an independent unit within the government to exclusively serve the incoming clothing manufactures). In the period of 2017-2018, nearly 80% of the investment projects in the Yudu county are related to textile and clothing manufacturing. According to information provided by the local bureau of statistics, there are now over 3,000 textile and clothing manufactures in the county and the value of production was over 40 billion RMB in 2018. The size of textile and clothing manufacturing in Yudu is still expanding very rapidly and the government's vision is to build an industry with a production value of over 100 billion RMB. At the moment, upstream textile firms, such as those specialized in fabrics and denim washing, are also being attracted to settle in Yudu, which would help the county to complete the entire supply chain of textile and clothing production.

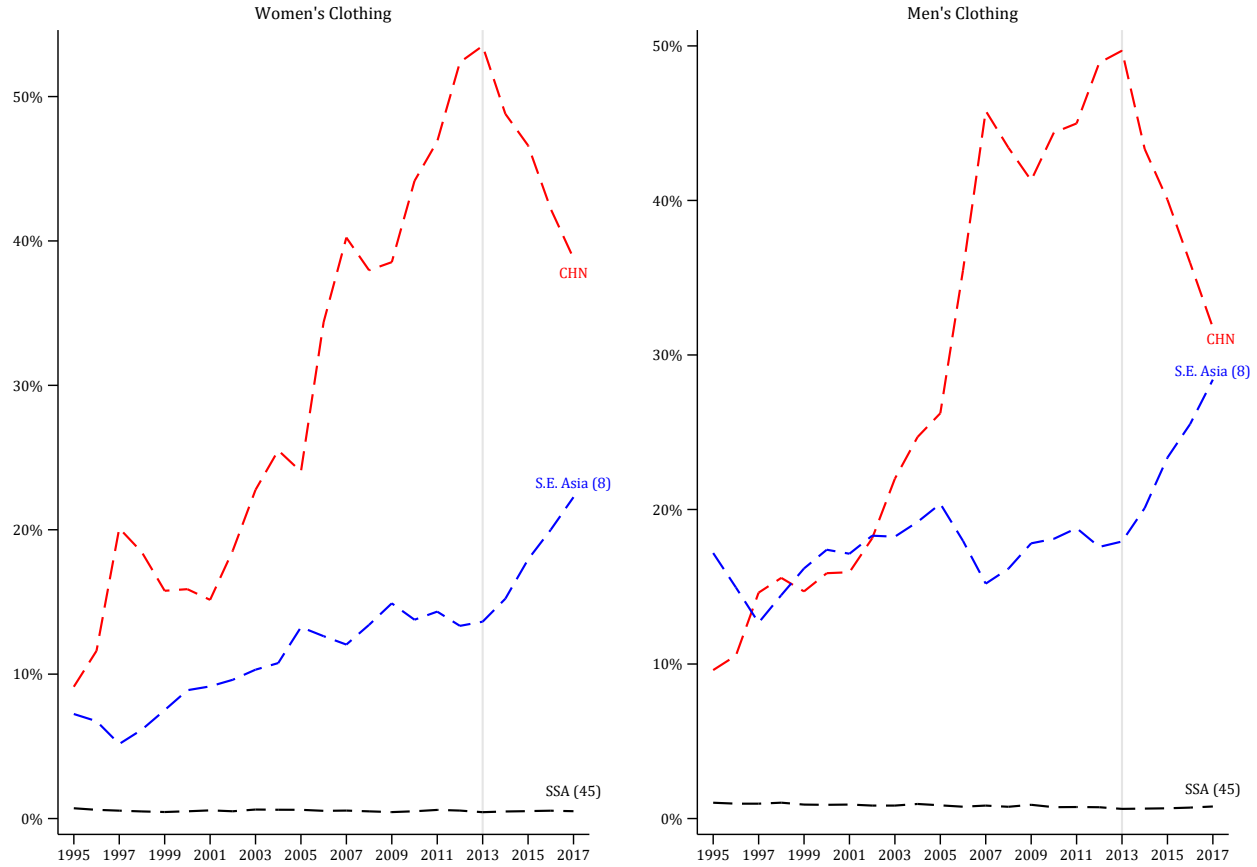
3.2. The size of relocation measured by changes in exports

This report now turns to examine China's labor-intensive manufacturing in a global context. More specifically, the focus will be placed on the changes in China's exports at the product level (in particular, goods that are produced by labor-intensive manufacturing industries). As noted earlier, export-oriented firms are more prone to relocation than others. If relocation has taken place, one would expect to find drastic declines in China's exports vis-à-vis countries that have been the recipients of China's manufacturing relocation. This report relies on the trade data compiled by the United Nations Conference on Trade and Development (UNCTAD), which classifies bilateral trade at detailed product level. While the trade data from UNCTAD is generally useful, it doesn't separate export volume from export value. Export value could remain unchanged if the decline in the quantity of exports is offset by the increase in the unit value of the items exported. Thus, the patterns observed based on export value may serve as a lower bound of change (or relocation) of Chinese manufacturing.

As shown in Figure 6, the world's exports of clothing are split into men's clothing and women's clothing (product code 843 and 844, respectively, in the UNCTAD classification). After its accession to the World Trade Organization (WTO), China's share of world exports in clothing started to increase drastically between 2001 and 2013 (note that there is a dip in China's share of exports in 2008 due to the breakout of global financial crisis). At its peak in 2013, China's share of exports in women's clothing is higher than all other countries combined, accounting for 53.5% of the global total. While the share of exports in men's clothing is somewhat smaller, it had also reached nearly 50% in 2013. This trend, however, is reversed after 2013. As shown in Figure 6, the export share of women's clothing from China dropped to 38.8% in 2017 (a decline of 15 percentage points) and the export share of men's clothing has plummeted to 31.8% in 2017 (a decline of 18 percentage points). In contrast to China's decline, the share of clothing exported by SEA-8 (a country group comprised of Bangladesh, Cambodia, India, Indonesia, Myanmar, Sri Lanka, Thailand and Vietnam) has increased steadily over time. For women's clothing, their export share went up from 13.6% in 2013 to 22.3% in 2017, an increase of nearly 9 percentage points. For men's clothing, the increase is even stronger, rising from 17.9% in 2013 to 28.4% in 2017 (an increase of over 10.5 percentage points). These two contrasting and concomitant trends are highly indicative to the relocation of clothing fabrication from China to countries in South and Southeast Asia.

There are two other interesting points to note from Figure 6. First, the export share of clothing accounted for by SSA (comprised of 45 countries) remains small and stable at around 0.6%. Second, the decline of China's export share in men's clothing is much stronger than that of women's clothing. This seems to suggest that the scale of relocation of clothing manufacturing is greater for men's clothing than for women's clothing. This finding also conforms to the intuition that women's clothing is more fashion-driven (e.g., requiring significantly more clothing accessories and greater varieties in style and design), hence the length of the supply chain is relatively longer and the skills required to produce women's clothing are somewhat higher than that for men's.

Figure 6: Share of exports in clothing by country groups

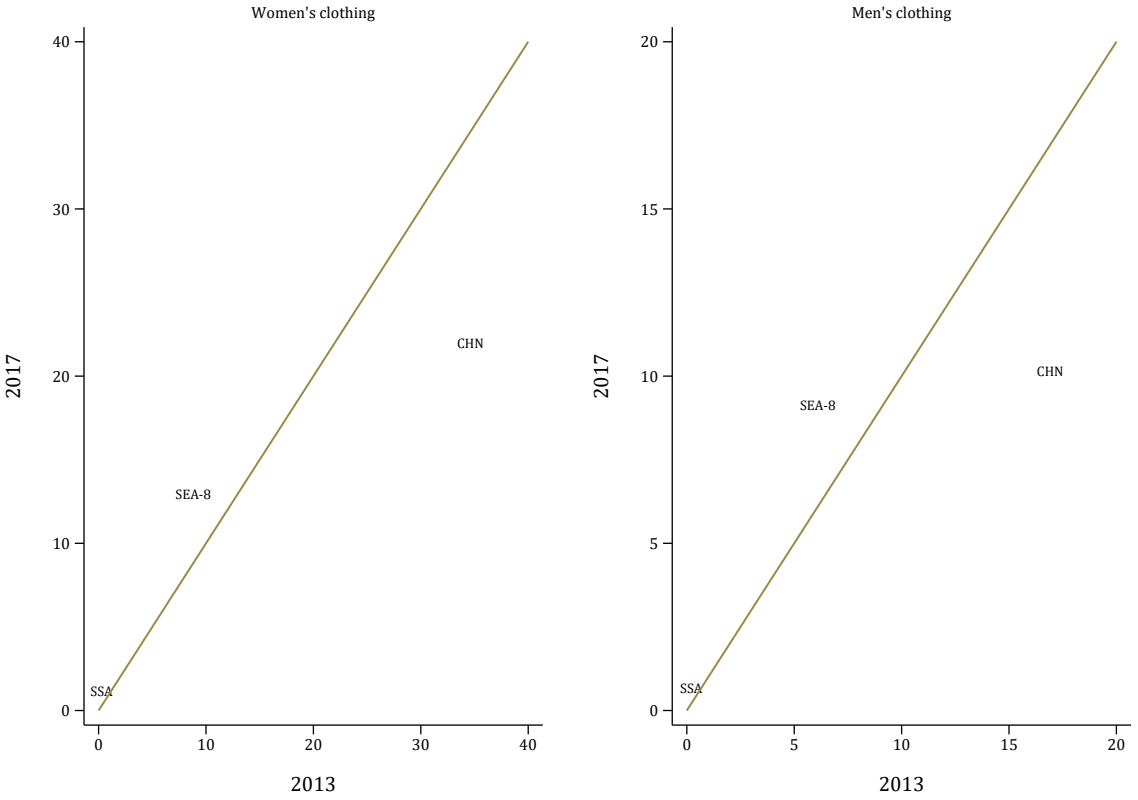


Source: United Nations Conference on Trade and Development

It is important to note that the comparisons discussed above are in relative terms. If we look at the absolute export values, the decline of China's exports in clothing is even more startling. For men's clothing, the total value of exports from China is 16.9 billion USD in 2013 and dropped to 9.7 billion USD in 2017 (a decrease of 42.6%). Although the decline is less acute, the total value of exports of women's clothing from China also declined by 39% from 34.6 billion USD in 2013 to

21.1 billion USD in 2017. Again, export is merely an outcome variable of production relocation, the decline in China's exports of clothing may well be the result of a shrinking global demand for clothing. Indeed, if we compare the global export value in clothing between 2013 and 2017, it went down by 16% for women's clothing and 10% for men's clothing. Suppose that China had faced the same magnitude of decline in demand, then 32.6% (42.6% - 10%) of the decline in men's clothing exports and 23% (39% - 16%) of the decline in women's clothing exports are likely to be the result of production relocation. On the other end of the spectrum of relocation, the export value of the recipient countries must have increased over the same period. As shown in Figure 7, the export value of women's and men's clothing from SEA-8 has increased by 42.4% and 37.1%, respectively, between 2013 and 2017. While it is rather crude, this piece of evidence seems to imply that the scale of outward relocation of clothing manufacturing is likely to range between 25% and 35%.

Figure 7: Value of exports in clothing: China versus SE Asia (in billions USD)

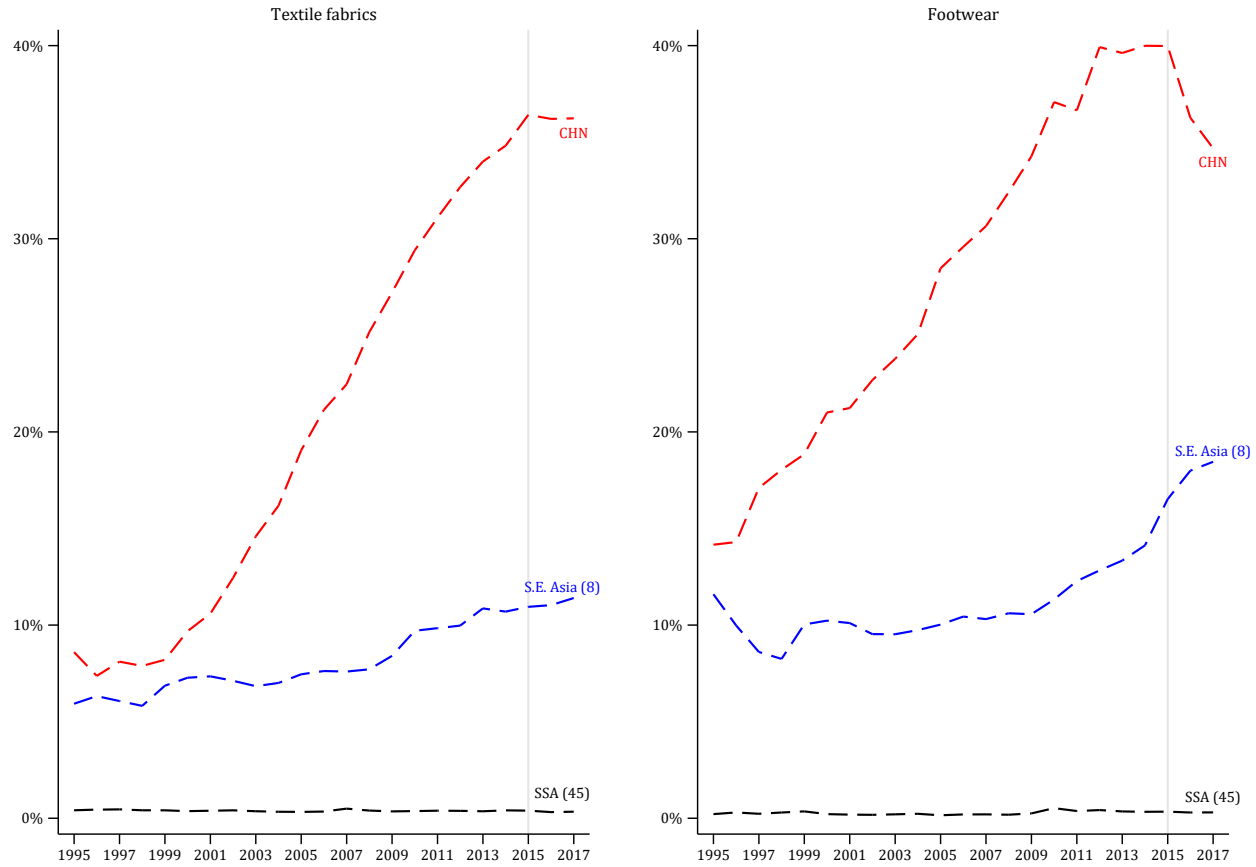


Source: United Nations Conference on Trade and Development

A different picture is found for the exports of textile fabrics (product code 650 in the UNCTAD classification), which is a more upstream industry than clothing fabrication. As can be seen from the left panel of Figure 8, the share of global exports in textile fabrics accounted for by China has been increasing strongly between 2001 and 2015 and there is slight decline afterwards. The

fact that the decline in exports of fabrics took place later and is far less profound than exports of clothing suggests that only the fabrication and processing of clothing have shifted to SEA-8 at a large scale (as shown in Figure 6). Meanwhile, these recipient countries relied quite heavily on importing fabrics and accessories from China for their production of clothing (which is probably the reason why there is a rather sharp increase in exports of fabrics from China between 2013 and 2015). This has started to change more recently. As shown in Figure 8, the export share of fabrics from China began to level off and has even declined slightly since 2015. This evidence is well in line with our field research in Ningbo where two giant textile manufacturers specialized in fabrics production (i.e., Bros Eastern and Shenzhou International) went to establish factories in Vietnam in 2014 and productions were commenced in 2015. Thus, the relocation of more upstream textile industries, such as textile yarn and fabrics, is starting to move offshore as well, but at a later date and far smaller scale than clothing fabrication.

Figure 8: Share of exports in fabrics and footwear by country groups



Source: United Nations Conference on Trade and Development

As for footwear (product code 851 in the UNCTAD classification), the share of China's exports reached its peak in 2012 and remained stable until 2015 at around 40%. It declined by 5.2 percentage

points in 2017, while the share of exports accounted for by SEA-8 went up by 5.6 percentage points over the same period. In terms of absolute values, the peak of China's exports is 56.2 billion USD in 2014 and declined to 48.2 billion USD in 2017 (a decrease of 14.3%). On the contrary, the export value of footwear by SEA-8 increased by 30% over the same period of observation. The value of global exports in footwear declined very modestly by 0.98% between 2014 and 2017 and suppose that China had faced the same order of decline in demand, then about 13.3% of the decline in footwear can arguably be attributed to relocation (see Table 4 for a summary of the estimated scale of relocation of clothing and footwear manufacturing).

Table 4: Summary of changes in China's exports of clothing and footwear

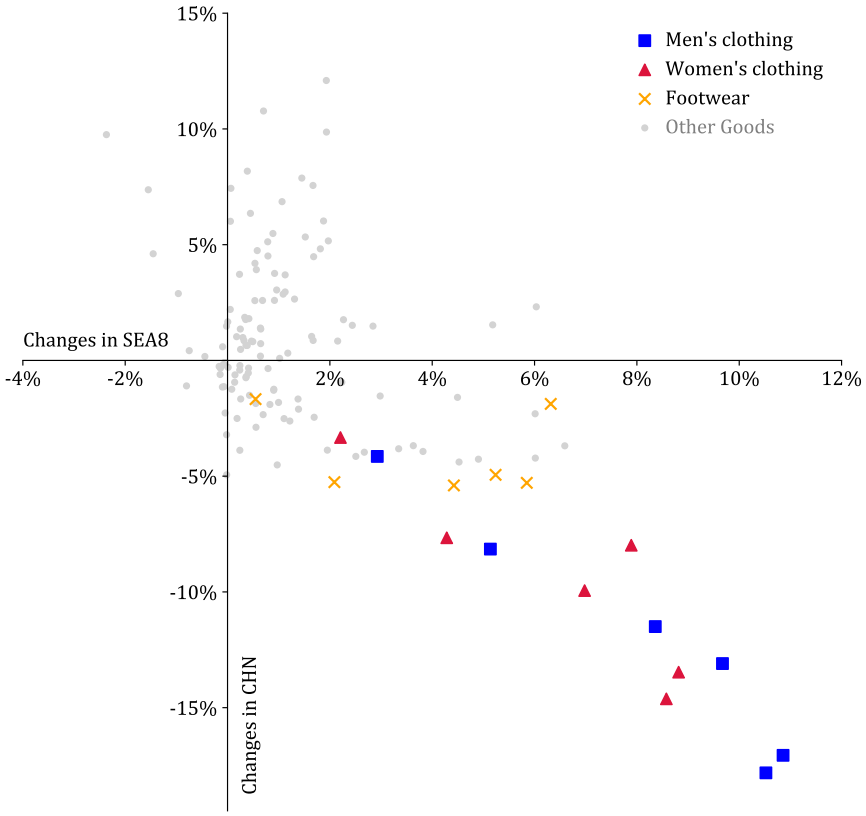
	Changes (%)	Decline in demand (%)	Proxy for relocation (%)
Export value of women's clothing	-39%	16%	23%
Export value of men's clothing	-43%	10%	33%
Export value of footwear	-14%	1%	13%

Another point of interest to note from Figure 6 and Figure 8 is that the share of exports accounted for by SSA countries remained very small and largely stable throughout the entire period of observation. This seems to suggest that labor-intensive manufacturing relocation from China did not reach the African continent or at a scale that is far smaller than the scale of relocation to SE Asia. Thus, relocation of labor-intensive manufacturing is mainly driven by clothing and footwear industries and SE Asia has been the main recipient of China's industrial transfers. More upstream textile industries, such as fabrics, have also started to shift offshore in more recent years, but the scale is still very small at the moment.

Besides clothing and footwear, did relocation also take place in other labor-intensive manufacturing industries? To check on this, we examined the changes of export shares between China and SEA-8 for over 20 labor-intensive manufactured goods (e.g., toys, household equipment, and stationery goods). As shown in Figure 9 where the vertical (horizontal) axis denotes changes in China's (SEA-8's) export share of these labor-intensive manufactured goods, it is really clothing and footwear that have stood out as the forerunners in relocating productions abroad. Thus, it can be concluded with a fair degree of confidence that industrial relocation from China is primarily led by clothing and

footwear industries, conforming to the patterns of the preceding waves of international industrial transfers.

Figure 9: Changes in export shares of labor-intensive manufactured goods



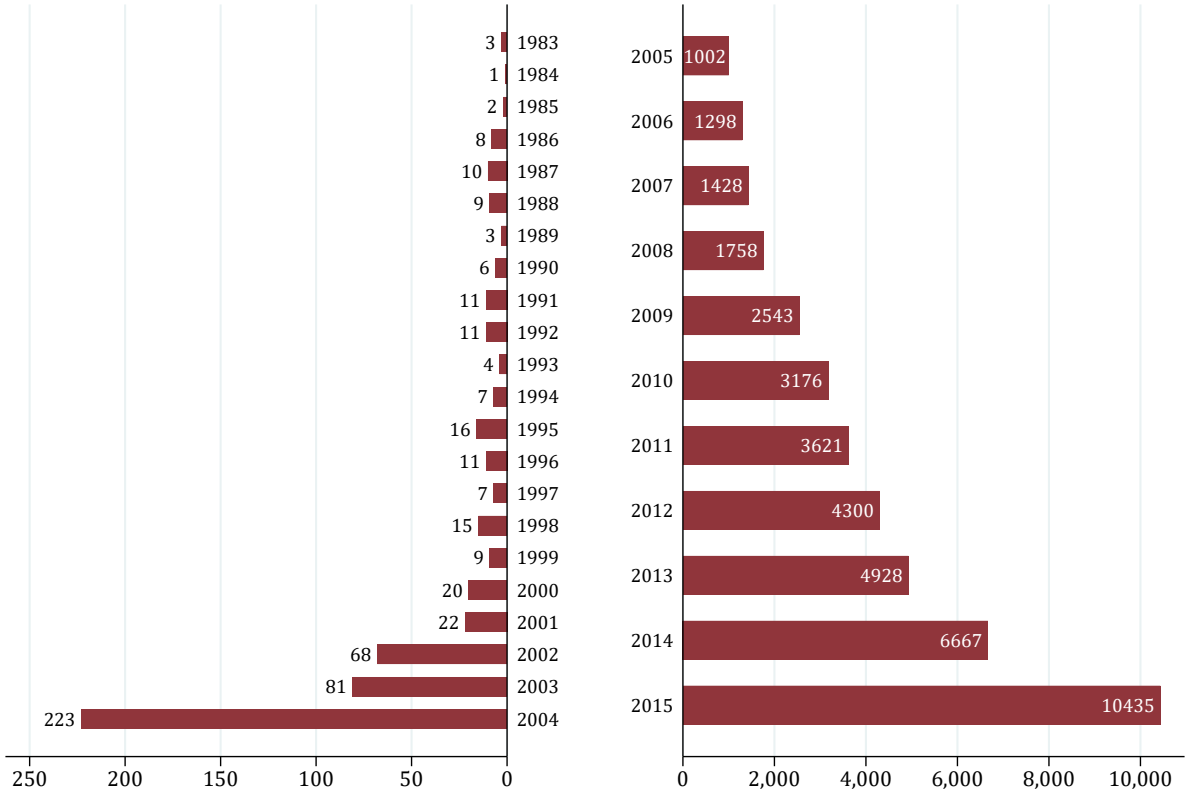
3.3. China's OFDI in labor-intensive manufacturing

In this subsection, we take a close look at China's outward foreign direct investment (OFDI). The rationale behind this attempt is that for overseas relocation to take place, Chinese firms will have to make investments abroad and (part of) these will be registered as China's OFDI.[27] The Chinese Ministry of Commerce (MOFCOM) maintains a database that keeps track of all the registered OFDI projects from China. Although this database has its limitations,[28] it is still of great value

[27] Admittedly, overseas direct investments made by Chinese firms may go under the radar through other means. For instance, the Chinese firm may be registered in Hong Kong or Cayman islands and money can be mobilized offshore and need not to go through any administration in China. Nonetheless, this does not discredit the potential value of looking at China's OFDI.

[28] There are three major limitations associated with the OFDI database compiled by MOFCOM. First, the investment value is not specified. Hence, the actual size of each investment is unknown and each investment project is treated equally. Second, the database only shows the approval status of the investment project, it does not track their implementation status thereafter. Third, firms are not obligated to report to MOFCOM for their overseas investment. According to the regulations, overseas investment project worth more than 100 million USD required approval from MOFCOM prior to October 6, 2014. Moreover, most Chinese foreign direct investment flows through Hong Kong and the database does not capture the final destinations of these investments. Therefore, this database is likely to (significantly) understate China's overseas investment to other economies. Other scholars have also discussed its limitations (e.g., Shen, 2015; Chen, Dollar, & Tang, 2018; Xu & Hubbard, 2018).

Figure 10: The number of registered OFDI: 1983-2015



Source: MOFCOM

to examine as it includes the name of the investment project from China, its province of origin, a detailed description of the investment project (i.e., line of business), destination country, and the year of approval. As shown in Figure 10, the number of OFDI projects from China has been small and quite volatile prior to 2001. It started to increase significantly afterwards and reached over ten thousands investment projects in 2015. Part of the surge in China's OFDI may be related to labor-intensive manufacturing activities. To check on this, we have looked closely at the description of each overseas investment registered at MOFCOM and identified OFDI as labor-intensive if the description of the investment project entails the following key words: clothing, textile, cotton, shoes, bags, luggage, household appliances, toys, leather, fur, wig, cloth, pants, jeans, jackets, light manufacturing, stationery goods, socks, knitting, and curtain. In addition, we impose the condition that OFDI has to be engaged in *production*, *processing* or *manufacturing* in order to assure that production activities will be carried out in the recipient country, rather than trading and selling.[29] In the end, 803 OFDI projects are identified as labor-intensive and the largest fifteen recipients of China's labor-intensive OFDI account for over 73% (see Figure 11), of which the top three recipient

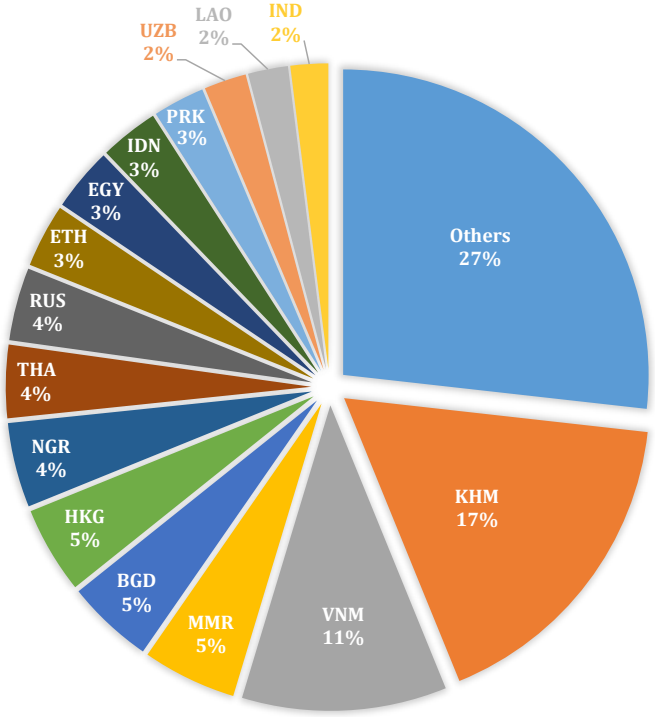
[29] Most of labor-intensive OFDI in HKG or other developed economies are mainly engaged in trading, selling, designing, consulting, brand management, marketing and research, rather than manufacturing.

countries, in descending order, are Cambodia (17%), Vietnam (11%) and Myanmar (5%). This piece of evidence is highly consistent with the prior finding that SE Asia is the prime destination for China's industrial relocation. While two African countries are also in the relocation picture (i.e., Nigeria and Ethiopia), the scale is far smaller relative to their SE Asia counterparts. This finding is also in line with the prediction of the FGP, that is, labor-intensive manufacturing tends to move to places characterized by lower levels of economic development and abundant supply of cheap labor.[30]

To check where these labor-intensive OFDIs originate from in China, we classify the origins of investments by Chinese provinces and by the dichotomous split between coastal and inland regions. As can be seen from the right panel of Figure 12, over three quarters of labor-intensive OFDIs originate from the coastal regions (led by enterprises from Shandong, Jiangsu and Zhejiang provinces) and less than one quarter are invested by enterprises located in inland regions. What is striking to note from Figure 11 is that the number of labor-intensive OFDI from Hunan has exceeded that of Guangdong (i.e, the PRD region), which is a forerunner in China's early industrialization and arguably the region that is most prone to relocation due to fast-rising labor costs since the mid-2000s. One would expect the relocation of labor-intensive manufacturing to be much higher in Guangdong than in Hunan. One possible explanation for this striking result is that Guangdong is known as the prime host of foreign-invested enterprises in China, in particular investments from Hong Kong and Taiwan (China). For this reason, business owners in Guangdong are more capable of mobilizing resources and investment through other means that can go under the radar. Thus, the OFDI database administered by MOFCOM is likely to (significantly) understates the actual extent of China's overseas investment (see footnote 27 for a more detailed discussion on the limitations of this database). Despite that, it is reassuring that most of labor-intensive OFDI went into countries characterized by lower levels of economic development, which is consistent with the FGP.

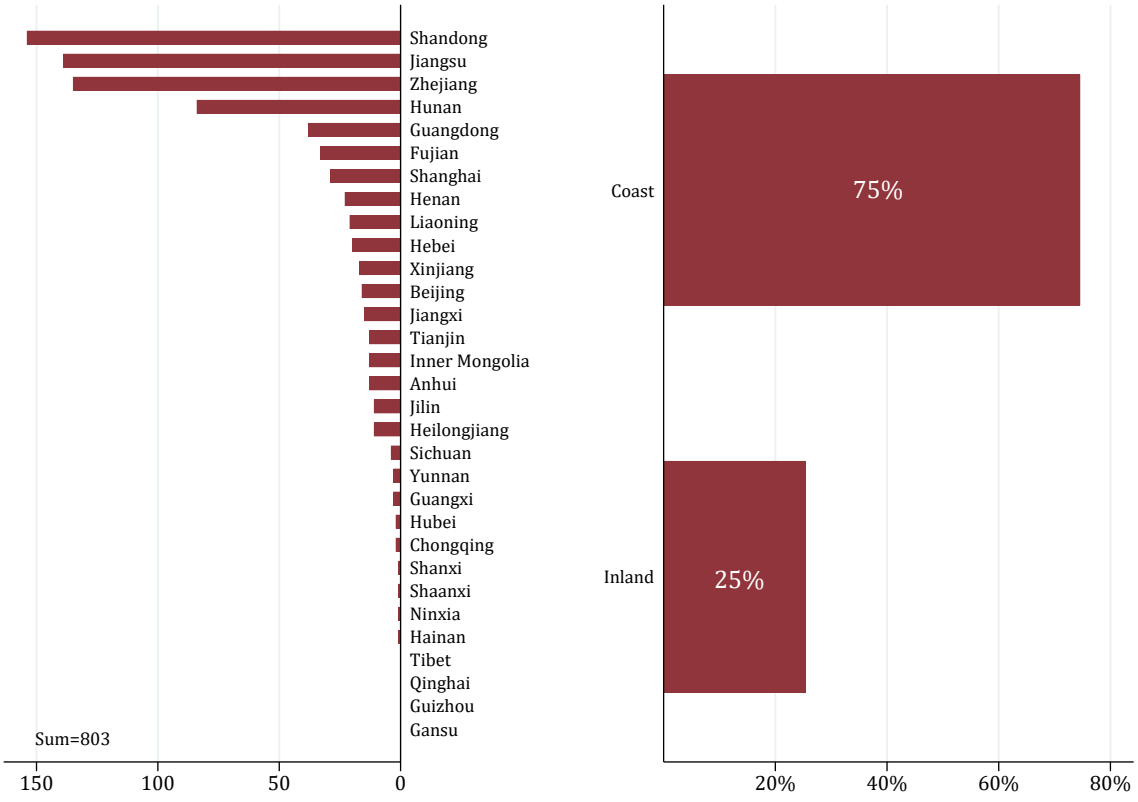
[30] A recent study by Xu and Hubbard (2018) has also used the MOFCOM database to examine whether rising factor prices have driven China's labor-intensive investments offshore.

Figure 11: Top 15 recipients of labor-intensive OFDI from China



Source: MOFCOM

Figure 12: Sources of China's OFDI by provinces



Source: MOFCOM

4

Evidence on Relocation from Field Research

To complement and strengthen the findings above, this section presents evidence on China's manufacturing relocation using information from our own field research. These evidences cover a representative set of industries in labor-intensive manufacturing, including in-depth interviews with experienced industry practitioners and business owners making relocation decisions. This section pays particular attention to TCF industries, which seem to be the main drivers of relocation of labor-intensive manufacturing out of China.

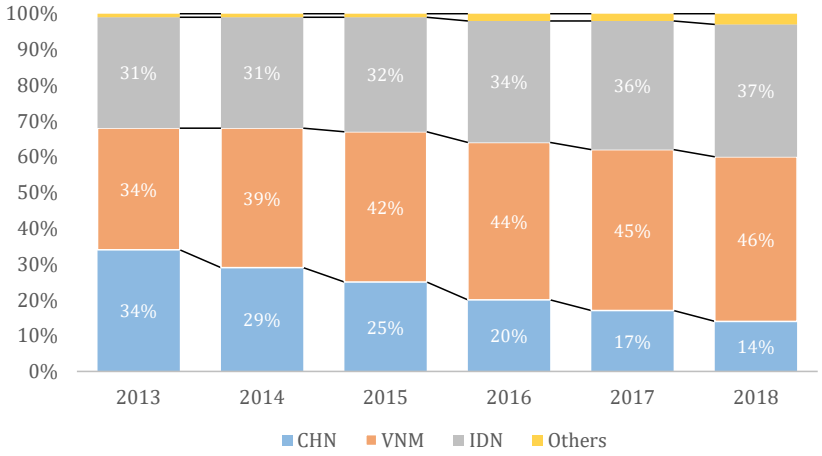
4.1. Industry clusters of footwear manufacturing

There are currently four major footwear industry clusters in China, of which Wenzhou, Jinjiang and Dongguan, the three largest clusters located in the Southeast coastal regions are covered by our field research (see Table 3 for more details). The origin of all three footwear clusters can be traced back to the opening up of China's economy in the late 1970s and doors to overseas investors in the 1980s. The "Three-plus-one" trading-mix was the prevalent working model at that time, which involved assembly work, making products based on provided samples, processing supplied materials, and compensation trade. While the starting line did not seem to be so different and all three places have thrived by making shoes for foreign companies, they have embarked on different development path. Over the past forty years, local businessmen in Wenzhou and Jinjiang have steadily acquired the skills and money they need to build their own brands. Now, Wenzhou is the capital of leather-shoe brands for men in China and Jinjiang is home to three of China's four largest sportswear brands. By contrast, footwear manufacturing in Dongguan has been stuck on producing for foreign brands and did not manage to cultivate any known brands comparable to those from Wenzhou or Jinjiang. In other words, out of the three early developed industry clusters of footwear manufacturing, two have successfully transformed or upgraded from OEM to ODM and finally to OBM. This may well explain why overseas relocation of footwear manufacturing is mainly observed in Dongguan, while the scale of relocation from Wenzhou and Jinjiang is extremely small or even negligible.[31] Thus,

[31] Based on in-depth interviews with both local authorities and footwear business associations, it is confirmed that large-scale relocation of footwear manufacturing did not take place in Wenzhou and Jinjiang. There are a few cases in which firms have set up factories abroad, but the scale remains too small to have any tangible impact on the local economy. Please refer to the last column of Table 6, which is footwear company located in Jinjiang and has just

the engine of relocation of footwear manufacturing is Dongguan. Based on information collected from field research, three different pieces of evidence are shown in this report and each of which provides a unique angle revealing the extent of relocation of footwear manufacturing from Dongguan. According to the local authorities of Houjie, a town situated within Dongguan Municipality and known as the world's footwear manufacturing hub for medium-to-high-end shoes, five out of the top twelve, or 42%, of the largest footwear manufactures have shifted their productions abroad and the scale of relocation of each firm is also quite sizable. In the case of Yue Yuen, a subsidiary of the Pou Chen Group, a world-renowned OEM for leading global brands like Adidas, Nike, Reebok, and Converse, over 20% of its production have been shifted outside China to countries like Vietnam, Indonesia, Cambodia and Myanmar (see Figure 13). The other giant OEM in the region is Huajian Group, a leading footwear manufacturer of women's leather shoes. Due to rising labor costs in Dongguan, the Group started to invest in Ethiopia since 2011 and has established, by now, four production plants there. As shown in Figure 14, Huajian's employment share in China started to decline in 2011 and plummeted to merely 24% by 2018. While precise numbers are not available, the other two large footwear OEM in Houjie (i.e., Lvzhou and Lvyang, both are among the top ten biggest footwear manufactures in the region) have also shifted a significant share of production orders abroad. According to the information provided by the local footwear association, it is estimated that no less than 30% of their production orders have been shifted abroad to SE Asia.

Figure 13: Footwear production of Yue Yuen by countries



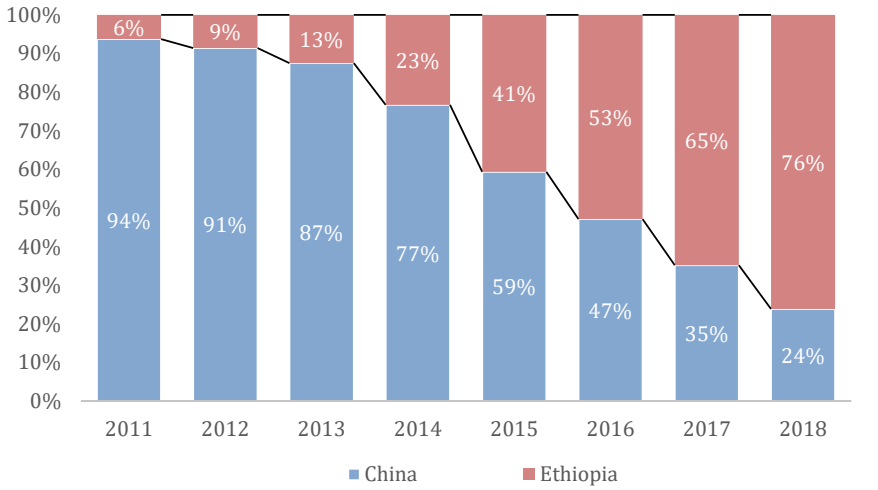
Source: Annual Reports of Yue Yuen Industrial Holdings

The other piece of evidence gathered in this report is the evolvement of footwear exports of Dongguan. As most of the relocating firms are OEM for foreign companies (i.e., firms that are export-oriented), the export value would be inevitably negatively affected. As can be seen from

started to shift productions abroad this year.

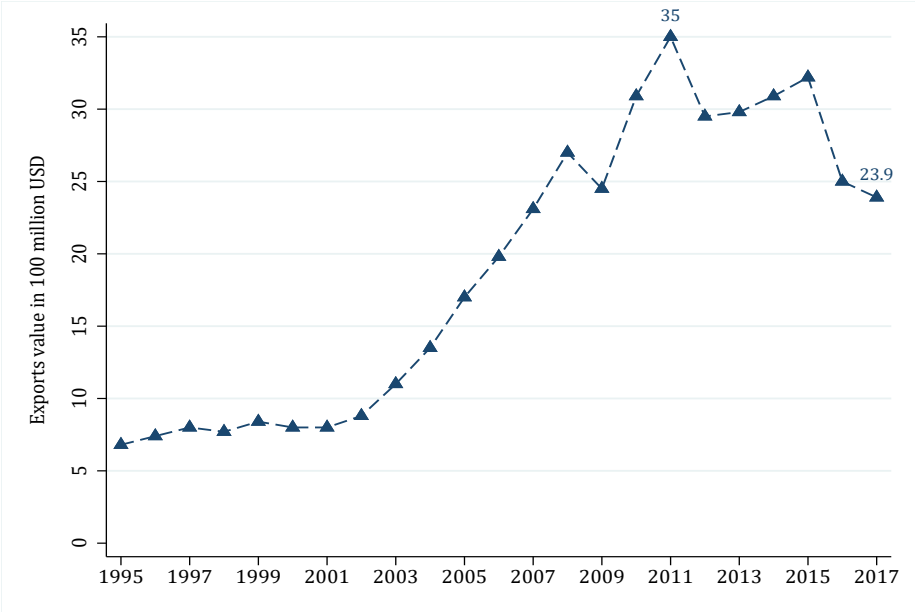
Figure 15, export value of footwear in Dongguan has increased significantly since China's accession to the WTO in 2001. Despite a dip in 2009 due to the breakout of global financial crisis, footwear exports have continued to increase until it peaked at 3.5 billion USD in 2011, which is also the year when Huajian Group began to relocate its production activities outside of China. Since then, exports of footwear began to decline and plummeted to 2.39 billion USD in 2017, a decrease of 32% relative to the peak value in 2011. These exports data support the findings from the firm-specific cases discussed above, suggesting that the relocation of China's footwear manufacturing is mainly driven by firms in Dongguan, Guangdong.

Figure 14: Share of employment of Huajian Group by countries



Source: Data collected through site interviews

Figure 15: Exports of shoes from Dongguan between 1995 and 2017



Source: Data provided by the local government

Box 3: Face-to-face interview with the representative from the Taiwanese Business Association of Houjie, Dongguan

With over 50 years of industry experience and as one of the first Taiwanese investors to settle in Houjie (Dongguan), Mr. Guo is widely acknowledged as an expert in footwear manufacturing and an important figure in the local business community. According to the local bureau of statistics, among all the foreign-invested footwear enterprises in Dongguan, 57% originated from Taiwan (China), making Mr. Guo's perspective especially relevant and insightful to the discussion of this report. According to Mr. Guo, over 40% of the Taiwanese footwear manufactures in Houjie have relocated their productions abroad, of which close to 10% are likely to have shifted productions entirely offshore. The most popular destinations are in SE Asia, such as Vietnam, Cambodia and Myanmar. "This high share does not come as a surprise", says Mr. Guo. Taiwan-invested enterprises initially came to mainland China for its supply of cheap labor in the early days and now the cost-competitive edge of mainland China has eroded due to rising costs of labor, these firms are relocating again to other places with abundant supply of cheap labor. In addition to rising labor costs, the increasingly stringent pressure of environmental protection from the Chinese government has also played an important role in motivating firms to go abroad. Mr. Guo believes that the relocation of footwear manufacturing is likely to continue in the future, but since labor markets in Vietnam and Cambodia are becoming saturated with foreign firms, many manufacturers may choose to move to other places, such as Bangladesh, India and countries in Africa.

Given his tremendous experience in footwear manufacturing, issues related to the degree of production automation and its impact on employment were also discussed during the interview. According to Mr. Guo, labor-saving technologies could replace workers to some extent. By and large, however, the degree of replacement is relatively limited. In addition, as household income continues to rise in China, there is a greater desire to consume better-quality products as well as more demand for greater varieties in design and style, both of which would require more labor inputs, lowering the possibility of massive labor market disruption from new technologies.

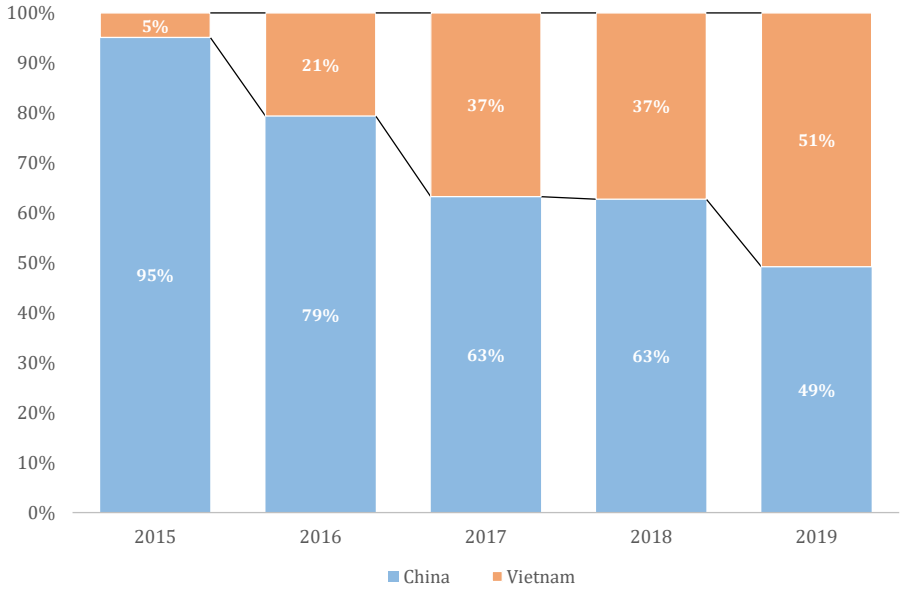
4.2. Industry clusters of textile and clothing manufacturing

Similar to footwear manufacturing, the early phase of development of China's textile and clothing industries is also around the late 1970s and is primarily clustered in the Yangtze River Delta and

the Pearl River Delta regions. Our field research covers four industry clusters of textile and clothing manufacturing: three from China's coastal regions and one in the newly emerged inland region in Jiangxi Province. We have found evidence of relocation of textile and clothing manufacturing across all three coastal industry clusters surveyed in this report. While evidence gathered on the relocation of textile and clothing manufacturing from China tends to be fragmented and case-specific, useful and informative insights can still be drawn.

First, in Zhejiang Province, in spite of the successful development of a large number of well-known men's clothing brands (e.g., Youngor, FIRS, GXG), production relocation of textile and clothing manufacturing has taken place at a quite sizable scale. Based on publicly disclosed information as well as field research in Zhejiang, we found relocation is driven by large OEM in partnership with foreign companies. For example, Jasan Group, a large manufacturer of cotton socks and seamless intimate wear headquartered in Hangzhou (Zhejiang), started to shift its production to Vietnam in 2014 and currently has over 50% of its production there (see Figure 16). The company's annual reports state that, aided by the construction of new production sites which will be completed by the end of 2019, Jasan intends to further expand its production activities in Vietnam in the future.

Figure 16: Production distribution of Jasan Group



Source: Annual Reports of Jasan Group

Another firm that is worth discussing in greater detail is Shenzhou International (SZ Int'l), the largest vertically integrated knitwear Chinese OEM headquartered in Ningbo (Zhejiang).[32] The

[32]The company has also built its own fashion brand named 'Maxwin'. The establishment of this brand, however, is not

company currently employs over 82,000 workers across three major production bases (52,000 in China, 18,500 Vietnam and 12,200 in Cambodia), producing about 400 million pieces of knitwear per year. SZ Int'l began to shift productions abroad in 2005 by starting clothing production in Cambodia. In 2014, SZ Int'l expanded productions abroad by setting up both fabric production plant and clothing assembly factory in Vietnam. This piece of evidence seems to be well in line with what is observed at the more aggregated level of China's exports of fabrics and clothing accessories, which has also started to move offshore around 2015. Our site visit to the company revealed that, SZ Int'l is planning to further increase productions in Vietnam and Cambodia and aim to hire another 23,000 workers in these countries, of which 17,000 in Cambodia and 6,000 in Vietnam (see Table 5). While SZ Int'l is expanding production and employment at massive scales, its production and level of employment in China will remain largely unaffected. This is because the production orders received by SZ Int'l have (consistently) exceeded its overall production capacity. The case of SZ Int'l exemplifies the fact that, at least at the firm level, production relocations abroad may not necessarily decrease production and employment at home.

Table 5: Allocation of production and employment of SZ Int'l

	Ningbo	Quzhou	Anqing	Cambodia	Vietnam
Pieces of knitwear / day	300,000	80,000	330,000	200,000	200,000
Knitwear production (%)		**64%**		36%	
Fabric production (%)		**60%**		40%	
Current & future employment		**50,000**		17,000→30,000	19,000→25,000

Note: Data presented in the table refer to the fiscal year of 2018. Numbers denoted in bold refer to total production in China (i.e., all three production bases combined), not that of Quzhou. Employment level in China will remain largely unchanged with 50,000 workers, while employment in Cambodia and Vietnam will be increased significantly in the next 2-3 years.

The last piece of (firm-specific) evidence on the relocation of textile and clothing manufacturing comes from an intimate wear producer based in Foshan, Guangdong. Founded in 2001, Biaomei (BM) operates as a mixture of OEM and ODM, primarily serving clients from Europe. BM employs about 350 factory workers itself, but contracts over 20 local small-size OEM, indirectly 'employing' another 900 workers. BM made its first step of relocating production activities in December 2018

meant as an attempt to upgrade from OEM to OBM, as a typical OEM would normally do. Instead, the setup of this brand is geared towards getting in direct contact with the customers so that first-hand information can be acquired regarding customers' needs and their demand for new fabrics. In order to focus on its core business, OEM/ODM, SZ Int'l has disposed 49% of the ownership of the retail stores business selling its own brand 'Maxwin' as of September, 2016. In the words of the chairman of the company, SZ Int'l is committed to build an enterprise brand, not a company known for its product brand.

and overseas production commenced in May 2019 in Myanmar. Currently, 20% of its production is abroad and BM plans to increase this share to 60%-80%. While Foshan will remain as its headquarter, specializing in design, innovation in fabrics and procurement of raw materials. In terms of employment, BM plans to hire up to 10,000 local workers in Myanmar in the next years, while most of its Foshan factory workers are likely to be laid off. For a comprehensive overview of all the case-specific relocation evidence of TCF manufacturing, please refer to Table 6.

Box 4: Face-to-face interview with experienced researcher from China National Textile and Apparel Council (CNTAC)

Formerly known as the Ministry of Textile Industry of the People's Republic of China, CNTAC is the official body governing and guiding the development of China's textile and clothing industries. The following information was shared by a senior researcher from CNTAC during a two-hour interview session.

According to the researcher, more than 1,000 Chinese textile and garment firms have established production facilities abroad, with a combined production value currently exceeding 10 billion USD. The most popular destinations for Chinese investors are Vietnam, Cambodia and Myanmar. It is interesting to note that Vietnam has mainly attracted more upstream textile firms from China, such as those specialized in yarn, cotton and fabric production, while most Chinese firms preferred to relocate their clothing production to Cambodia and Myanmar. Based on CNTAC's research, Chinese-invested firms account for 60%-70% of clothing production in Cambodia, and around 50% for Myanmar and Vietnam. This is a highly insightful finding, as while the scale of relocation may seem rather small from China's perspective (given its size as a 'leading dragon'), the impact on the local economy can be enormous and far-reaching. In addition, the researcher also noted that the momentum of outward relocation of textile and garment firms from China appeared around 2012. This remark is well line with the sharp drop of China's exports of clothing since 2013 (see Figure 6).

When asked about the driving forces of relocation, the researcher noted that rising labor costs is one of the principal reasons for Chinese firms to relocate their production activities abroad. In addition, the Temporary Reserve Procurement Program implemented by the Chinese government during the 2011-2013 period, which allowed the state-run cotton reserve system to stockpile procured cotton at above world market prices, helped to push up the domestic price of cotton by 6,000 RMB per ton. While this was only a temporary policy, it has catalyzed firms' relocation to overseas.

Table 6: Examples of relocation of labor-intensive manufacturing firms in China

	SZ Int'l	**Jasan**	**Biaomei**	**Yue Yuen**	**Huajian**	**Mingzhi**
Industry	Textile/Garment	Garment	Garment	Footwear	Footwear	Footwear
Main products	Fabrics and clothing	Socks and intimate wear	Intimate wear (women)	Sports shoes	Leather shoes (women)	Sports shoes
Ownership	Chinese invested	Chinese invested	Chinese invested	Foreign invested	Chinese invested	Chinese invested
Established in	1990	1994	2001	1988	1996	1983
Relocated to	KHM/VNM	VNM	MMR	IDN/VNM/KHM/ BGD/MMR	ETH	MMR
Year of relocation	2005/2014	2014	2019	1992/1994/2009 /2009/2015	2011	2019
Share of production produced in China	60%	49%	80%	14%	n.a	n.a
Share of production produced abroad	40%	51%	20%	46% (VNM) + 37% (IDN) + 3% (Other)	n.a	n.a
Plan to increase production abroad in the future	Yes, by no less than 10%	Yes	Yes, by 60%-80%	Yes	n.a.	Yes
Employment level or share in China	50,000	n.a.	1,200	n.a.	23.8%	4,000
Employment level or share abroad	19,000	n.a.	500	n.a.	76.2%	n.a.
Plan to increase employment abroad	Yes, +17,000 in KHM; +6000 in VNM	n.a.	Yes, +9500	Yes	n.a.	Yes

Note: Numbers on the share of production and employment between China and abroad refer to the most recent information. In many cases, these numbers refer data from 2019. A caveat of this representation is that it only shows the final result of relocation and does not capture the evolvement of relocation over time.

4.3. Relocation by foreign enterprises operating in China

The final piece of evidence on outward relocation from China is gathered through business surveys conducted by the American and German Chamber of Commerce in China. This provides yet another angle looking at the issue of overseas relocation from China. As shown in Table 7, a fairly sizable share of American and German firms have shifted productions outside China and more are planning to follow suit in the near future. When asked about the motivations behind their relocation decisions, the dominant responses were rising labor costs in China, both for American and German firms. Among the destinations, SE Asia also comes out on top to be the most popular choice. This extra piece of evidence is well in line with the prior findings and conforms to the FGP as well.

Table 7: The scale of relocation by American and German firms operating in China

	American Chamber of Commerce in China	**German Chamber of Commerce in China**
Name of the Survey	China Business Climate Survey Report 2017	Business Confidence Survey 2018
Survey conducted in	2016	2017
Firm sample size	462	423
Already relocated	14%	13.8%
Plan to Relocate	11%	5.3%
Sum	**25%**	**19.1%**
Destination	Primarily shifted to SE Asia (>50%)	SE Asia (34%); India (32.1%); Africa (1.9%)
Key drivers	1. Rising labor cost; 2. Strategic re-prioritization of other countries;	1. Rising labor costs (53.8%); 2. Strategic re-prioritization of other countries (36.5%);

Note: Both surveys were carried out before the breakout of China-US trade frictions, thus the scale of relocation shown in the table are not affected by this 'external shock'.

5

Driving Forces of Relocation

In this section, we discuss the key driving forces behind the ongoing wave of relocation from China. As relocation is found to be mainly driven by clothing and footwear industries, a comparative perspective is taken to reveal the reasons why relocation of other labor-intensive manufacturing industries (i.e., household appliances) did not take place. Before proceeding, it is important to emphasize that we do not attempt to rank the driving forces in terms of their importance. Instead, this section is aimed at outlining all the factors that are found or considered to be important drivers of relocation.

The first key driver of relocation and also a common denominator among all the relocating firms is the surge in labor costs in China. Based on data provided by the NBS of China, both real wage growth and labor productivity growth (LPG) are plotted in Figure 17. As can be seen from this figure, real wage growth in China is 5.2 per cent per annum over the period of 1978-2001, and the rate of growth for labor productivity is 5.3 per cent per annum.[33] This suggests that growth in labor productivity has outpaced the growth in real wage, so that unit labor cost has actually declined in this period. In the period of 2002-2017, however, the table has turned. Real wage growth of urban residents has reached over 10 per cent per annum, while LPG is about 9 per cent per annum, indicating the fact that not only has the real wage grown at a very rapid rate of over 10%, it has also outpaced LPG, driving up the unit cost of labor in China. Similar findings are also shown by Li, Li, Wu, and Xiong (2012) who also found that wage growth has outpaced productivity growth, posing significant pressure on the survival of labor-intensive manufacturing firms. Based on China Urban Household Surveys, Ge and Yang (2014) also found profound changes in China's wage structure between 1992 and 2007. According to their estimation, the average real wage in urban China increased by over 202% and the decomposition analysis reveals that a large portion of this wage growth can be attributed to higher pay for basic labor (i.e., low-skilled labor). Moreover, in a recent study by Gan, Hernandez, and Ma (2016), it is found that increases in minimum wage are significantly associated with declines in exports from China and this negative effect is stronger

[33]Labor productivity is calculated as real value-added of the industrial sector divided by the number of people employed in the industrial sector. Producer price index of the industrial sector is used to deflate nominal value-added.

on labor-intensive firms. While the issue of relocation is not discussed in Gan et al. (2016), this piece of evidence is perfectly in line with the relocation story and relocation may well be the mechanism behind their findings. To be specific, as wage increases in China, labor cost-sensitive firms, especially those that are export-oriented, would be more prone to relocating productions abroad and as a result, exports from China would decline and exports of the recipients of relocation would increase, which is exactly what is found in this report (see Figure 6).

Figure 17: Comparison of wage growth and labor productivity growth in China

Source: National Bureau of Statistics of China

In addition to fast-rising wages, non-wage labor costs have also increased significantly in China. This is particularly evident after the implementation of the new Labor Contract Law, which became effective on January 1, 2008. Besides the regular wage payment, employers are also obligated to cover additional payments for the social security scheme (SSS) for the employees. The SSS consists of five different categories of insurance (pension, medical insurance, unemployment insurance, work-related injury insurance, maternity insurance) and contribution to the mandatory housing provident fund. Depending on the regions, these extra payments may well add up to over 35% of one's payroll. As social security payments are proportional to one's wage, the fast increase in wage rates in the past years also implies the extra payments induced by the SSS has been increasing in tandem. Another indirect cost of labor that does not show up in the wage bill is the demand for better working and

living conditions. Most of migrant factory workers in coastal regions are provided with housing and food, and most of the time, for free. Extra cost on this has become particularly evident in the last few years, as labor shortage along the coastline has given the workers an upper hand in negotiation.[34] While the exact cost is unknown, this has definitely levied another layer of cost burden on the employer.

As most of the relocating firms are found to be export-oriented, two other factors that are likely to have played an important role in relocation are (1) the steady appreciation of the Chinese currency RMB since July 2005; (2) tariff differentials between China and the recipient countries of China's relocation. Base on the annualized exchange rates, the rate of appreciation of RMB is found to have exceeded 25% in the period of 2005-2018. This has significantly deteriorated the cost competitiveness of export-oriented labor-intensive manufacturing firms in China. As for tariff differentials, it is widely known that countries in SE Asia and Africa, such as Vietnam, Cambodia or Ethiopia, face extremely low or even zero rate of customs duty in exporting to Japan, the EU and the US. For example, the tariff rate of textile exports from Vietnam to Japan and the EU is zero. In contrast, the tariff rates for China's textile exports are 7% to Japan and 12% to the EU.[35]

Another highly important driver of China's relocation is the increasingly stringent regulations on environmental protection. This regulatory pressure was mentioned repeatedly throughout the entire field research, in particular among industry clusters located along the coastline. It is a known fact that the fast-pace industrialization of China has been achieved, to some extent, at the expense of the environment. Strict measures have been put in place since the early 2010s to reduce industrial pollution and these measures have required companies to adopt cleaner waste processing technologies, which are often very costly. As countries are at different levels of economic development, environmental protection standards in lower-income countries or regions are, by and large, less stringent than in China. As a result, some firms are drawn into other countries to produce.[36] This is a quite common economic phenomenon and also known as the Environmental Kuznets Curve, which depicts the relationship between income and environmental deterioration to have an inverted U-shape.[37] That is, environmental quality declines in early stages of economic

[34]During our field research, business owners pointed out that it has become quite a standard practice to equip work dormitories with air-conditioners, internet and wash-machines.
[35]In a recent study, Xu et al. (2017) also discussed the tariff differentials between China and other low-income countries, in particular the preferential scheme named the US African Growth and Opportunity Act (AGOA).
[36]In textile and footwear manufacturing, pollution is generated during the process of dyeing and (denim) washing.
[37]In his path-breaking paper, Kuznets (1955) found that income inequality widens at first as income increases, and then reaches the peak before it gradually declines, forming the inverted U-curve shape. The extension to the relationship

development, after a certain level of income per capita is reached, the trend is reversed as income rises, generating the EKC inverted U-curve (Grossman & Krueger, 1995; Lantz & Feng, 2006; Ota, 2017). The fact that environmental protection has become a driver of relocation may well indicate that China is probably on the verge of passing over the peak of the inverted U-curve as China's income per capita will soon join the ranks of high-income economies.

As for why large-scale outward relocation did not take place in the household appliances industry, we identified three key reasons through field research. First, the reliance on labor and the costs of labor as a share of total production costs are quite small or much smaller than that of clothing and footwear manufacturing firms.[38] According to information collected from on-site interviews with business owners, about 50%-60% of the production processes of major appliances (e.g., wash machine, fridge, air-conditioner and the like) can be automated and the cost share of labor is merely between 7% and 8%. This is also in line with the findings of a recent study by Wang et al. (2020) who found that the productions of household appliances are much less labor-intensive and the production processes can be more easily automated relative to clothing and footwear manufacturing. Thus, given its low reliance and a small portion of the costs accounted for by labor, the impact of rising labor costs on household appliances producers is very limited.[39] Second, the length and complexity involved in the supply chain of the household appliances industry have made offshore relocation all the more difficult. It is often the case that about half or more of the components used in appliance production, such as wash machine or fridge, are sourced from outside and by hundreds of suppliers. Among those numerous suppliers of components, they can be further distinguished by fist-tier, second-tier and even third-tier suppliers, making the supply chain extremely intricate. This feature alone would already inhibit the relocation of appliance producers, as longer supply chains mean less agility and much higher costs of moving away from the supply chain. Third, the establishment of an appliance factory is very costly. To get a sense of the magnitude, even the set-up of a small-size appliance factory would cost tens of millions of USD. Thus, the labor cost advantages provided in the other countries do not seem to be sufficient to compensate for the potential risks of producing overseas, which requires a tremendous amount of investment upfront.[40] The fact that

between income and environmental deterioration is popularized by the World Bank (1992) as well as Grossman and Krueger (1995).

[38] While closely related, low reliance on labor does not necessarily imply the cost of labor as a share of total production cost will be small.

[39] Note, this is not biased towards large firms that are able to use more or better machinery in production. In-depth company surveys were filled out by two household appliances producers, one is a listed firm with sales value over billions of RMB in 2018, while the other is a much smaller privately-owned firm producing medium-low end appliances.

[40] A caveat to note here is that these reasons may not be applied to small appliance producers. During our visit to

relocation of the household appliances industry did not take place in China is also consistent with the work of Lin (2017) who classified a (middle-income) country's industry into five categories and household appliances in China fell under the heading of leading-edge industry, which requires firms to actively engage in indigenous R&D for new technologies and products, rather than moving away to places with comparative advantage in labor cost.

a small-size electrical company, specialized in producing fan motors, the owner decided to move its production from Foshan (located in the PRD region) to Bangladesh. The main reasons behind this shift are that the biggest market for the company is in Bangladesh and the tariff rate of importing motor fans from China will increase from 7% to 39%. Apart from these reasons, the owner also stressed that the wage differential between China and Bangladesh has also played a role in moving its productions abroad.

6

Future Potentials

WHETHER overseas relocation from China will continue to take place in the future will depend on a multitude of factors. Akin to prior discussions on the driving forces of relocation, we do not attempt to argue which factor is more important than the other, as evidence and information gathered in this report do not allow us to quantitatively differentiate their importance. The goal, instead, is to spell out all the factors that are found to be important and highly relevant to the potential of future relocation.

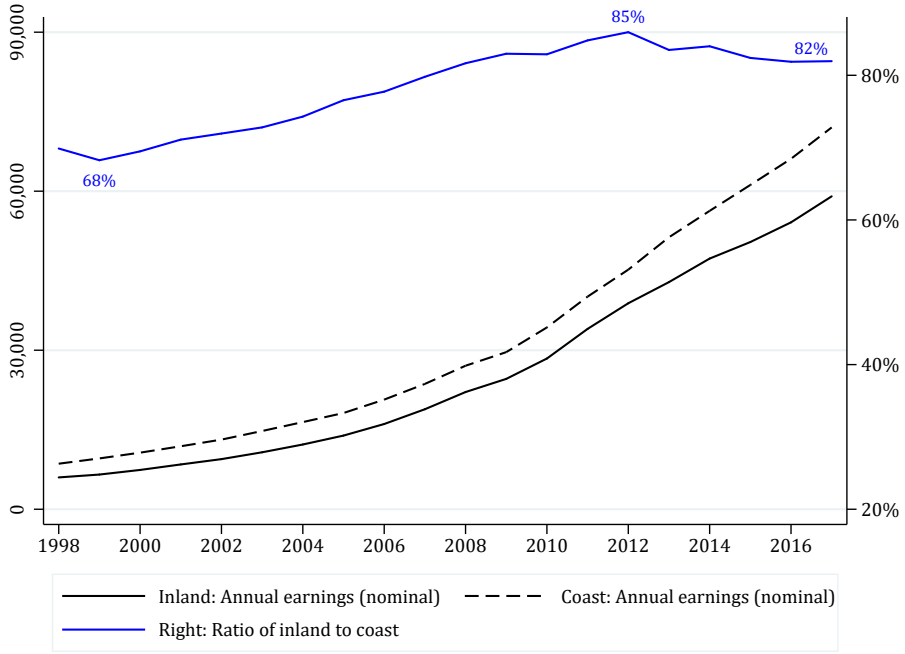
The first key determinant of the future potential of relocation is, as one would expect, labor costs. Wage rates in China have grown very rapidly at over 10% per annum in the past 15-20 years (see Figure 17). This rising trend will continue as the Chinese economy is projected to grow at a steady rate of 6%-6.5% and (part of) this growth at the aggregate level will be translated into wage growth.[41] In addition, outward relocation to other countries is much more likely to take place than inward relocation to inland regions. As can be seen from Figure 18, the wage differentials between inland and coastal regions are converging over time (see footnote 23 regarding the distinction between inland and coastal regions in China). The ratio of inland to coastal regions was about 68% in 1999, and it has climbed up to over 82% in 2017.[42] Thus, the cost-competitiveness of labor of inland regions is very small and eroding over time. In addition, wage rate is one of the constituents of labor cost. Non-wage labor costs, such as social security payments (which became effective in China since 2008) as well as demand for better working and living conditions, are expected to raise as well. From field research, the pressure of mounting non-wage labor cost is repeatedly mentioned and stressed by business owners. Thus, rising labor costs in China is not only an issue of rising wage rates, but other costs that do not show up in wage statistics are also inflicted upon the employer.

While increasing labor costs in China seems to favor relocation to take place, this is only half of the

[41] Eminent scholars have also commented that the growth potential of the Chinese economy should be around 8% until 2030. Nonetheless, to what extent it can be achieved will depend on the demand-side of the economy, such as exports, investments and consumption.

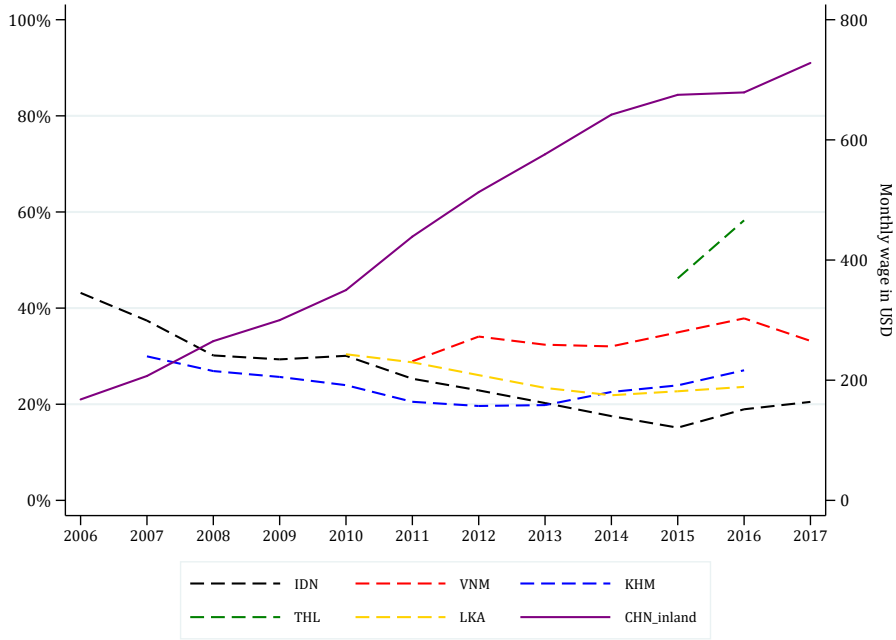
[42] The comparison of wages between inland and coastal regions are based on nominal wage rates of the manufacturing sector. Data are retrieved from the China Labor Statistical Yearbook. An implicit assumption behind this comparison is that changes in price levels are constant across Chinese regions.

Figure 18: Wage differentials between inland and coastal regions



Source: China Labor Statistical Yearbook

Figure 19: Comparison of manufacturing wage between China and SE Asia



Source: International Labor Organization

picture. The other half requires a comparative analysis examining the differentials of labor costs between China and the other (potential) recipient countries. Based on the wage data retrieved from the International Labor Organization (ILO), it is shown in Figure 19 that manufacturing wage in

SE Asia remains far below that of China (i.e., below 40%).[43] The fact that these ratios have even declined somewhat over time suggests that wage growth in China has outpaced wage growth in SE Asia. It is important to point out that these comparisons are based on the average wage rates of inland regions in China. Thus, wage differentials would be even higher if wage rates from the coastal regions or national average rates were used, further magnifying the potentials of future relocation of labor-intensive manufacturing from China.[44]

Beyond these numbers, the potential of future relocation is also justified based on the information gathered through field research. For one, 'new' firms are found to relocate productions abroad (predominantly in SE Asia) since this year and the shift of production is a gradual process, which will take about 2-3 years to complete. For two, among those that have already invested in SE Asia, productions will be further expanded abroad at a large scale in the coming years (e.g., SZ Int'l). Although the provision of an exact estimate on the future potentials of relocation is not possible or feasible, the outlook is clear: overseas relocation will continue to take place in the near future.[45]

If one takes a long-term perspective, looking in 20 or 30 years from now, the landscape of relocation is likely to be somewhat different. According to the projections of the United Nations (2019), the only place that will see a steady rise in the share of working population (aged between 15 and 64) is SSA (see Figure 20). The actual size of the working population of SSA is 563 million in 2018 and this number will be skyrocketed to 1.3 billion by 2050, making SSA the world's largest pool of labor.[46] As rising labor cost is found as (one of) the dominant drivers of relocation, the potential for SSA to overtake labor-intensive manufacturing from China or even from SE Asia looms large (as labor costs are also increasing fast and steady in SE Asia). This potential is further magnified as Africa will also be one of the world's fastest-growing consumer markets in the coming decades (Signé, 2018). Having said that, one should be mindful that low labor costs is merely a necessary

[43] Wage rates are denominated in local currency units and market exchange rates are used for conversion to USD. Data on average manufacturing wage of Chinese inland regions are obtained from China Labor Statistical Yearbook. In addition, it would have been desirable to also collect wage data on SSA, but these are not available from ILO.

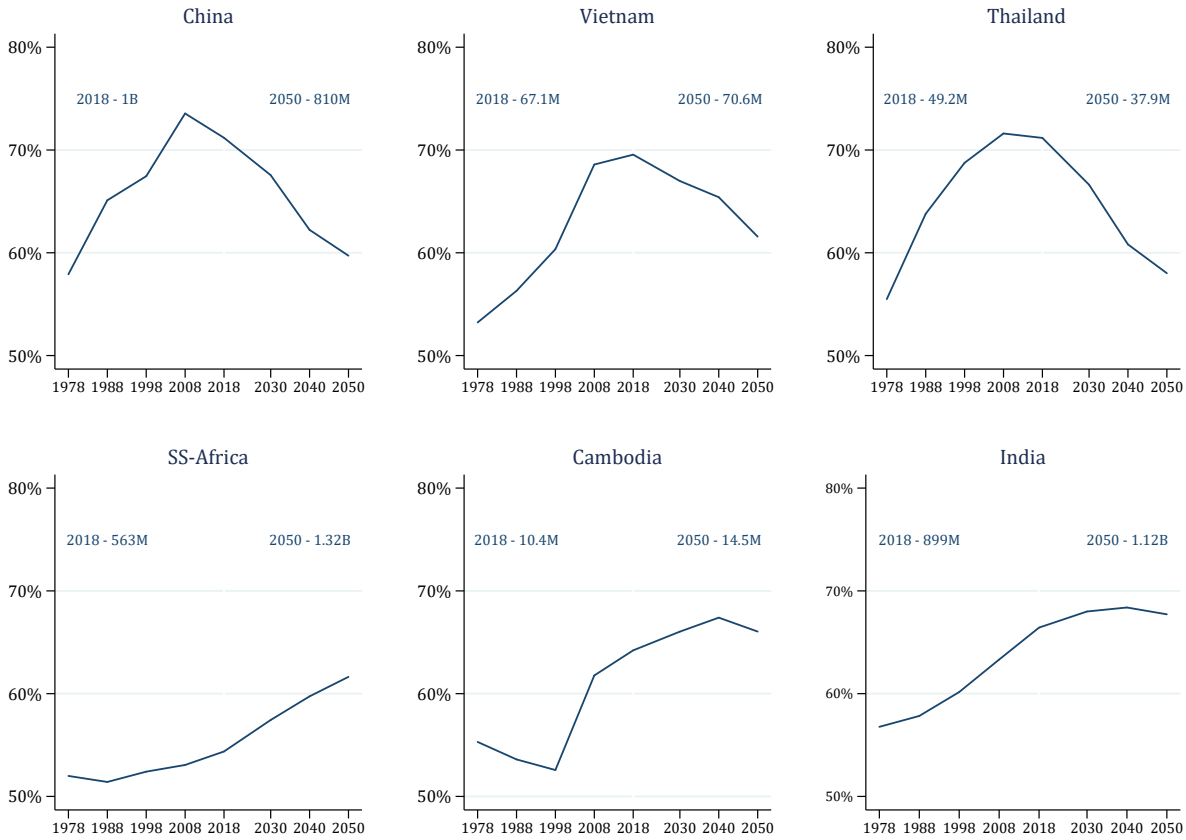
[44] Using data on wage rates to compare cost competitiveness across countries is, admittedly, somewhat crude. A more rigorous comparison of cost-competitiveness should also take cross-country differences in labor productivity into account. The appropriate measure should be based on unit labor cost (ULC). However, precise calculations of ULC across a number of countries is too data demanding and not really feasible to implement in practice. While labor productivity may be lower in SE Asia, it does not fully erode its cost competitive edge vis-à-vis China. Based on some early available data, recent studies also find evidence showing that ULC is also higher in China than ASEAN countries (Cui & Lu, 2018).

[45] Evidence gathered through field research are not affected by the ongoing China-US trade frictions. Nonetheless, the ongoing trade frictions between China and the US would ineluctably serve as a catalyst precipitating relocation.

[46] The only place that is near the size of working population of SSA is India, which is projected to have 1.1 billion working population.

condition for relocation. The cost-competitiveness of a country does not only depend on labor costs (or factor costs of production at large), but also on transaction costs. The latter is a multifaceted concept associated with the inadequacy of broadly defined hard and soft infrastructure, such as road access, provision of electricity, and ease of doing business. Thus, given its abundant supply of surplus labor, SSA is well positioned to overtake labor-intensive manufacturing from China or other countries. However, whether and to what extent it can be materialized hinges closely (if not exclusively) on the level of transaction costs, which is also the arena where the local government can potentially play a significant facilitating role in keeping it in check so that latent comparative advantages can be turned into competitive advantages.

Figure 20: The projection of working population aged between 15 and 64



Source: United Nations Conference on Trade and Development

Before closing, another factor that is highly relevant to the future potentials of relocation is the rise of labor-displacing production (or automation) technologies, which is also what makes the current industrial transfers from China unique. While clothing and footwear industries have been slow, compared to automobile manufacturers, in adopting new robotics and automation technologies, the successful creation of sewing robots (sewbots) in the last few years may have

set the revolution of clothing and footwear manufacturing in motion. It is estimated that the use of sewbots could displace 50% to 70% of the laborers from the workplace. As impressive as it may seem, these numbers should be read with caution. For one, the current frontier for robotic textile manufacturing is highly limited in scope to simple pieces made in large quantities (e.g., T-shirts). Second, the fact that certain tasks *can be* automated does not imply it *will be* automated. The former is a technical consideration signaling technological feasibility, while the latter is an economic consideration that takes cost-benefit analysis into account. According to information gathered through our field research from business owners and experienced industry practitioners, the application of new production technologies is not meant to have workers replaced, but to equip them with better 'tools' so that labor productivity and product quality can be improved. Even if the installment of machinery could reduce a certain number of workers, this is more of a 'side-effect' rather than a preset goal. Hence, the disruptive effects on labor employment has been quite limited and the vision to have clothing and footwear manufacturing fully or largely automated is not yet in sight.[47] Based on the frontline experiences of Chinese business owners, clothing and footwear productions are likely to remain labor-intensive in the foreseeable future. For one, this has to do with the pliability and breathability of the fabric itself, which stretches, warps, folds and can be 'immune' to the vacuum gripper used in the current frontier sewing robots. Thus, the nature of the fabric has given the laborers the upper hand in clothing and footwear production. Second, as income rises across the globe, there is an ever-increasing demand for more varieties in design and style in fast fashion industries, and in less quantities. These trends would require more nimble human hands in production and make automation all the more difficult. Nonetheless, one should also be mindful that given the unpredictability of how (fast) automation technologies could progress in the future, the scope and the timing of labor market disruptions due to automation technologies is like 'the proof of the pudding in the eating'.

[47] In a recent paper by Kromann and Sørensen (2019), it is also found that the adoption of new (automation) technologies in Danish manufacturing firms is low and almost half of the firms relied significantly on manual production processes.

7

Concluding Remarks

The relatively recent move of labor-intensive manufacturing activities from China has sparked wide interests and attention from scholars and policy makers alike. This move is not only of great importance to China as the economy is in the transition phase to higher levels of economic development, but it also carries enormous implications for the other catching-up developing countries, as they are well positioned to take over labor-intensive manufacturing from China which, in turn, may help them to set the process of industrialization in motion. Based on the publicly available data and first-hand information gathered through field research, this report has formally examined the issue of relocation of Chinese labor-intensive manufacturing industries, both from a conceptual point of view and an empirical point of view.

It is found in this report that a non-negligible scale of relocation has taken place in China, and it is primarily driven by export-oriented textile, clothing and footwear manufacturers. Based on the exports statistics, the scale of relocation is found to be between 25% and 35% for clothing manufacturing. The scale, however, is smaller for footwear manufacturing and it is estimated to be about 15%. It is important to note that while the scale of relocation seems quite large in terms of the value of exports, the impacts of relocation on domestic production and employment are quite limited. This is largely because over the past forty years of reform and opening up, manufacturing firms in China have steadily acquired the skills and money to cultivate their own fashion brands in clothing and footwear. While export-oriented firms have been shifting production abroad since the early 2010s, the emergence of domestic-serving firms (often upgraded from OEM to ODM and finally to OBM) has significantly expanded their productions and size of employment in tandem. Workers displaced and productions negatively affected by relocation are, to a large extent, offset by the expansions of these Chinese home-grown TCF manufactures. The other probable reason why the impact of relocation on employment is more limited may have to do with more stringent employment protections since the 2008 Labor Contract Law, which makes employment more 'sticky' and less responsive to changes in production. Thus, the relocation of labor-intensive manufacturing from China is not at a scale of great concern and most probably will not be in the

near future. Moreover, international industrial transfer is a common development process that most industrializing countries need to go through as it transforms and upgrades from lower value-added economic activities to higher ones.

In accordance with the prediction of the Flying-Geese Paradigm, rising labor costs is found to be one of the key driving forces behind the past and the ongoing manufacturing relocation from China. It should be noted that not only has wage rates increased significantly in China in the past 10-15 years, other non-wage labor costs have also surged in tandem. For instance, the obligation to pay for the social security scheme for the employees and the demand for better working and living conditions by the workers. While the exact costs are hard to estimate and would vary from region to region, these have undoubtedly imposed another layer of significant cost burden on the employer. Besides rising labor costs, wage and tariff differentials between China and the recipient countries of relocation are found to have played an important role in driving firms to produce overseas. Last but not least, the increasingly stringent regulations on environmental protection, in particular along China's coastline, are repeatedly mentioned by industry practitioners and business owners as an important driver of relocation.

Unlike textile, clothing and footwear manufactures, the relocation of other labor-intensive industries, such as household appliances, did not take place at a noticeable scale and there are three plausible reasons for that. First, the reliance on labor and costs of labor as a share of total production costs is very small. Thus, the impact of rising labor costs on household appliances producers is quite limited. Second, the supply chain of appliances production is extremely lengthy and complex, which have made relocation all the more difficult. Third, the establishment of an appliance factory is very costly and labor cost advantages provided abroad are much less likely to justify or motivate production relocation, as the tremendous amount of investment required upfront would significantly increase the riskiness of productions abroad. Plus, the household appliances should be seen as a leading-edge industry in China and its future growth potentials hinge on indigenous R&D for new technologies and products, rather than moving productions offshore.

Based on the registry database of China's outward foreign direct investment as well as case-specific evidence collected from field research, the main beneficiaries of the past and ongoing industrial transfers are countries in Southeast Asia, in particular Vietnam, Cambodia, and Myanmar who is gaining popularity in more recent years as well. African countries are in the relocation picture

as well, and Ethiopia and Nigeria are among the most popular destinations in Africa. However, the scale remains far smaller relative to that of SE Asia. This report also believes that relocation is likely to continue in the future and SE Asia is projected to experience further expansions in textile, clothing and footwear manufacturing in the next 3-5 years. The fact that Vietnam has officially signed the CPTPP in January 2019 and the uncertainties regarding the trade frictions between China and the US would further catalyze the speed and scale of relocation to SE Asia. The potential for Sub-Saharan Africa to take over China's labor-intensive manufacturing is real and large, but it is more likely to materialize in the long run. According to the projections of the United Nations, SSA will be home to the world's largest pool of labor in the coming decades. Thus, given that the increase in labor costs has been a key driver of relocation, SSA is well-suited take over labor-intensive manufacturing from China or even from SE Asia in the future. A related issue that is heatedly discussed these days is the development of production automation technologies and artificial intelligence, which may prevent relocation from taking place. If production can be done by machines or robots at a reasonable cost, there is then no incentive for factory owners to search for places characterized by lower labor costs. What is found in this report, based on frontline experiences of business owners and industry practitioners, is that the vision of having clothing and footwear production fully or largely automated is not yet in sight and most probably will not be in decades. For one, this has to do with the nature of the fabric itself, which stretches, warps and folds. It needs to be accurately aligned before they are sewn, something workers can easily and aptly accommodate but sewing robots cannot. For two, the increasing demand for greater varieties in design and style in clothing and footwear will require more nimble human hands in production, dimming the prospects of large-scale production automation in these industries.

Although SSA seems to have all the necessary conditions to attract labor-intensive manufacturing from China and other countries, these are not sufficient. A country's global competitiveness hinges on the summation of factor costs of production and transaction costs. The latter is a multifaceted concept associated with the inadequacy of broadly defined hard and soft infrastructure. To what extent the relocation of Chinese labor-intensive manufacturing could reach the African continent will depend on the ability of the local government to keep the transaction costs in check such that latent comparative advantages can be turned into competitive advantages. Although this estimation is rather crude, given that China's working population is projected to shrink by about 20% in the next 30 years from 1 billion to 810 million workers, the shift potential or exposure of 20 million

labor-intensive manufacturing jobs is not far out of reach.

While the best efforts are made in this report to examine the ongoing relocation of labor-intensive manufacturing from China, there are caveats to note and large rooms for improvement. For instance, among the key driving forces of relocation outlined in this report, the significance of their importance is not (rigorously) examined. Should the data become available in the future, one could formally test the elasticity of rising labor costs on relocation through econometric modeling and, depending on the richness of data, quantitatively differentiate the significance of different drivers of relocation. This report should be seen as a qualitative exercise aimed at collecting different pieces of evidence, each of which serving as a piece of the puzzle in forming a clearer picture of the ongoing industrial relocation from China.

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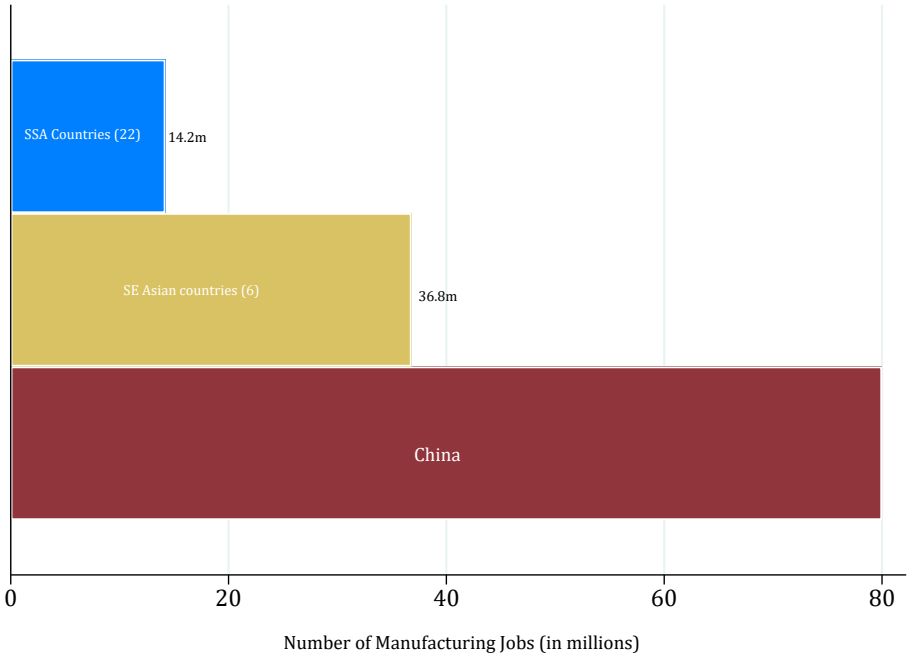
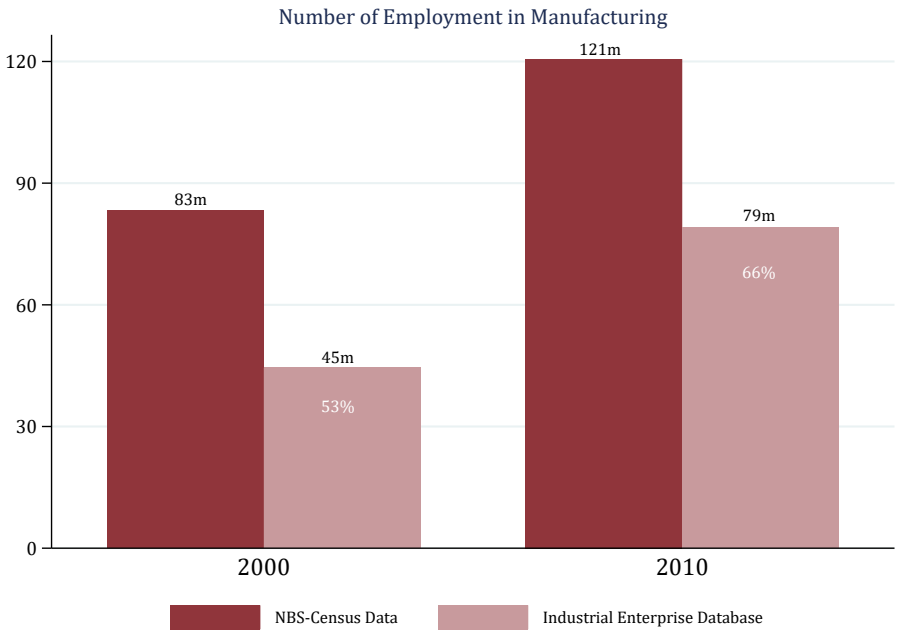
Appendix - Figures

Figure A1: Comparisons of manufacturing employment by country groups



Source: International Labor Organization

Figure A2: Representativeness of the CIED



Source: China Industrial Enterprises Databases

Figure A3: Geographical representation of the field research