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Research Article

The Impact of Imports from China on African Textile Exports

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ABSTRACT

This study uses Comtrade trade data covering 1990–2017, 14 textile subsectors, and 53 African countries with their main trade partners to evaluate Chinese trade impacts on African textile exports over three subperiods at the sector level. It finds that, although textile imports from China had a significant positive impact during the first period, this effect disappeared in the second period. From 2009 to 2017, the impact became significantly negative. I explain these results by arguing that Chinese products exert both intermediate goods and crowding-out effects on African local producers. During the first period, the intermediate goods effect exceeded the crowding-out effect, and helped to strengthen African textile production and exportation. Over time, however, the net crowding-out effect was increasing. In the last period, imports from China reduced Africa's exports. This study, thus, raises a concern about African "premature deindustrialization", presumably as a consequence of the continent's trade with China.

1. INTRODUCTION

African economies are highly dependent on trade because Africa is, in terms of the ratio of trade volume to Gross Domestic Product (GDP), one of the world's most open regions, just behind East Asia (Broadman, 2007). According to the Organisation for Economic Co-operation and Development (OECD, 2002), between 1950 and 2000, the share of Africa's GDP in PPP globally fell by a third, that of exports by two-thirds, and that of Foreign Direct Investment (FDI) from 6% to 1%. The downward trend in Africa's share in world GDP and exports can be explained largely by the changes in the terms of trade. Since the mid-1990s, however, most African countries have realized an average growth rate of more than 4%. This growth rose steadily between 2000 and 2009. In 2007, it was at a record high of 5.5% (OECD, 2008). One explanation is the growing trade linkage with some emerging industrial regions, particularly China (Alden et al., 2008; Asche and Schuller, 2008; Manji and Marks, 2007). Most economists regard this linkage as a major opportunity for African countries. This view has been expressed, for example, in two publications by the World Bank and the OECD (Broadman, 2007; Goldstein et al., 2006).

The presence of China and India in Africa is doubtlessly positive from the macroeconomic point of view (in terms of the effects on balance of payments, saving, growth, investment, and government budget). Trade with these countries helped to improve Africa's terms of trade by increasing the demand for African exports, especially for the region's natural resources, to reduce Africa's internal inflation, and to increase Africans' purchasing power (Alden, 2007; Goldstein et al., 2006).

From the trade theory point of view, this positive change can be explained by the gains from comparative advantage. The macroeconomic improvement comes from the decrease in production of some sectors in which a country has no comparative advantage and the increase in production of those in which the costs are lower and (or) the factors of production are more abundant.

Without necessarily doubting its normative or welfare implications, there are concerns about this mainstream gains-from-comparative-advantage argument. In relation to certain countries such as China, most African countries have no comparative advantage in almost any of the manufacturing sectors; they have to reduce manufacturing activities, according to theory, and specialize in agricultural and mining sectors. In other words, a free trade system grounded on comparative advantage could disfavor African industrialization. For more than half a century, we have observed a trend of deindustrialization in Africa (Grabowski, 2015). Based on data from the

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World Bank, the share of manufacturing value added in GDP has progressively decreased in sub-Saharan Africa, from more than 16% in 1990 to about 10% in 2017.

Rodrik (2015) characterized this deindustrialization in developing countries as "premature deindustrialization," a term earlier used by Dasgupta and Singh (2007). In most of these countries, manufacturing shrinks at levels of income much lower than those at which the advanced economies started to deindustrialize. Rodrik (2015) cites particularly sub-Saharan African countries as experiencing premature industrialization. He explains this with the large role played by trade and globalization. As developing countries opened up to trade, those without a strong comparative advantage in manufacturing became net importers of manufacturing, reversing a long process of import-substitution. In addition, developing countries "imported" the decline in the relative price of manufacturing from advanced countries even though they may not have experienced much technological progress.

In this study, I focus on sectorial analysis and evaluate sectorial trade impacts. As comparative advantage theory does not allow a specific impact analysis on industrialization, I apply another method. From a comparative advantage point of view, the increase in importation of one kind of goods always has a negative effect on the local production of these goods. Therefore, the sectorial effect is always negative. Based on some recent theoretical development, I consider the evolution of two sectorial effects of importation: the intermediate goods effect and the crowding-out effect. Whereas the second effect is negative to the production of the sector, the first effect is positive: importing cheaper and higher quality intermediate goods could increase the output of this sector. The overall impact on industrialization could be either positive or negative, depending on the relative importance of the two effects. With this method, I could obtain an estimate of the industrial impact, which is not possible based on the traditional approach involving gains from comparative advantage. This is because intermediate goods and crowding-out effects are two alternative ways to regulate the world production system, and both of them are considered welfare improving.

The textile sector is chosen for the study, because it is one of the major African production and exportation sectors. As China has become incomparably the largest textile exporter to Africa, it will be important to evaluate the effects of the imports from China on African textile production and exportation at the more disaggregate level. Such studies are generally lacking, due in large part to the difficulty in the collection and treatment of data covering the trade activities between African countries and their trade partners at the sector level over a long period.

I use the Comtrade data. The values of exports and imports of 53 African countries in 14 textile subsectors during 1990–2017 are gathered. For the econometric tests, besides other control variables, I regress African countries' textile exports on the shares of imports from China in the total imports by African country, by subsector and year. The data are divided into three periods: 1990–1999, 2000–2008, and 2009–2017. By comparing their respective regression results, any changes in impact are expected to be captured.

A strong positive effect of imports from China on African countries' textile exports during the first period was estimated, whereas in the second period the positive effect disappeared. In the more recent period (2009–2017), the effect became significantly negative. I interpret this result by arguing that during the first period, the positive intermediate goods effect was strong, whereas the negative crowding-out effect was weak. In the last period, as the Chinese textile exports into Africa became increasingly finished goods in nature, the crowding-out effect became stronger, and the total impact became negative. This result raises concerns over possible African "premature deindustrialization" as the consequence of globalization based on comparative advantage.

The remainder of this paper is organized as follows. After this introduction, Section 2 reviews existing studies on Chinese trade impact on Africa, Section 3 discusses the methodology and data, and Section 4 analyzes the results, before presenting the conclusion.

2. EXISTING STUDIES ON CHINESE TRADE IMPACTS ON AFRICA

Existing studies about Chinese trade impacts on Africa use different data covering various periods, countries, and sectors, and report different results. Here I focus on their differences in methodology. In general, the main works on this topic have been undertaken based on an analytical framework adopted by several authors (Jenkins and Edwards, 2005; Kaplinsky et al., 2007; Goldstein et al., 2006). In this framework, the impacts are distinguished as direct or indirect according to the trade channels. The direct impacts result from direct trade between China and its African trade partners, which may be further divided into complementarity and competitive effects. The fomer effect comes from the rising Chinese demand for African products, and the latter from the change in African local production caused by the influx of relatively cheap Chinese goods into African markets. The indirect impact is the third-market effect: the increasing exports to a third market by China may reduce the market share of African goods in that market.

To evaluate the direct effect, existing studies have used traditional measures of trade similarity with a complementarity index, and compared the exporting pattern of African countries with that of China, or have looked at the evolution of international market shares (Jenkins and Edwards, 2005; Goldstein et al., 2006; Stevens and Kennan, 2006; Geda and Meskel, 2008).

The studies on the indirect impact involve mainly regressing the African countries' exports to a country on the Chinese exports of the same types of products to that country. Giovannetti and Sanfilippo (2009) found that Chinese goods are likely to crowd out related African manufactures in the main trade partners of Africa, namely, the United States and the European (EU) countries.

A number of studies have also explored the Chinese trade impact on economic growth of African countries. They regress African countries' growth rates on their imports, FDI, aid from China, and other control variables (Kummer-Noormamode, 2014; Busse et al., 2016).

These studies focus on the macroeconomic effects, in line with the gains from comparative advantage analysis. As such, the studies have been criticized for being too aggregated and unable to reveal some important specific impacts requiring firm-level methodologies. Kaplinsky et al. (2007), for instance, cites several studies demonstrating that a high percentage of domestically produced manufactures in such countries as Ghana, South Africa, and Ethiopia have been downsized or forced into bankruptcy by imports from China, thus motivating studies at the sector and firm levels. Edwards and Jenkins (2015) used a database of 44 manufacturing industries at the firm level covering the period 1992–2010, and a Chenery-type decomposition and econometric estimation, to evaluate the impact of Chinese trade on prices, production, and employment in the South African manufacturing sector. Fu et al. (2015) evaluated the impact of trade with China on firm productivity in Ghana. These sectorial studies were limited to one country, however, and are therefore unable to provide a picture for African countries generally.

3. METHODOLOGY AND DATABASE

The main objective of this study is to examine the direct trade effects: the impact of importing Chinese textile products by African countries on the production and exportation of products in their textile sector. It does not cover the indirect trade effects, for instance, the third-market effect mentioned in Section 2, which may have equal importance in explaining African textile production and exportation.

The study is motivated by the idea that an increase in imports of intermediate goods from a more advanced country could increase the less-developed country's exports. This idea comes from the theory of appropriate (or intermediate) technology based on Schumacher (1973). More recently, Xie (1999) has shown that the benefit of learning from the more developed country can be realized in the less-developed country only when the technology gap is within a certain range such that technological interaction between the two countries exists. A stream of papers has econometrically shown that importing intermediate goods raises productivity via learning, variety, or quality effects (cf. Kasahara and Rodrigue 2004; Blalock and Veloso, 2007; Fernandes, 2007; Amiti and Konings, 2007).

On the one hand, in general, Chinese manufacturing technology is superior to that of most African countries, but also labor-intensive and, therefore, more accessible to African producers. Chinese products used as intermediate goods could have stronger positive impacts on African production of manufactured goods than importing from, say, the United States. Overwhelmingly composed of equipment and with high requirements of technical skills, these products imported from developed countries prevent their use as production inputs by most small- and middle-sized producers.

On the other hand, Chinese manufactured goods being mostly labor-intensive have a stronger crowding-out effect on African-produced intermediate and consumption products. This is an argument against imports from China by African countries. By contrast, given that most imported goods from developed countries are those that local producers are unable to fabricate, the local production substitution effects of imports from developed countries must be rather weak.

Applying this concept to textile trade, importing the same category of textile goods from China could have a positive intermediate goods effect: the imported goods can be transformed and adapted for local markets and exportation. The best example is perhaps the following: by using higher-quality Chinese textile products as input, African producers can easily increase the quantity and improve the quality of their traditional clothing production. A number of products (fabric and clothing) classified as finished goods are also able to be used as intermediate goods. White T-shirts, although classified as finished goods, can be regarded as intermediate goods for producing colored T-shirts after the printing and dyeing process. However, textile imports from China can also have a substitution effect if they comply directly with the final demand. This crowding-out effect could be stronger if Chinese goods are cheaper and have better quality. Thus, the overall impact of textile imports from China on African textile sector could be positive, neutral, or negative, depending on which is dominant: the intermediate goods effect or the crowding-out effect.

Estimating the impact of imports on African exports is an indirect way to estimate the impact on African production activities, because exportation and production performances coincide in most African countries.[1] Such an approach is often employed because of the scarcity of production data on finely sorted manufacturing sectors for a large number of African countries over a long period.

For estimation of this impact, one could simply regress African countries' textile exports on their imports from China in the same sector. However, random shocks that affect African countries' exports are also likely to affect their imports. For example, a growth in demand leads to an increase in African exports as well as in imports from China. The estimates obtained by simply regressing African exports on imports from China would, therefore, be likley biased.

Other endogeneity sources could also come from trade policy changes that occurred during the period in question, and from the third-market effect. The abolition of quota at the end of Multifiber Arrangement during the early 2000 and the associated preferential access of African, Caribbean and Pacific (ACP) countries could affect African exports to the world and imports from China in the same direction. The textile exportation of China to, for example, France, could also affect African countries' exports to France, as well as their textile imports from China.

[1]African exporting performance is positively linked with the production performance of these countries. The empirical evidence was provided by He (2013).

In general, the Instrumental Variable (IV) technique is designed to handle problems of this type. One method is to build a gravity model using some market potentiality (population or GDP) and geographical variables (such as distance or landlockedness) of the trade partners to predict the trade volumes between them (He, 2013).[2] Nevertheless, this method is not applicable here because we are focusing on 14 textile subsectors. The gravity model is useful only for predicting country-to-country trade, or at most trade at the level of few large sectors.

For the sake of dealing with methodological difficulties in this study, I propose to use the import ratio as an explanatory variable. Instead of estimating the effect of the textile volumes imported from China on African textile exports, I regress African countries' exports on the ratio of imports from China in the total of their imports in the same category of goods. On the one hand, increasing imports from China is more likely to coincide with an increasing Chinese ratio. As such, the two estimates could generate similar effects. On the other hand, more importantly, this ratio allows users to avoid bias due to endogeneity, because the ratio is at most weakly affected by a random shock. If a random shock affects the total volume of imports, it must have a limited short-term effect on the relative shares of these imports from China, intra-Africa, European countries, etc.

Comtrade data contain full information on imports and exports of each country with one of all the other countries by sector and year. As the database covers 1990–2017, 53 African countries, and 14 subsectors, a complete set of observation numbers must be 28 (years) × 53 (countries) × 14 (sectors) = 20,776. I drop 1790 observations due to the lack of data on imports from the chosen partners (by country, sector, and year). As such, 18,986 observations are available for the regressions.

The 14 categories of textile products, as listed in Table 1, correspond to 14 subsectors. From this table, based on the Harmonized System (HS) classification, goods are arranged in order of their degree of manufacture: from raw materials, unworked products, semifinished products, to finished products. The pertinence of this method of classification, however, is relative. The articles classified into 57–63, more likely regarded as finished products, can also be used as intermediates, and transformed into new varieties of clothing.

For the sake of completeness, I consider all 53 African countries and their major partners. They include China (including Hong Kong and Macao) and 11 European countries (EU11): UK, France, Germany, Spain, Italy, Belgium, Netherlands, Switzerland, Austria, Sweden, and Portugal. The United States, Japan, and India are listed individually. Together with intra-Africa trade (the imports of an African country from other 52 African countries), these textile trades account for at least 80% of the total Africa textile trade.

Upon further checking, it became obvious that the value reported by a country is different from that reported by its trade partner (country) because the export values are fob (free on board) and the import value is recorded as cif (cost insurance and freight), creating a difference of 10–20%. Moreover, the same goods may be recorded in different categories by the exporter and the importer. Important missing data in the import and export reporting of a number of African countries are also observed owing to the imperfections in their customs and statistical systems.

A natural way to fix these problems would be to consider the mirror data method by automatically using the data used by the partner countries. As the provider of Comtrade data recommends caution in the use of this method, in general, the data of African reporting countries are used. I use the mirror data method only in the case of missing data—for example, when the African country's reported value was zero, whereas that of its partner country was positive. Besides this, modifications are made in two cases. First, if the African country (e.g., Senegal) reported zero values for all 14 subsectors, whereas its partner country (e.g., China) reported positive values in at least one subsector, then the values reported by the partner country are used. Second, I sum up the values of all 14 subsectors reported by this African country, and compare it with the corresponding sum of the values of all 14 subsectors reported by the partner country. If the first is more than 30% lower than the latter, then the values reported by the partner are used. With this method, I get the adjusted values from the trade partners by African country, subsector, and year.

Table 1 | List of textile subsectors

50	Silk
51	Wool, fine/coarse animal hair, horsehair yarn
52	Cotton
53	Vegetable textile fibers; paper yarn and weaving
54	Manmade filaments
55	Manmade staple fibers
56	Wadding, felt, nonwovens, yarns; twine, cordage
57	Carpets and other textile floor coverings
58	Special woven or tufted textile fabric; lace; tapes
59	Impregnated, coated or laminated textile fabric
60	Knitted or crocheted fabric
61	Art of apparel and clothing access, knitted or crocheted
62	Art of apparel and clothing access, not knitted or crocheted
63	Other made up textile articles; sets; worn clothes

[2]For one of the widely cited works on the application of the gravity models, *cf.* Frankel and Romer (1999).

To compute the ratios of imports by category of textile goods from the trade partners, the total imports by African country, year, and subsector from the world must also be determined. On the one hand, each African country has reported its total imports from the world by subsector and year. On the other hand, also, I obtain the estimated total imports by summing up the just mentioned adjusted import values from Intra-Africa, China, EU11, United States, Japan, and India by subsector and year. Guided by the idea that more than 80% of an African country's trade was conducted with these partners, this sum times 1.2 is the estimated sum. Comparing the reported sum of imports from the world and the estimated sum, the higher value is taken, called the adjusted total. Finally, the ratio of imports from a partner is computed as the share of the adjusted values of imports from this partner in the adjusted total by subsector and year.

4. RESULTS

4.1. Summary Statistics

As can be noted in Table 2, African textile is an open and dynamic sector. Before 2010, the trade surplus was huge but progressively declined. A closer look at more detailed data indicates that the trade deficit appeared by 2012, and reached its highest level in 2017. Between 1991 and 2010, both exports and imports achieved remarkable growth. Since 2010, whereas imports kept increasing, exports were significantly decreasing. Finally, as can be readily calculated using the shares of finished products, whereas the share of African exports of finished products either decreased or, at most, slightly increased for a few years, the total amount of imports of finished products drastically increased. The increase in deficit and the massive imports of finished products reveal a worsening situation in the African textile sector since 2010.

In Table 3, first, we observe a spectacular progress of the Chinese share in African total textile imports. Second, India's presence in Africa was also significant, but it only kept a steady share without significant growth. Third, although European countries were the largest exporters to Africa during initially, their shares of African textile imports progressively declined and were eventually surpassed by China's as of 2000. In 2017, EU11 exports of textile goods to Africa were less than one-third of those of China. The shares of all other Western countries shrank in the face of China's aggressive expansion. Fourth, relative to the three major trade partners, intra-African trade only kept a modest share, and this share has been decreasing. Last, the United States' and Japan's textile trade positions in Africa were rather weak.

As can be further observed in Table 4, whereas the share of finished products in total exports has been increasing for all main exporters to Africa, the growth rate of China was still significantly higher. Together with the fact that Chinese textile exports to Africa were incomparably larger in relation to those of other trade partners of Africa, there appears to have been an increasing crowding-out effect of Chinese exports on the African textile sector over this period.

Table 2 | Evolution of the African textile trade structure (million USD at current prices)[a]

Year	Export	% of finished products	Import	% of finished products
1990	1745	56.17	1579	26.68
1995	14,800	73.65	8972	35.83
2000	19,600	79.08	10,400	42.66
2005	24,500	80.82	15,400	47.22
2010	28,500	78.60	27,400	50.73
2015	26,000	79.62	38,000	57.37
2017	23,300	78.97	34,400	55.81

[a]Based on Comtrade data of 53 African countries. The method of adjustment of the data is introduced in Section 3; percentage of finished products is the share of 57–60 products in the total (50–63 products).

Table 3 | Shares of main African trade partners in African textile imports[a]

Year	China (%)	Intra-Africa (%)	EU11 (%)	India (%)	United States (%)	Japan (%)
1990	0.27	0.17	68.47	5.66	0.03	7.64
1995	17.54	4.25	57.13	4.44	4.13	0.99
2000	20.46	6.29	42.15	6.58	2.27	0.72
2005	33.53	5.25	32.94	5.61	1.39	0.73
2010	40.51	4.25	22.55	6.08	2.21	0.89
2015	51.58	3.18	15.36	7.08	1.22	0.70
2017	51.16	2.99	16.10	7.15	1.21	0.67

[a]Derived from Comtrade data; the method of adjustment of the data is introduced in Section 3.

Table 4 | Shares of finished products in textile exports to Africa by main African trade partners[a]

Year	China (%)	Intra-Africa (%)	EU11 (%)	India (%)
1990	29.84	29.24	27.91	25.51
1995	46.30	20.80	35.71	27.93
2000	52.52	32.37	42.26	22.28
2005	54.37	39.60	44.22	24.79
2010	56.64	53.60	48.76	28.00
2015	62.76	46.82	52.47	45.01
2017	62.03	54.15	51.03	49.67

[a]Based on Comtrade data. The method of adjustment of the data is introduced in Section 3; this share is measured as the percentage of the trade partner's exports of 57–63 products in its total exports (50–63 products) to Africa.

4.2 Regressions

Panel regressions are performed with the specifications of the following equation:

$$\ln EXP_{ijt} = \alpha + \sum_k \beta_{1k} share_{kijt} + \sum_l \beta_{2l} Y_{ilt} + T + \delta_i + \varepsilon_{ijt} \quad (1)$$

The dependent variable is the exports by African country, by subsector and year. The export values are converted at constant prices. Here, i represents one of the 53 African countries, j denotes one of the 14 subproducts (50–63), t is one of 28 years, and k denotes one of the four partners [China, intra-Africa (the total of the other 52 African trade partners of the African reporter), EU11 (11 main European trade partners), and India].[3] $Share_{kijt}$ denotes the shares of the import value of k by i, j, and t. All four shares in the same regression are included because, first, they have a tolerable level of collinearity and, second, this specification allows the measurement of Chinese impact in a comparative context. Y includes two variables by African country and year, population and per-capita GDP at constant prices, in order to control for local textile demand and, indirectly, production capabilities. All variables are in logarithms. T is the dummy value for year, δ_i reflects an African country i's fixed effect to control for time-invariant factors that affect its exportation, and finally ε is the error term that reflects other unidentified influence on African country i's exportation in that category of products at year t.

The overall panel is divided into three periods—1990–1999, 2000–2008, and 2009–2017—and some changes in impacts among these periods are expected. Only the fixed-effects model is used, because the Hausman tests suggest that the random-effects model is less appropriate than the fixed-effects model.

In the subsequent tables reporting the regression results, robust estimators are used to avoid conditionally heteroskedastic errors. As the main explanatory variables are ratios and the sample sizes are huge, the values of R^2 are meaningfully reduced, and the evaluation of the validity of the model is mainly based on F statistics, which are all significant. One can also note that the rho values are high; rho is the fraction of variation due to u_i: the individual effects in a composite error term. The high rho value signifies that the individual effects of African export countries were strong.

Table 5 contains six sets of regression results. I just focus on the results reflecting the Chinese impact. In the first three regressions, the overall panel of 14 subsectors (50–63) of three periods are used. It is found that during both periods, 1990–1999 and 2000–2008, imports from China exerted significant positive impacts on African exports. During 2009–2017, however, this impact was no longer significant. To reinforce the robustness, in the second three regressions, only the 20 most important African countries in terms of textile export values are kept. They reveal that the significant positive impact from China remained about the same in the first period. This positive impact disappears during the second and third periods.

In the above regressions using all 14 subsectors data, I suspect an underestimation of finished goods effect for two reasons. First, in Table 2, we know that exports from 50–56 subsectors, with more raw materials and semifinished goods nature, represent 20–30% of the total African textile exports, but they also represent more than a half of the observations. Second, a large amount of these imports must have been used in other subsectors, especially in 57–63 subsectors. This cross-sectorial effect, however, cannot be estimated with the setting of my econometric model.

This leads me to redo the regressions using the data for the 57–63 subsectors only. The products of these subsectors have more finished goods and represent 70–80% of the total African textile exports. As explained earlier, their finished goods nature is nonetheless relative because they can also be used as intermediates. Therefore, the results derived from these regressions must be more accurate in reflecting the intermediate goods and finished goods effects. These results are report in Table 6.

From the first three regressions of Table 6, although during the first period, the Chinese impact was significantly positive, it disappeared during the second period, and in the third period, it became significantly negative. In the last three regressions, where the 20 most important textile exporting African countries are analyzed, I obtain similar results.

[3]As shown in Table 2, the shares held by the United States and Japan were small and continued to decrease, so they are removed from regressions.

Table 5 | Panel fixed-effects regressions: all 50–63 subsectors[a]

Variables	53 African countries			20 main African exporting countries		
	(1) 90–99	(2) 00–08	(3) 09–17	(4) 90–99	(5) 00–08	(6) 09–17
	ln exp	ln exp	ln exp	ln exp	ln exp	ln exp
share_chn	5.491*** (0.654)	2.500*** (0.762)	0.927 (0.592)	5.401*** (1.107)	1.362 (1.100)	−0.156 (0.660)
share_af	0.941 (0.974)	1.711* (0.881)	−0.792 (0.735)	0.00674 (1.914)	1.405 (1.087)	−2.264** (0.829)
share_eu11	−0.339 (0.524)	−0.736 (0.642)	−0.380 (0.673)	−0.983 (1.155)	−2.621** (0.982)	−2.770* (1.387)
share_ind	2.190*** (0.720)	1.223 (0.865)	2.424*** (0.729)	1.541 (1.552)	0.118 (1.374)	0.496 (0.982)
lnpopu	7.622** (3.781)	0.382 (3.228)	−0.221*** (0.0197)	31.03*** (9.472)	−0.656 (3.966)	−1.472 (6.769)
pergdp	−0.000178 (0.000258)	$1.54e^{-05}$*** ($3.87e^{-06}$)	$2.49e^{-05}$ ($5.35e^{-05}$)	0.000369 (0.00112)	0.000352*** ($9.29e^{-05}$)	−0.000164 (0.000466)
trend_9099	0.345*** (0.0934)			−0.193 (0.221)		
trend_0008		−0.0533 (0.0776)			−0.0663 (0.0685)	
trend_0917			−0.105*** (0.0231)			−0.0679 (0.186)
Constant	−113.2* (58.67)	3.770 (50.33)	13.54*** (0.515)	−504.0*** (157.7)	24.42 (64.59)	39.46 (112.1)
Observations	6124	6386	6476	2159	2503	2514
Number of countries	48	52	53	16	20	20
R^2						
(within	0.146	0.024	0.015	0.198	0.042	0.027
between	0.324	0.210	0.091	0.003	0.013	0.231
Overall)	0.150	0.096	0.004	0.006	0.001	0.057
F (prob. > F)	35.19 (0.000)	11.09 (0.000)	175.80 (0.000)	18.40 (0.000)	10.63 (0.000)	5.59 (0.002)
Rho	0.840	0.423	0.496	0.983	0.430	0.576

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. [a]Robust standard errors in parentheses.

Table 6 | Panel fixed-effects regressions: 57–63 subsectors only[a]

Variables	53 African countries			20 main African exporting countries		
	(1) 90–99	(2) 00–08	(3) 09–17	(4) 90–99	(5) 00–08	(6) 09–17
	ln exp	ln exp	ln exp	ln exp	ln exp	ln exp
share_chn	6.445*** (0.767)	0.436 (0.764)	−2.375*** (0.852)	6.154*** (1.374)	−0.108 (1.143)	−2.108* (1.092)
share_af	2.029* (1.197)	1.945 (1.209)	−1.455 (1.256)	2.322 (3.059)	3.190 (1.990)	−4.892*** (1.558)
share_eu11	−0.115 (0.577)	−1.508 (0.998)	−1.599 (1.089)	−0.791 (1.454)	−2.457 (1.636)	−3.167 (2.061)
share_ind	2.367*** (0.725)	0.0768 (1.438)	2.885** (1.366)	2.889 (1.873)	1.357 (1.303)	2.250 (1.684)
lnpopu	9.711** (4.279)	−1.047 (3.850)	−0.152*** (0.0250)	35.59** (12.12)	−0.200 (3.731)	4.039 (5.840)
pergdp	$-6.64e^{-05}$ (0.000195)	$3.02e^{-06}$ ($7.23e^{-06}$)	$3.79e^{-05}$ ($6.08e^{-05}$)	0.000359 (0.00137)	0.000384*** (0.000113)	0.000142 (0.000437)
trend_9099	0.326*** (0.101)			−0.313 (0.296)		
trend_0008		−0.00128 (0.0985)			−0.0363 (0.0654)	
trend_0917			−0.0546* (0.0273)			−0.208 (0.168)
Constant	−145.8** (66.19)	27.43 (60.09)	14.37*** (0.676)	−579.1** (201.9)	17.70 (61.09)	−50.39 (96.25)
Observations	3189	3260	3306	1092	1258	1260
Number of countries	48	52	53	16	20	20
R^2						
(within	0.199	0.015	0.027	0.270	0.035	0.054
between	0.296	0.194	0.005	0.001	0.017	0.072
Overall)	0.153	0.076	0.003	0.004	0.019	0.037
F (prob. > F)	43.48 (0.000)	2.66 (0.020)	176.90 (0.000)	22.62 (0.000)	5.16 (0.002)	5.71 (0.001)
Rho	0.905	0.615	0.545	0.990	0.391	0.759

***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. [a]Robust standard errors in parentheses.

These results give rise to the following interpretation. During the first period, as importing textile products from Africa by developed countries has been long regarded as a way to support African countries, African textile exports were dynamic and derived a significant trade surplus. In this context, the entry of cheaper and higher-quality Chinese products increased African capabilities of exportation. Thus, the Chinese products used as intermediates allowed local African textile producers to derive substantial added values through further manufacturing in order to adapt to the demand of consumers. Therefore, textile imports from China exerted a strong intermediate goods effect. Table 4 reveals also that during this period, higher shares of imports from China consisted of intermediate goods.

After this period, with the progressive decrease of African exports as a result of policy changes adopted by developed countries (which earlier gave preferential access to ACP countries) and the massive entry of Chinese products into African markets, the intermediate goods effect

began to decrease. Chinese textile producers learned more about the African market, and were able to provide the products without the need for further manufacturing. By contrast, there was the increasing presence of African merchants in China. They could directly order from China the products they needed to meet the local market demand. In both cases, the substitution effect of the imports from China increased. The shrinking of local production led to further reduction of imports of intermediate products. Therefore, there was an increasing finished goods effect or crowding-out effect. Over time, the positive impacts of the textile imports from China on African textile exports disappeared. The substitution effect progressively exceeded the intermediate goods effect, and the overall impact became negative during the last period.

5. CONCLUSION AND IMPLICATION

Using Comtrade import and export data, the impact of imports from China on African exports was estimated during three periods. It was found that although this impact was significantly positive during the first period, it disappeared in the second period, and became significantly negative during the more recent period. An explanation is that although these imports exerted an initial positive intermediate goods effect that exceeded the negative crowding-out effect, over time, as the imports from China became dominant and had increasing finished goods nature, the negative effect progressively surpassed the positive effect.

This result gives rise to a serious concern: with the accumulation of negative crowding-out effect over time, we are confronted with the prospect of African deindustrialization. The textile sector is a highly representative case. In relation with other manufacturing sectors, textile is one area in which a number of African countries could have greater comparative advantage because of its linkage with the cultivation of cotton, strong local demand, and labor-intensive feature. The share of textile in manufacturing in terms of value added is important in a number of African countries (e.g., 35% in Mauritius, about 20% in Kenya and Tunisia). Based on the criterion of comparative advantage, however, most African countries must reduce their textile sector and import these products from China. Their other manufacturing sectors could not increase as a consequence of the decrease in textile production, because in these sectors they have lower comparative advantage. During the first period, with the preferential access to textile markets of Western countries, the gains from the intermediate goods effect had given rise to some optimism; during the following periods, however, the dominance of the crowding-out effect led African countries to lose their exporting capacity in textile production.

The present analysis seems to imply that an important way for African countries to maintain their manufacturing activities is through the cooperation of their main trade partners. The preferential trade agreements in favor of African countries should be maintained. Given its prominent role in African trade, China, African countries and the international community must also do more. For example, Chinese textile exportation to Africa needs to be regulated selectively according to the types of products: those having strong crowding-out effect must be limited, and those having basic intermediate goods nature must be encouraged. Having largely benefited from African mining exploitation, China has a duty to be engaged in relocating an increasing share of manufacturing production to Africa. To achieve this goal, more institutional regulation and coordination from major international organizations are necessary, because otherwise, China may not find any incentive to do so. It should be noted, however, that the current analysis relates to only the direct effect. The indirect impact may be just as strong. Some of the crowding-out effect, as earlier observed, likely results from the increased competitiveness of Chinese exports into other markets around the world, thus crowding-out African exports in those markets also.

CONFLICTS OF INTEREST

The author declares no conflicts of interest.

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