

Empirical Analysis of Trade Effects of China's Outward FDI to Africa

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Abstract. This paper tries to re-examine both positive and negative effects of trade and China's outward foreign direct investment (FDI) to Africa. We focus on the achievement of China's outward FDI to Africa and whether the trade impacts of China on Africa are positive by making regression equations of panel data of the major African countries which have the most stock of China's outward FDI. Due to the results, we find that trade creation exists rather than trade substitution if China's outward FDI increases. Therefore, China's increased engagement with Africa could generate important gains for African economies. Trade openness of host country and economic scales of both traders have positive impacts on the export of both sides. Additionally, the influence of China's outward FDI is limited and the development of African countries mostly depend on the growth of their own economies. In terms of policy implications, these results clearly demonstrate the opportunities and challenges that African countries are facing when dealing with a partner like China.

1. Introduction

China's growth and its economical capacity moved within thirty years from under-development and poverty to an emerging global power and become one of the largest exporters of manufactured goods has attracted the attention of many African countries. Tangible trade and investment between China and Africa dated back in 1950s, but China has become Africa's largest trade partner since 2009. Total merchandise trade of China and Africa increased from \$9 billion in 2000 to \$170 billion in 2017. In terms of foreign direct investment (FDI), Chinese outward FDI flows to Africa increased from just \$200 million in 2000 to \$4.1 billion in 2017, turning China into the largest developing country investor in Africa. According to China's National Bureau of Statistics, the turnover on economic cooperation projects in Africa reached \$31 billion in 2017 compared to \$1.2 billion in 2000.

Historically Africa has suffered from many negative stigmas as the results of its diverse challenges, namely political instability, civil wars, limited investments, uncontrolled outbreak of disease, corruption, inequalities, changing climate, high level of poverty, and poor infrastructure. Although China supports the political liberalization as an engine for development, it does not appear to share the ideal of political liberalization. Faithful to its logic, China does not intervene in domestic policies of economic partners. The relations with China offered to African countries numerous advantages compared with those maintained with the western countries.

Obviously, various factors have contributed to Africa's better growth performance, including a marked improvement in institutions and infrastructure and a decrease in conflicts and macroeconomic distortions. Most African countries have substantially improved their FDI frameworks. The contribution that FDI can make to their economic development and integration into the world economy is widely recognized. China's economic activities have resulted in an overall increase of trade, FDI, and aid in Africa. In addition, China's outward FDI to Africa is no longer concentrated in the traditional natural resources sector, but also manufacturing and services industries have received considerable amounts of FDI in recent years. Generally, there is an understanding that many African consumers benefited from the cheap Chinese goods and China's imports of commodities, and the demand of African exports increased as pushing up the prices of African exports thereby enhancing

the earnings of the exporters in African countries [1]. Due to the intensity of China-African economic linkages, an empirical assessment of the impact of China on African growth is warranted.

Therefore, the paper focus on the achievement of Chinese outward FDI and both positive and negative effects of trade. Then, we try to argue whether there is trade complementary or trade substitution between China and Africa by empirical model.

2. Literature Review

China and Africa relations have been the subject of voluminous scholars, those who believe in economic and trade interaction as central point that forces China involvement in Africa, pointing out the economic, trade and trade related issue as the major factors for China involvement in Africa. The review of the literature on this relation is based on driving forces for China involvement in and its implications for Africa. The impacts of China on African economy from three aspects, trade, FDI and aid [2]. Many researchers identified the most popular specific determinants of FDI in the region to include natural resources, market size, low labor cost, openness to trade, low taxes, incentives, political stability, favorable policies, and in some cases, good infrastructure [3-4]. Natural resources consistently seem to be the most dominant determinant of FDI into the African region. China's rapidly growing economy has necessitated the increased demand for raw materials, hence increased China involvement in Africa. China's outward FDI demonstrated a definite interest in mining, oil and infrastructure in Africa [5], so China's investment in Africa is market-oriented and resource-oriented [6]. Meanwhile, diplomatic support are other driving forces for China's involvement in Africa [4,7].

Other authors have argued that market size and local economic condition such as opening degree of African countries are also the main factors of trade effect and China's outward FDI to Africa [8]. As on the factors that inhibit the flow of FDI into Africa, macroeconomic instability, corruption, political instability, poor infrastructure, inflation and investment restrictions will determine investment inflows [9]. Empirical literature on the determinants of FDI in individual African countries shows that factors such as natural resources, political stability and favorable FDI policies are important in all of them [5,10].

Generally, the involvement of China in Africa can be mostly beneficial to African countries considering the abundant resources these countries have. For example, South Africa benefit from this relationship due to its geographical and strategically advantages on mining, tourism, and raw materials. These relations should be seen as an opportunity rather than a threat following the study findings of Chinese assistance of Africa which show to have contributed to the betterment of this part of Africa [11]. Alden et al. (2015) supported these ties by pointing out those Chinese investments should be welcomed especially those with skills transfer as they could help reduce investments from western countries that come with condition [5]. Ayodele et al. (2014) thought that Chinese investment in Africa was not a threat to African countries and they were full of gains [12]. Most Chinese scholars believe that, obtained from the empirical models, there is complementary effect of China's outward FDI which are always affected by the host country institutions, such as tax collection, national economic plan, and social factors [13]. The empirical analysis shows that China's outward FDI to Africa has remarkable promoted trade between China and Africa [14], and the host country's large scale of GDP growth [15].

However, many authors argue that, China's emergence as a major player in Africa trade, investment, and aid has led to many concerns. Implications of China involvement in Africa is seen in different approaches, some scholars see this as an opportunity for Africa to grow while others see it as a threat or a neocolonialist [16]. For example, even if a strong Chinese demand for oil is enhancing the earnings of the exporters in African countries, and its export of low-cost textiles is threatening to displace local production. They have negatively impacted local trade and commerce, and in some case, African labor has not benefited from Chinese investment [17]. China's investment on infrastructures in Africa including roads, railroads, and ports has been built with one goal in mind: getting the resources out of the country at as low a price as possible, with no effort to process the resources in the country. The research by Muekalia (2004) indicated likely increase in agricultural productivity following the adoption of Chinese technology [4]. There is evidence where Chinese

investments have caused threat in Africa by selling the goods at price below the costs of production so as to penetrate into the market [4]. Little complementarity between China's agricultural import demand and the Southern African countries' agricultural export supply [18]. Another threat is unemployment to locals where Chinese labour is employed in those projects funded by their government as well as to some manufacturing projects [19]. Balamoune-Lutz (2011) supported the hypothesis of growth by destination and thought there was no empirical evidence that exports to China enhance growth unconditionally [20]. Additionally, Naudé et al. (2007) noted that policies to improve economic and political stability will improve FDI flow into Africa inevitably [21]. It can also be observed that these factors fall within the categories of economic factors, government policy factors, and business facilitation factors. Researchers remain divided among those who believe existing economic theories of international trade can satisfactorily explain the patterns of China's trade with Africa and those who believe political considerations are also highly salient.

3. Recent Achievements of China-Africa Economic Cooperation

The beginning of China's policy toward Africa began in 1955, when a meeting of representatives from 29 African and Asian nations was held in Bandung, Indonesia. The meeting increased the China-Africa relations and marked the beginning of Chinese appreciation of the role of the Third World in combating adversaries and winning international recognition and support. This model of development that we described as non-interference in the domestic policies of other countries is also one of the pillars of China's foreign policy. China claims that its trade and FDI with other countries is based six characteristics which are sincerity, equality, mutual benefit, solidarity, and common development.

China's economical involvement in Africa over the past decade is one of the recent utmost significant developments in the region. Due to the increased involvement over the last decade, China has become one of Africa's most important partners for trade and economic cooperation. Therefore, FDI in infrastructure, market businesses and tourism from China are significant part of the China-Africa relationship. The China-Africa traded goods changed from clothing, footwear and light manufactured goods that China exported to Africa during the 1980s and 1990s to higher technology exports like electronic goods and machinery, which now accounting for close to 50 percent of its exports, whereas China imports oil, iron ore, cotton, diamonds, and other natural resources and primary goods from Africa. African countries without much oil or many raw materials to export and trade with China is less mutually complementary, which results in a rise in their trade deficit [22].

China-Africa Cooperation Forum which is a collective dialogue mechanism between China and African countries in the context of South-South cooperation, was established in 2000. Members of the Forum include China and 53 African countries which have established diplomatic relations with China and the African Union Commission. The Ministerial Meeting of the Forum on China-Africa Cooperation is held every three years and has held seven sessions. Chinese Government released its first official Africa Policy in January 2006, which among other things encourages and supports Chinese enterprises' investment and business in Africa and will continue to provide preferential loans and buyers credits (China's African Policy, 2006). Chinese government promotes business ties with Africa by providing information, coordination mechanisms and financial assistance for Chinese companies and investors in Africa.

According to Chinese Customs statistics, the total import and export volume of China and Africa in 2017 is about \$169.75 billion. China exports about \$94.5 billion to Africa and imports about \$75.25 billion from Africa. The top 10 African countries in terms of import and export volume are South Africa (\$39.17 billion), Angola (\$22.61 billion), Nigeria (\$13.78 billion), Egypt (\$10.83 billion), Algeria (\$7.23 billion), Ghana (\$6.68 billion), Kenya (\$5.2 billion), Congo (Kinshasa, \$4.33 billion), Congo (Bulgaria, \$4.23 billion) and Morocco (\$3.83 billion). South Africa and Angola remain China's top two trading partners in Africa. From the overall annual growth rate, the total import and export volume of China-Africa trade increased by 13.80% in 2017 compared with \$149.2 billion in 2016.

From China's export volume to African countries, South Africa and Nigeria, as the two largest economies in Africa, are still the most important destination countries for China's export to Africa.

From the overall annual growth rate, the total export volume of China to Africa increased by 2.4% in 2017 compared with the total export volume of China to Africa of \$92.3 billion in 2016. According to import data, the top 10 African countries in China's import from Africa are still mostly African resource-based countries. From the overall annual growth rate, China's imports from Africa increased by 32.2% in 2017 compared with the total imports from Africa of \$56.9 billion in 2016. The annual growth rate of China's imports from Africa is as high as 32.2%, while the annual growth rate of China's exports to Africa of about 2.4%. On the one hand, with the development of China-Africa capacity cooperation, more and more Chinese enterprises have entered Africa and invested in Africa. To some extent, it has helped African countries to establish part of the value-added industrial chain, replacing part of Africa's imports. On the other hand, it has also released the signal of the transformation of China-Africa trade commodity categories. With the advancement of Africa's industrialization process, China has made great efforts to promote Africa's industrialization. Africa's exports have gradually shifted from primary industrial exports to those of modern machinery, electrical equipment and other production tools and products required by high-tech and high-level industrial chains. In recent years, Africa's imports from China mainly consist of consumer goods, machinery and equipment, transportation and construction materials. Besides, Africa's main export commodities to China include agricultural and forestry raw materials, petroleum and related products, and mineral raw materials.

China's outward FDI to Africa was \$4.1 billion, up to 70.8% year-on-year, accounting for 2.6% of the current year's outward FDI flows. It mainly flows to Angola, Kenya, Congo (Kinshasa), South Africa, Zambia, Guinea, Congo (Bulgaria), Sudan, Ethiopia, Nigeria, Tanzania and other countries. China's outward FDI stock in Africa is \$43.3 billion, accounting for 2.4% of total China's outward FDI stock, which mainly distributed in South Africa, Congo, Zambia, Nigeria, Angola, Ethiopia, Algeria, Zimbabwe, Ghana, Kenya, Tanzania, Sudan, Mauritius and so on. China's outward FDI stock in Africa is mainly distributed in the construction industry and mining industry, accounting for 29.8% and 22.5% respectively, followed by the financial industry (14%) and manufacturing industry (13.2%). When measured by the number of Greenfield projects, the United States remains the largest investor in Africa, but China has surpassed the United States in terms of total amount.

4. Empirical Analysis of Trade Effects of China's Outward FDI to Africa

4.1 Trade Effects of China's Outward FDI to Africa

The contribution that FDI can make to their economic development and integration into the world economy is widely recognized. For this reason, African countries have made considerable efforts over the past decade to improve their investment climate. Most African countries have substantially improved their FDI framework, and a number of them have already attracted significant amounts of FDI, in absolute or relative terms, or both, from an increasing number of home countries, including developing countries. While some scholars see China's FDI and trade as a positive development model for the Third World, others look more critically at China's behavior on the continent. Generally, there is an understanding that many African consumers benefited from the cheap Chinese goods and China's imports of commodities, which are pushing up the prices of Sub-Saharan Africa exports thereby enhancing the earnings of the exporters in African countries [1].

Theoretical data has not formed a unified opinion on the relationship between international direct investment and trade. One view is that substitution effect exists in trade of host country when there is FDI, which is based on theory of international trade endowment theory and entirely replace equalization theorem, and Mundell (1957) [23] and Samuelson (1949) [24] as the representatives; The other is complementary effect which theoretical basis is comparative advantage theory and new trade theory and represented by Kojima (2011) [25] and Helpman et al. (2004) [26]. Vernon (1966) also believed that there is alternative relationship between foreign investment and trade, and complementary relationship [27].

What is worrisome is the impact of Chinese competition on African enterprises and exports. If investors import more than they export, FDI can end up worsening the trade situation of the country.

These are related to the trade, commerce, and social areas. Trade, especially in Sub-Saharan Africa, is impacted in two ways. One aspect is the competition in internal markets for domestically-oriented manufacturers, and the other is competition in external markets from export-oriented industry [28]. The balance of trade favors China as local industries and merchants have been hit hard by the flood of affordable Chinese wholesale and retail shops used to establish networks to sell goods [29]. Moreover, African producers cannot compete with Chinese companies even in African markets since Chinese manufacturers have low production cost and market prices [30].

Actually, in principle, this should have positive effects because an expansion of international trade with a new partner like China could boost growth rates by increasing demand for African products (mainly raw materials). In contrast to North-South FDI, spillovers from South-South FDI could be even larger, as Chinese firms use technologies that may be more appropriate for African firms. Also, foreign investment could foster productivity spillovers to African firms. It has canceled debt worth \$10 billion from African countries, sent doctors to treat Africans, and hosted thousands of African workers and students in their universities and training centers. In addition, the roads, bridges, railways and dams built by China are important contributors to the continent's infrastructure.

4.2 Model Creation and Data Source

14 countries were chosen as the representative research objects which had the highest stock of China's outward FDI to Africa in recent three years. Main countries include South Africa, Congo (Kinshasa), Ghana, Angola, Algeria, Sudan, Zimbabwe, Tanzania, Ethiopia, Kenya, Congo (Bulgaria), Mauritius, Nigeria, and Zambia, which consist approximately 75% of the total China's FDI stock to Africa. The panel data were from 2003 to 2017. We used the traditional Trade Gravity Model.

$$y_{ij} = \frac{A(x_i^{\beta_1} x_j^{\beta_2})}{D_{ij}} \quad (1)$$

y_{ij} represents the trade volume between country i and country j . A is a constant, while x_i and x_j represent the respective economic scale of country i and country j . D_{ij} indicates the geographical distance between the two countries. This model shows that the larger the economies of both countries, the greater the potential export supply and potential import demand. Moreover, the further the geographical distance, the smaller the trade scale between the two countries.

Firstly, it is important to note that the model is logarithmically processed and transformed into a linear model. The main purpose of this model is to indicate the bilateral trade effect of China's outward FDI to the major African countries. The trade policy as an economic condition of host country is also an important factor which would influence the trade effect. Then, we choose trade openness to measure the total trade policy of host country. The two variables, the stock of China's outward FDI to Africa which is the core variable and the trade openness, are added in the regression equation. Finally, we analyze the trade effect of export (export from China to individual African country) and import (import from China to individual African country, which can also be considered as export from individual African country to China) respectively.

The formula or model of export effect:

$$\ln EXP_{it} = \beta_0 + \beta_1 \ln FDI_{it} + \beta_2 \ln OPE_{it} + \beta_3 \ln CGDP_t + \beta_4 \ln GDP_{it} + \beta_5 \ln DIS_i + \varepsilon_{it} \quad (2)$$

The formula or model of import effect:

$$\ln IMP_{it} = \beta_0 + \beta_1 \ln FDI_{it} + \beta_2 \ln OPE_{it} + \beta_3 \ln CGDP_t + \beta_4 \ln GDP_{it} + \beta_5 \ln DIS_i + \varepsilon_{it} \quad (3)$$

Basically, the dependent variable EXP_{it} indicates export from China to host country i and IMP_{it} indicates the export from host country i to China. The independent variable FDI_{it} represents China's FDI stock in country i , $CGDP_t$ represents China's GDP and GDP_{it} represents the host country's GDP. The above data unit is \$1 million US dollars. The degree of trade openness OPE_{it} in the host country i plays a vital role in volume of trade in different countries. The proportion which the total import and export of country i is divided by GDP in percentage is calculated as an index to measure the trade openness. DIS_i represents the distance between China and African country i . Distance calculator comes from <http://www.indo.com/distance/index.html>, which measures the distance between the two capitals. ε_{it} is random error term. The above data come from the World Bank, the China's National

Bureau of Statistics, and the Statistical Bulletin of China's Outward Foreign Direct Investment from 2003 to 2017 published by the Ministry of Commerce of the People's Republic of China.

4.3 Empirical Analysis and Results

In this study, it is assumed that the sectional units have individual influences, and the intercept term is used to explain the difference. Therefore, the variable intercept model is selected. The distance variable is not varied from time to time. In that case, random effect model is used. Table 1 shows the results of the regression.

Table 1. The results of the regression.

Variables	Export effect		Import effect	
	Coefficients	P-value	Coefficients	P-value
C	-5.2217	0.4916	-8.0812	0.0566
lnFDI	0.0687	0.0095	0.1466	0.0066
lnOPE	0.7811	0.0000	7.9516	0.0000
lnCGDP	0.5461	0.0000	0.2215	0.1727
lnGDP	0.8760	0.0000	0.9754	0.0000
lnDIS	-1.2314	0.1399	4.5079	0.1711
R^2	0.9146		0.7204	

The coefficients of lnFDI, lnOPE, lnCGDP and lnGDP were significant in 5% significance level in the export effect model. It showed that for China's outward FDI to African countries, trade openness of host country and the economic scales of both traders had obvious influence on the export. The coefficient of lnFDI was also positive, so it shows that the export effect is positive which means trade promotion exists. Additionally, the higher level of the trade openness of host African countries is, the more export value would be. The coefficient of lnOPE is positive, which means the higher level of trade openness of the African country is, the more export from China would be. Meanwhile, the coefficients of lnCGDP and lnGDP are positive which indicate that larger economic scales at both sides also can promote China's exports to the country. Meanwhile, the pull of GDP growth of African countries is greater than that of China because the coefficient of lnGDP is larger than that of lnCGDP. The coefficient of lnDIS is not significant. The reason why the geographical distance is not significant may be that the trade gaps between China and every African country are huge, but the difference of the distance is close.

In the import effect model, the coefficients of lnFDI, lnOPE and lnGDP are significant in 5% significance level while the coefficient of lnCGDP is not significant. It means that the import is affected by the FDI from China, the trade openness of host country, and the economic scales of African countries. The coefficient of lnFDI is positive, indicating that the increase of China's outward FDI to Africa promoted Africa's export to China namely China's import from Africa. The coefficient of lnOPE is positive, indicating that the higher the level of trade openness in African countries, the greater the China's import from the country. The coefficient of lnGDP is positive, indicate that larger economic scales of African countries also can promote Africa's exports to China., which is the same as the export effect model. The coefficients of the constant term and lnDIS are still not significant.

However, if China's outward FDI increases one percent, the export from China to Africa would also increase 0.0687 percent and the export from Africa to China would increase 0.1466 percent. Therefore, trade creation exists rather than trade substitution for African countries though the coefficients are relatively small.

The empirical results show that China's outward FDI in Africa have a promoting effect on the China-Africa trade, namely, China's outward FDI to Africa did not replace the trade between the two countries. Moreover, the pull export effect of the host country is more powerful than that of home country. The bilateral trade volume is significantly related to the openness of the host country, and the greater the openness of the host country, the more conducive to the increase of bilateral trade. At the same time, the larger the economies of both sides of the trade, the greater the potential export supply and import demand, which is consistent with the theoretical expectation of the model of trade

gravity. But the distance between the China-Africa trade country variable was not significant, which does not match the expectations and the trade gravity model. This may be due to the African countries and China are large distances and the difference of distances is relative similar. Thus, increasing China's outward FDI to Africa will make a great progress of the trade between China and African countries.

5. Conclusions

Despite all the different views from several authors, good government seems to be of paramount importance if Africa wants to witness the positive effects of trade and FDI. There is a consensus that governance encompasses institutions with the capacity to ensure the rule of law, respect for individual freedoms and a democratic political regime [31]. In recent years, international organizations and bilateral aid agencies from traditional donors have made their assistance conditional on good governance. Good governance will lead to a country's political stability, which is closely related to trade policy. In our empirical model, trade openness is a variable to represent trade policy. With the increasing of trade openness in host countries, we can find that the import and export between China and Africa will both increase.

In terms of the influence of FDI, our empirical results show that China's outward FDI to Africa has significant effect on the trade between China and Africa, and trade creation exists rather than trade substitution which means that many African countries have benefited greatly from China's outward FDI. However, FDI flows from China and the rest of the world as well as Chinese economic cooperation and foreign aid from other countries seem to play limited role for African countries' economic development. Our results also indicate that FDI from China to Africa has a limited positive impact on bilingual trade. The economics environment and trade condition of the host country also play an important role in our empirical results, while the increase of China's GDP does not have so significance effect. Therefore, African development still depend on the improvement of its own economic environment, the stability of its trade policy related to good governance.

Similarly, in terms of policy implications, these results demonstrate that the opportunities and challenges that African countries are facing when dealing with a new partner like China. It is also clear that opportunities arise due to higher total export earnings of resource-rich African countries. Many western authors maintained that most foreign investment in Africa has been resource-seeking because FDI has few linkages with other sectors. Therefore, African governments should focus on attracting efficiency-seeking FDI by creating a better environment for the private sector. This could be achieved by providing a simpler and more transparent regulatory environment, building and upgrading infrastructure, enhancing educational levels, and offering investment incentives, such as tax exemptions or the establishment of Special Economic Zones that have worked in other developing countries, most notably China.

The main limitation of this study includes that we focus on the common characteristics of major African countries. It very important to note that every African country has a unique and important history and culture that is hardly picked up in this kind of empirical analysis.

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