THE DETERMINANTS OF CHINA'S OUTWARD DIRECT INVESTMENTS IN AFRICA: THE ROLE OF THE CHINESE GOVERNMENT'S POLICIES

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Abstract- Using the panel data on 49 African countries over the period from 2003 to 2011, this paper estimated the determinants of China's outward direct investments in Africa by employing the Hausman-Taylor method which controls the endogeneity of some variables. The results show that, as investors from developed countries, China's OFDIs in Africa are attracted by marking-seeking and resource-seeking motives, tend to invest in the African countries having good macroeconomic performance and strong economic interaction with China. There is no evidence that China tends to invest in the countries having bad governance. Transaction cost is not an obstacle for Chinese investors. The results show moreover that the Chinese government's policies of economic cooperation in Africa, of "China's African Policy" and of the diversification of foreign exchange reserves explained 58% of the annual average growth rate of China's investments in Africa. This marks the key difference with western investors.

Keywords- China, OFDI, Africa

Introduction

Since the launch of the "going global" policy in 2002, China's outward foreign direct investment (OFDI) in the world increased very quickly, passed from US $ 33 billion in 2003 to 425 billion in 2011, with an annual average growth rate of 35%. Beginning at a negligible level, China's OFDI increased even more quickly in Africa from US$ 0.5 billion in 2003 to 16 billion in 2011, with an annual average growth rate of 56%.

This growth rate intensification of China's investment in Africa corresponds to one period when the Chinese government has made a deliberate effort (the establishment of a tri-annual *Forum on China-Africa Cooperation* in 2000 and the issue of "*China's African Policy*" in 2006) to encourage firms to invest in Africa. It is facilitated by the strong development of China's economic cooperation in Africa and by the large accumulation of China's foreign exchange reserves [1].

Most previous studies have assessed the merits and risks in China's moving to Africa, but without empirical analysis [2-7]. The empirical analysis on the determinants of China's OFDIs in Africa is emerging. Two studies [9,10] showed that China's ODIs in Africa are explained by the traditional economic determinants including market seeking and resources seeking motives and China's economic cooperation without however investigating the role of "China's African policy" and foreign exchange reserves in China's investments in Africa.

The objective of this paper is thus to complete the two previous studies by analyzing the impact of the Chinese government's policies, measured simultaneously by China's economic cooperation in Africa, "China's African Policy" issued in 2006 and the diversification policy of foreign exchange reserves on its investments in Africa. Using the panel data over the period 2003-2011, we show that the behavior of China's OFDI in the African continent is not so different from investors of developed countries: they are positively influenced by market-seeking and resource-seeking motives, and tend to invest in the African countries having good macroeconomic performance and strong economic interaction with China. There is no evidence that China tends to invest in the countries having bad governance as obtained in previous studies. Transaction cost is not an obstacle for Chinese investors. The results show that the Chinese government's policies of the economic cooperation in Africa, "China's African Policy" and the diversification of foreign exchange reserves explained 58% of the annual average growth rate of China's investments in Africa. The key difference from western investors is thus the strong implication of the Chinese government in its investments in Africa.

The rest of this paper is the following. The next section shows the evolution of China's OFDI in Africa, followed by the presentation of the determinants of China's OFDI in Africa, which are estimated by using the panel data on 49 African countries over the period from 2003 to 2011. Political and economic implications are given in the conclusion.

Evolution of China's OFDI in Africa

The level of China's OFDI in Africa is small, but increase at very high growth rate. China invests in almost all African countries, but focuses on several countries. All types of enterprises are involved in the Chinese investments in Africa, with state-owned enterprises focused mainly in natural resources sector while private ones in service and trade.

China's OFDIs were weak in the beginning of 1980s when China focused on attracting inwards foreign investments. Since the "go global" policies launched in 2002, China's OFDIs increase very quickly, passed from US$ 33 billion in 2003 to 425 billion in 2011, i.e. at an annual average growth rate of 39%; which is almost four time higher than that of the world total FDIs (from US$ 9 519 billion in 2003 to 20 872 billion in 2011, i.e. at an annual average rate of 10%). Even this higher growth rate, China's OFDI stocks are still very weak and accounted only 2% of the global FDI in the world [Fig-1]. China is the 13th biggest investor in the world in 2011, but the first one among developing and emerging countries.
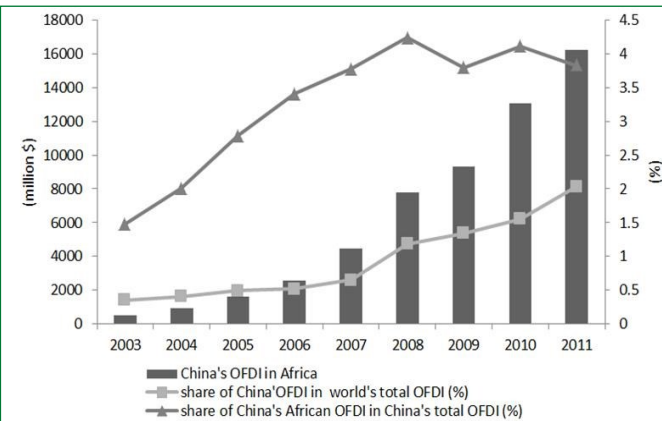

Fig. 1- Evolution of China's OFDIs in Africa and its shares in China's total OFDIs and the last ones in the World total OFDIs

Source: UNCTAD statistics and 2011 Statistical Bulletin of China's outward Foreign Direct.

China's OFDI in Africa was negligible before 2000s. It increased very quickly since the first *China-Africa Cooperation Forum* in 2000, in particular since 2006, the year "China's African Policy" was issued. China's OFDI in Africa increased from US$ 491 million in 2003 to 425 billion in 2011, i.e. at an annual average growth rate of 56% [Fig-1]. Despite this high growth rate, China's investments in Africa are still weak, accounted only 3.8 % of its total OFDI in the world.

The presence of China's OFDI in Africa is wide. The 2011 *Statistical Bulletin of China's Outward Foreign Direct Investment* shows that China invested in 51 of the 54 African countries during the period 2003 to 2011. Only Burkina Faso, Somalia and Swaziland have never received Chinese OFDI, while Sao Tome and Principe received since 2010 and South Sudan since 2011.

Even this wide presence, China's OFDIs are mainly concentrated in countries which have either high economic performance or rich donation of natural resources. In 2011, South Africa received a quarter of China's OFDI; The Chinese Industrial and Commercial Bank acquired a 20 percent stake in Standard Bank in the country. Other major recipients of Chinese FDI by order of importance were Sudan, Nigeria, Zambia, Algeria and the Democratic Republic of Congo [Fig-2].
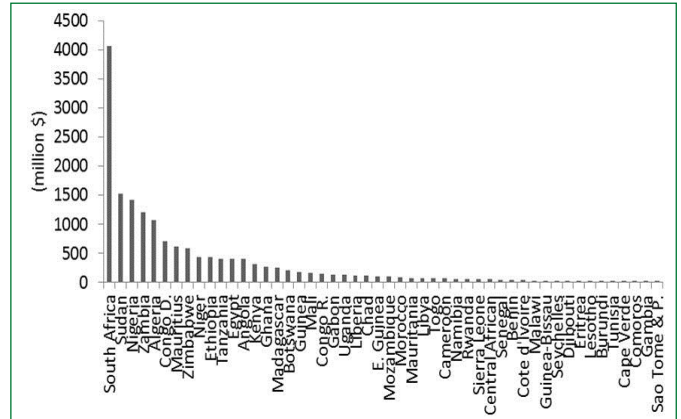

Fig. 2- Geographical distribution of China's OFDI in stocks in Africa in 2011

Source: 2011 Statistical Bulletin of China's outward Foreign Direct Investments.

China's foreign direct investments in Africa are recent, firstly with state-owned enterprises (SOEs) mainly implicating in large raw materials projects (resource-seeking) and focused on the long term [1,3,4,11,12]. They are followed by private firms focusing in the manufacturing trade sector (market-seeking). While resource investment is likely the largest sector in value terms, the number of private projects in other sectors is high and growing. Recently, China's state-owned enterprises are increasingly moving into mergers and acquisitions of resources in Africa [13].

The Determinants of China's OFDIs in Africa

The objective of this section is to understand why China decided to invest in Africa, a continent which is politically and economically considered very risk by investors of developed countries. What is the role of the Chinese government in this investment in Africa? Do Chinese investors have risk preferences as shown previous studies? In order to answer these questions, we use traditional determinants identified in the literature [14] and several variables capturing the special characters of China and Africa as well as their relationship to explain the evolution of China's OFDIs. The variables can be classified as 1) marking-seeking variables (MS); 2) resource-seeking factors (RS); 3) domestic condition of host countries (DC); 4) the economic interaction between China and African countries (EI) and 5) the policies of the Chinese government in favor of investing in Africa (CG). The equation can be thus written as following:

$$COFDI_{ij} = c_0 + c_1 MS_{jt} + c_2 RS_{jt} + c_3 DC_{jt} + c_4 EI_{ijt} + c_5 CG_{it} + \mu_{jt}$$

The objective of market-seeking investments is to serve local and regional markets. They are horizontal FDI and often driven by domestic demand such as large markets and high income in the host countries, which are approximated by the real GDP of host countries [15-17]. The marking-seeking is cited as a motive of Chinese investments in Africa which is identified by the Chinese government as a market for Chinese consumer products [18,19]. Africa is also a continent through which Chinese investors can overcome external trade barriers imposed by developed countries thank to the participation of African countries to a generalized system of preferences with third markets [20]. Chinese investors can thus take advantage of preferential trade treatment of African exports in advanced countries. The US's *Africa Growth and Opportunity Act* (AGOA) gives eligible SSA countries duty-free access to the US market. Thus, a

dummy variable AGOA are used in this study to capture third market-seeking motives.

The resource-seeking motives can be captured by the reserve of natural resources in host countries. Chinese investors locate abroad in order to secure suppliers of raw materials unavailable at home. Most resource-seeking FDIs are export-oriented and vertical ones. To capture this effect, the share of the sum of exports of fuel and ores and metals in total exports is used to measure the natural resource endowment [17]; however this variable cannot capture the impact of natural resource not yet exploited on investments. The oil production is used to be a proxy of natural resource endowments [9], which ignores mineral resource. In this paper, as [10], we employed energy depletion and mineral depletion as indicatives of natural resources endowment. Energy depletion is the ratio of the value of the stock of energy resources to the remaining reserve lifetime (capped at 25 years). It covers coal, crude oil, and natural gas. Mineral depletion is the ratio of the value of the stock of mineral resources to the remaining reserve lifetime (capped at 25 years). It covers tin, gold, lead, zinc, iron, copper, nickel, silver, bauxite, and phosphate. They are estimated by the World Bank [21].

The geographical, economic and political risk factors are the obstacles to invest in African countries. They can be respectively captured by the distance between China and African countries, inflation and governance of the last ones. We also introduce a dummy variable with the value equal to one for the mineral rich countries having good governance, and zero for the rest.

China's economic interaction with African countries may facilitate Chinese investments in Africa. They can be captured by African trade intensity with China, which is expressed as the ratio between the host country's trade with China and its GDP.

Traditionally, many African countries are considered very risky, both economically and politically. This explains why Africa receives a relatively small portion of capital from Western investors. Moreover, the African continent is far and unknown for Chinese investors. In order to help the last ones, the Chinese government issued in 2006 "China's African Policy" and established the *China-Africa Development Fund* to encourage Chinese private enterprises to make direct investment in Africa.
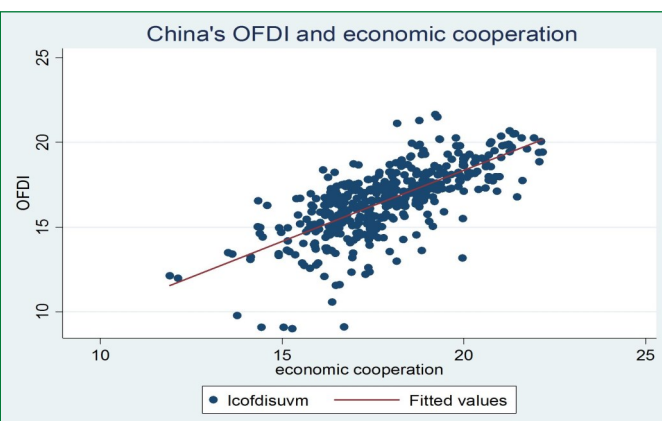

Fig. 3- Statistical relationship between China's OFDI and economic cooperation in Africa

Second, China's economic cooperation is an important channel through which China favors its investors in Africa. China's foreign economic cooperation is not an OFDI activity, because Chinese contractors neither risk their own equity capital nor control any for-

eign affiliate [22]. It is an agreement between a Chinese contractor and a host government that assigns the first the responsibility to realize a project and to secure the required capital against the management rights and the resulting profits for a pre-determined period before transferring the rights to the host government [10]. Chinese investors, in accordance with the international common practice, contract and implement construction projects in foreign countries, including reconnaissance, design, construction, supervision, purchasing of equipment and materials, installation and testing, engineering consulting and project management (*National Bureau of China Statistics*). These contacted projects include building of highways and roads, bridges, schools, shopping centers, housing and office buildings, water conservancy, dams and power plants etc. [Fig-3] shows the statistical relationship between China's OFDI and economic cooperation.

Finally, from [Fig-4], the Chinese investors are pulled by the huge amounts of the foreign exchange reserves and its weak returns [1]. The Chinese authorities seek to diversify the investment portfolio of their foreign reserves for a better rate of return, which is in fact negative [23]. Moreover, greater capital outflows may mitigate the appreciation pressure on the renminbi. The Chinese investors not only invest in the US and European economies, but also in emerging markets and low-income countries, including in Africa [1].
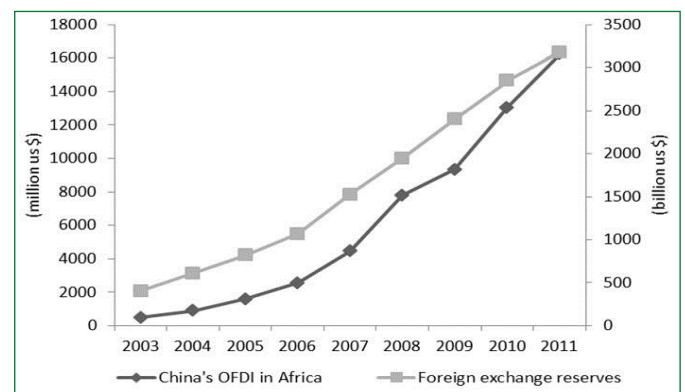

Fig. 4- Evolution of China's OFDIs in Africa and foreign exchange reserves

From the above analysis, the determinants of China's OFDI in Africa are written such as:

$\ln OFDI_{ijt} = c_0 + c_{11}\ln YA_{jt} + c_{12}AGOA_{jt} + c_2NR_{jt} + c_{31}INF_{jt} + c_{32}G_{jt} + c_{33}\ln D_{ij} + c_4 \ln XM_{ijt} + c_{51} \ln CEC_{ijt} + c_{52}D06_{it} + c_{53} \ln FE_{it} + \mu_{jt}$

OFDI is China's outwards foreign direct investments to each African country

YA is real GDP of a African country

AGOA is a dummy variable equal to 1 if member country and zero for others

NR is natural resources of African countries

INF is inflation rate of an African country

G is a governance indicator

D is distance between China and an African country

XM: share of China's trade with an African country relative to the GDP of African country

CEC is China's economic cooperation

D06: dummy variable capturing the effect of "China's African policy" issued in 2006

FE is foreign exchange reserves of China

μ error terms.

Econometric Results

The above model is applied to China's outward foreign direct investments to 49 African countries of the 54 African countries over the period from 2003 to 2011. Burkina Faso, Sao Tome & Principe, Somalia, Swaziland and South Sudan are excluded because of unavailable data. China did not invest in Burkina Faso, Somalia and Swaziland, and only since two years in Sao Tome & Principe. South Sudan became an independent country in 2011. The sample is unbalanced, with some countries having more observations than others among the independent variables.

China's outward FDI stocks are originated from *Statistical Bulletin of China's Outwards Foreign Direct Investments 2011*, which publishes the data by country since 2003. They are deflated by import unit value of corresponding recipient coming from UN *UNCTAC Stat*.

GDP of African countries are expressed in 2000 US$. Inflation of African countries is expressed as GDP deflator. Natural resources (energy and mineral reserves) are calculated as the share of natural resources (energy and mineral reserves) relative to GNI, all come from the *World Development indicators*, World Bank. AGOA is a dummy variable with one for member countries of *African Growth and Opportunity Act* of the United-States, and zero for others. Governance is a measure of political stability and absence of violence/terrorism with the values in the range from -2.5 to 2.5 proposed by [24] and actualized each year by the World Bank. Higher values indicate better governance outcomes. EITI is a dummy variable with one for member countries of EITI (Extractive Industries Transparency Initiative, an indicator of good institution of mineral resource rich countries) and zero for the rest. Data on foreign exchange reserves and on the turnover of China economic cooperation come from *China Statistical* Yearbooks. The means and standard deviations of the variables are provided in [Table-1], while their definitions and sources are given in the appendix.

Table 1- Summary of variables, 2003-2011.

Variables	Obs.	Units	Means	Std. Dev.	Min	Max
Chinese real FDI stocks in Africa	424	Million us $	84.5	229	0.008	2490
GDP of African countries	437	Billion us $	16.2	33.4	0.2	193
AGOA	441		0.72	0.45	0	1
Natural resource to GNI	431	%	10.4	18.2	0	137
Energy depletion to GNI	437	%	7.97	18.5	0	137
Mineral depletion to GNI	437	%	1.54	4.17	0	39
China Africa trade intensity	455	%	9.4	26	0.01	341
Inflation of African countries	437	%	9.3	11	-33	105
Governance	441		-0.5	0.89	-2.69	1.19
EITI	441		0.31	0.46	0	1
Distance	441	Kilometer	10666	1527	7551	12968
China's economic cooperation in Africa	441	Million us $	240	555	0	4290
Dummy 2006	441		0.67	0.47	0	1
Foreign exchange reserves	441	Billion us $	1640	950	403	3180

Source: See Appendix

A potential econometric problem is the endogeneity of economic cooperation. Endogeneity is a difficulty that is met in all the estimations on macroeconomic data due to simultaneity bias, to measurement errors of variables which are a particularly serious problem in China, and to the risk of omitted variables. It causes inconsistency of the OLS estimates and requires instrumental variable methods to obtain consistent parameter estimates. In order to deal with the endogeneity problem and to allow time invariant variables in gravity model, Hausman-Taylor model with instrumental variables techniques [25] are used in this study as econometric method. It consists estimating a random effect model and uses exogenous time-varying variables as instruments for the endogenous time-varying variables and exogenous time-invariant variables plus the unit means of the exogenous time-varying variables as instruments for the endogenous time-invariant variables. As a precaution against the risk of simultaneity of the dependent and explanatory variables, we have lagged one year all the explanatory variables except for governance and distance variables.

[Table-2] presents the results of econometric estimations. The obtained results show that the coefficients of all the variables are statistically significant except for governance and distance and are largely consistent with theoretical predictions [Eq-1]. Two market-seeking variables (real GDP and AGOA) are statistically very significant with a positive sign. These results are in line with the view that China's investments in Africa are not only attracted by the market

size of African countries, but also by the third market of developed countries to get around the high tariffs of last ones.

The variable of national resources is also statistically significant, confirming the hypothesis that Chinese investments in Africa are attracted by natural resources of African countries [Eq-1], in particular by energy resources [Eq-2], and mineral resource rich countries having good institutions [Eq-3].

The inflation of African countries exerts a negative effect on China's investments, while the economic interaction between China and African countries influence positively Chinese investments in Africa. Governance is not statistically significant.

Our three key variables are all statistically very significant and with waited signs. As obtained in previous studies, the activities of China's economic cooperation increase significantly Chinese investments in Africa. The issue of "China's African Policy" since 2006 increases the Chinese investments in Africa. Finally, with estimated coefficient of 0.60, the result confirms to the proposal that foreign exchange reserve favours Chinese investments in Africa [1].

Not only the coefficients of the economic cooperation, "China's African policy" and the foreign exchange reserves are significant, but the elasticity values show also that the results are economically relevant. During the period from 2003 to 2011, the annual average growth rates were respectively 42% for China's economic cooperation and 31% for China's foreign exchange reserves [Table-2]. They led to an increase in the annual average growth rate of China's

African investments of 11.8% (0.28*42%) and of 20.5% (0.66*32%). Together with the annual contribution of 0.49% following the "China's African policy," the three policies of the Chinese govern-ment contribute to an increase of 32.7% of the annual average growth rate of China's OFDIs in Africa of 56%, in other words, they explain 58.4% of the last ones [Table-3].

Table 2- The determinants of China's OFDI in Africa, 2003-2011

	Hausman-Taylor 1	Hausman-Taylor 2	Hausman-Taylor 3	Ramdon Effect 4	Fixed effect 5
Ln(African real GDP$_{-1}$)	0.59*** (5.01)	0.59*** (4.82)	0.59*** (5.12)	0.56*** (5.33)	0.91* (1.81)
AGOA$_{-1}$	0.55*** (3.59)	0.55*** (3.48)	0.54*** (3.42)	0.53*** (3.37)	0.53*** (3.12)
(Natural resources/GNI)$_{-1}$	0.01* (1.89)				
(Energy resource/GNI)$_{-1}$		0.01** (2.12)	0.01** (2.34)	0.01** (2.36)	0.02** (2.01)
(Mineral resources/GNI)$_{-1}$		-0.002 (-0.08)	-0.003 (-0.17)	-0.002 (-0.10)	-0.01 (-0.61)
eiti$_{-1}$			0.93*** (2.57)	0.90*** (2.71)	
African Inflation$_{-1}$	-0.01* (-1.82)	-0.01* (-1.67)	-0.01* (-1.70)	-0.01* (-1.67)	-0.01* (-1.65)
Governance	0.05 (0.24)	0.02 (0.1)	0.1 (0.52)	0.09 (0.48)	0.14 (0.56)
Ln(distance)		0.94 (0.78)	-0.1 (0.08)	0.19 (0.18)	
Ln(China Africa Trade/African GDP)$_{-1}$	0.23*** (2.83)	0.22** (2.55)	0.19** (2.28)	0.17** (2.17)	0.25** (2.15)
Ln(China's economic cooperation)$_{-1}$	0.28*** (5.06)	0.28*** (4.83)	0.28*** (4.86)	0.31*** (5.67)	0.27*** (4.25)
Dummy 2006	0.52*** (3.62)	0.50*** (3.38)	0.49*** (3.34)	0.50*** (3.31)	0.49*** (3.25)
Ln(China's foreign exchange reserve)$_{-1}$	0.60*** (5.52)	0.64*** (5.74)	0.66*** (5.94)	0.65*** (5.84)	0.60*** (4.35)
Numbers of observation	414	421	421	421	421
Numbers of countries	49	49	49	49	49
R ^{2} adjusted	0.63	0.63	0.64	0.64	0.53

Table 3- Contribution of the Chinese government policies on China's investments in Africa

	Estimated coefficients	Annual average growth rates	Contribution
China's economic cooperation	0.28	42	11.76
China's African Policy	0.49		0.49
China's foreign exchange reserves	0.66	31	20.46
Total			32.71
China's OFDI in Africa		56	58

Conclusion

This paper proposes "the Chinese government's policies" augmented determinants of China's outward foreign direct investments in Africa. By using the panel data on 49 African countries over the period from 2003 to 2011, we found that Chinese investments in Africa are not so different from investors of developed countries: they are attracted by marking-seeking and resource-seeking motives, tend to invest in the African countries having good macroeconomic performance and strong economic interaction with China. There is no evidence that China tends to invest in the countries having bad governance. Transaction cost is not an obstacle for Chinese investors. The results show that the Chinese government's policies of economic cooperation in Africa, "China's African Policy" and the diversification policy of foreign exchange reserves explained 58% of the annual average growth rate of China's investments in Africa. This marks the key difference from western investors. However, the contribution of the Chinese government may be overestimated in this study, because the official OFDI data used in the estimation did not include the increasing private investments which benefited little from the Chinese government's helps [12].

Anyway, China's investments in Africa together with the policies of the Chinese government are certainly immediate financial sources for economic growth of African countries [26]. By improving the infrastructure in African countries, which has been the main obstacle of foreign investments [27], the economic cooperation improves their investment attractiveness. In long terms, African countries should be however careful to "Dutch Disease" phenomena due to the concentration of Chinese investments in raw materials sector by inciting them to go to the manufactured sector.

Appendix. Definitions and Sources of Variables

Name of variables	Calculation method	Sources
China's outward foreign direct investments	China's OFDI in Africa in stock deflated by African import unit value (2000=100)	UN UNCTAD stat Statistical bulletin of China's outward foreign direct investment
China Africa trade intensity	Sum of China's exports to and imports from Africa divided by African GDP	UN Comtrade World Development indicator, World Bank
Africa's real GDP	African nominal GDP deflated by its deflator (2000 US$)	World Development Indicators World Bank
African Inflation	GDP deflator of African countries (annual %)	World Development Indicators World Bank
African natural resource	Natural resource depletion is the sum of net forest depletion, energy depletion, and mineral depletion. Net forest depletion is unit resource rents times the excess of round wood harvest over natural growth.	World Development Indicators World Bank
Energy depletion	Energy depletion is the ratio of the value of the stock of energy resources to the remaining reserve lifetime (capped at 25 years). It covers coal, crude oil, and natural gas.	World Development Indicators World Bank
Mineral depletion	Mineral depletion is the ratio of the value of the stock of mineral resources to the remaining reserve lifetime (capped at 25 years). It covers tin, gold, lead, zinc, iron, copper, nickel, silver, bauxite, and phosphate.	World Development Indicators World Bank
Landlocked countries	Burkina Faso, Botswana, Central African Republic, Ethiopia, Lesotho, Mali, Malawi, Niger, Rwanda, Swaziland, Chad, Uganda Zambia Zimbabwe	CEPII
Governance	Political stability calculated by Kaufmann et al. (2010)	World Bank

Appendix. Definitions and Sources of Variables Continues

Name of variables	Calculation method	Sources
Agoa	Agoa member countries	
China's economic cooperation	China's economic cooperation deflated by African import unit value (2000=100)	UN UNCTAD stat China Statistical Yearbook
China's foreign exchange reserves	China's foreign exchange reserves	China Statistical Yearbook
Dummy 2006	Dummy variable equal to 1 for the period 2006-2011, zero for the rest to capture the impact "the Year of Africa"	
Distance	Geographical distance between China and African countries	CEPII
Eiti	Eiti member countries	http://eiti.org

Conflict of Interest: None Declared.

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