

Why is China investing in Africa?

Evidence from the firm level

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Abstract

China's increased trade with and investment in Africa has boosted the continent's growth rate but has also generated considerable controversy. In this paper we investigate China's outward direct investment (ODI) in Africa using macro and micro data. The aggregate data on China's ODI in African countries reveal that China's share of the stock of foreign investment is small, though growing rapidly. China's attraction to resource-rich countries is no different from Western investment. China's ODI is uncorrelated with a measure of property rights and rule of law, whereas Western investment favors the better governance environments. As a result, Chinese investment in strong and weak governance environments is about the same, but its *share of foreign investment* is higher in the weak governance states. The micro data that we use is MOFCOM's database on all Chinese firms investing in Africa between 1998 and 2012. We use key words in project descriptions to code the investments into 25 sectors. This database captures the small and medium private firms investing in Africa. Contrary to common perceptions, there are few projects in natural resource sectors. Most projects are in services, with a significant number in manufacturing as well. In our country-sector-level regressions based on firms' transaction-level data, we find that Chinese ODI is profit-driven, just like investors from other countries. In particular, our regressions show that Chinese ODI is relatively more concentrated in skill-intensive sectors in skill-abundant countries, but in capital-intensive sectors in capital-scarce countries. These patterns are mostly observed in politically unstable countries, suggesting stronger incentives to seek profits in tougher environments. Finally, the predominance of Chinese ODI in services appears to be related to the recipient countries' natural resource abundance, which is also consistent with the profit-driven nature of Chinese ODI.

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1. Introduction

Since 2000 China has emerged as Africa's largest trading partner. Chinese direct investment in and lending to African countries has grown rapidly as well. This Chinese engagement in Africa has no doubt led to faster growth and poverty reduction on the continent. Per capita growth rate of the average African economy surged from 0.6% per annum in the 1990s to 2.8% in the 2000s. African countries have strengthened their institutions and macroeconomic policies, and that is one factor in the growth acceleration. But demand from China for the continent's main exports – oil, iron, copper, zinc, and other primary products – led to better terms of trade and higher export volumes, other important factors in the growth accelerations.

In the Pew Global Attitudes survey for 2015, African respondents had a significantly more positive view of China (70% with a favorable view) than respondents in other regions such as Europe (41%), Asia (57%), or Latin America (57%). This likely reflects the positive impact of China's engagement on African growth. At the same time, China's involvement in Africa is not without controversy, as conveyed by some typical headlines from the Western press: "Into Africa: China's Wild Rush": "China in Africa: Investment or Exploitation?"; "Clinton warns against 'new colonialism' in Africa." The criticism comes not just from Western voices. In an op-ed essay last year in *The Financial Times*, Lamido Sanusi, who was recently suspended as Nigeria's central bank governor, wrote: "In much of Africa, they have set up huge mining operations. They have also built infrastructure. But, with exceptions, they have done so using equipment and labor imported from home, without transferring skills to local communities. So China takes our primary goods and sells us manufactured ones. This was also the essence of colonialism."

In this paper we investigate one aspect of China's engagement in Africa, its outward direct investment (ODI). We start, in Section 2, by examining the allocation of Chinese investment across 49

African countries and by comparing it to the continent's total foreign direct investment (FDI). A first important point is that at end-2012 China's share of the stock of FDI in Africa was on the order of 3%. While its investment may be growing rapidly, it is still a small player, and the vast majority of FDI in Africa comes from Western sources. In this section we show that Chinese investment and Western investment are similar in that they are attracted to larger markets and to countries with natural resource wealth. Controlling for those factors, Western investment tends to stay away from countries with poor governance in terms of property rights and rule of law. Chinese investment, on the other hand, is indifferent to those governance measures, with the result that the countries where China's investment share is large tend to be ones with weak governance.

China's investment in Africa includes some large deals that have been highly publicized. In DR Congo, for example, the Sicomines iron mine involves the Chinese state-owned enterprises China Railway Engineering Corporation and Sinohydro and the private company Zhejiang Huayou Cobalt, in partnership with Congolese state-owned companies. Other high-profile deals include CNPC's gas investment in Mozambique, Chinalco's mining investment in Guinea, and Sinopec's oil and gas acquisition in Angola. In the data on the stock of Chinese investment in different African countries, these large state-to-state deals no doubt play an important role.

In Section 3 we turn to a different kind of data source. All Chinese enterprises making direct investments abroad have to register with the Ministry of Commerce. The resulting database provides the investing company's location in China and line of business. It also includes the country to which the investment is flowing, and a description in Chinese of the investment project. However, *it does not include the amount of investment*. The investment to Africa over the period 1998 – 2012 includes about 2000 Chinese firms investing in 49 African countries. We think of the typical entry as a private firm that is much smaller than the big state-owned enterprises involved in the mega-deals. These

data provide insight into what the Chinese private sector is doing in Africa. Section 3 introduces this firm-level database. Based on the descriptions of the overseas investment, we categorize the projects into 25 industries covering all sectors of the economy (primary, secondary, and tertiary). The allocation of the projects across countries and across sectors provides a snapshot of Chinese private investment in Africa.

Section 4 then investigates the allocation of projects more rigorously. In particular we ask whether factor endowments and other country characteristics influence the number and types of investment projects from Chinese investors. If Chinese investment is similar to other profit-oriented investment, then the number and nature of projects should be related to the factor endowments and other characteristics of the recipient countries. Indeed, we find that while Chinese ODI is less prevalent in skill-intensive sectors in Africa, it is more prevalent in the more skill-abundant countries, suggesting that Chinese investors aim to exploit the local comparative advantage. We also find that Chinese ODI is more concentrated in capital-intensive sectors in the more capital-scarce countries, suggesting its importance as a source of external financing to the continent. These patterns are mostly observed in politically unstable countries, implying firms' stronger incentives to seek profits in tougher environments. We also find that the prevalence of Chinese ODI in services is positively related to the recipient countries' natural resource abundance.

Our paper is related to various strands of literature. First, it relates to the classical theory of multinational enterprises (MNEs) about how firms use their capabilities and resources to generate competitive advantage over indigenous firms in host countries (Caves 1971, Hymer 1976, Kindleberger 1969 and 1970). More recent studies show that in addition to facilitating foreign sales, firms undertake ODI to acquire resources, assets and technology to develop their competitive

advantage (Child and Rodrigues 2005, Makino et al. 2002, Mathews 2006).² Second, our paper contributes to the growing literature on Chinese ODI. Most of the earlier studies were descriptive in nature, sometimes relying on case studies (e.g., Deng 2003 and 2004, Wu and Chen 2001). Cai (1999) proposes that Chinese firms invest overseas mainly to seek markets, natural resources, technology, managerial skills, and financial capital.³ More recent studies focus on the empirical examination of the determinants of Chinese ODI (e.g., Buckley et al. 2007), but most of these studies rely on aggregate data for analysis. There are a few notable exceptions that use micro-level data. For instance, Luo et al. (2011) show empirically that ODI by private Chinese firms had been prompted to exploit firm-specific advantages as well as to tackle market imperfection due to underdevelopment of China's domestic institutions. Other studies on Chinese overseas M&As support the resource-seeking and technology-seeking motives (Antkiewicz and Whalley 2007, Rui and Yip 2008). Using aggregate data, Cheng and Ma (2007) and Cheung and Qian (2007) show that China's investment was motivated by both market seeking and resource seeking.

Our paper contributes to this literature by showing that the African investment by private sector firms that predominate in the MOFCOM database is driven by the profit-oriented motivations that drive outward investment from other countries.

2. Allocation of Chinese ODI and total FDI across African countries

China's official statistics on the country's overseas direct investment (ODI) in Africa reveal a number of paradoxes. Simply put, China's investment in Africa is both big and small. It is small in the

² Here, technology is broadly defined to include production technology, management skills, and brand names.

³ Deng (2004) identifies two additional motives: strategic assets (e.g., brands, marketing networks) and diversification. The focus of our paper focuses on the non-financial type of OFDI. Clearly, because the PRC was itself a low-cost production base, cost minimization was not a major motivation of Chinese ODI.

sense that China is a latecomer to Africa and accounts for only a very small share of the total stock of foreign investment on the continent. At end-2011, that total stock was \$629 billion, of which the Chinese share was 3.2%. China's investment in Africa has been growing rapidly and its share will rise over time, but slowly, starting from a low base. China's investment in Africa is big in a relative sense, however. The world as a whole has six times as much direct investment in the U.S. as in Africa, reflecting the fact that most FDI goes to advanced economies. China's pattern of investment is different, however. As of end-2013, China had more ODI in Africa (\$26 billion) than in the U.S. (\$22 billion). So, China's *relative* focus on Africa is large, though it is still a small player in investment overall.

What about the allocation of China's investment among African countries? Is it similar to or different from the pattern seen from existing, mostly Western investors? To answer this question we use the data on the stock of Chinese ODI in 49 African countries at end-2012 from the Ministry of Commerce.⁴ A useful point of departure is the allocation of the overall stock of FDI among those 49 countries. Those data are available at end-2011.⁵ Globally, the allocation of FDI can be explained quite well by a parsimonious set of variables that measure (1) market size (total PPP GDP); (2) natural resource rents as a share of the economy; and (3) governance. For governance we consider two distinct measures, from the World Governance Indicators:

- Rule of law “captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence”;

⁴ Ministry of Commerce of China, 2012 Statistical Bulletin of China's Outward Foreign Direct Investment.

⁵ The stocks of FDI end-2011 are from the updated online database originally published as Lane and Milesi-Ferretti (2007).

- Political Stability and Absence of Violence/Terrorism “measures perceptions of the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism.”

Regression 1 in Table 1 shows that the allocation of FDI across 49 African countries follows the global pattern. FDI is attracted to larger markets with an elasticity of 0.74. Other things equal, resource rich countries receive more FDI. The standard deviation across African countries of the resource rents variable is 17.6, so that the coefficient indicates that one standard deviation richer in resource wealth attracts 49% more FDI. Finally, FDI prefers an environment of good property rights and rule of law. Across African countries the standard deviation of the rule of law index is 0.49, so one standard deviation better on rule of law attracts 31% more investment. Figure 1, a partial scatter plot of the log of total FDI and the rule of law index, shows this strong relationship.

How does the allocation of Chinese ODI compare? Specification 2 in Table 1 shows that Chinese ODI is positively correlated with market size and natural resource wealth, with coefficients similar to those in the equation for overall FDI. However, Chinese ODI has a modest, negative correlation with the Rule of Law index (specification 3). While property rights/rule of law may not matter, Chinese ODI is positively correlated with the index of political stability (specification 4). Also, population seems to matter as a measure of economic size, not just total GDP (specification 5). Comparing the FDI equation in specification 1 and the Chinese ODI allocation in specification 5: China has a modestly stronger attraction to natural resources and in terms of governance favors political stability over property rights/rule of law. The partial scatter of the log of Chinese ODI and the political stability index is shown in Figure 2. This relationship makes sense given that some significant part of the volume of Chinese investment in Africa is tied up in state-to-state resource deals. China is more concerned with the

political stability of the government than with the environment of rule of law in the domestic economy. Political stability and rule of law are fairly highly correlated (0.59 across African countries). Still, there are countries that are rated to be significantly better on political stability than on rule of law. Some examples are Angola, Eritrea, Madagascar, Zambia, and Zimbabwe – all of which have significant Chinese investment relative to their total FDI. Dollar (2015) finds that these relationships exist globally: total FDI is strongly attracted to good property rights and rule of law, whereas Chinese ODI is attracted to politically stable environments, without reference to the rule of law. So, the relationship is not special to Africa but says something about Chinese ODI in general.

Since Chinese investment is indifferent to the property rights/rule of law environment, there are similar amounts of Chinese investment in good governance countries and poor governance countries. For example, if we divide the 49 African countries into three groups based on the Rule of Law index in 2012, the stock of Chinese ODI is nearly the same in the good governance countries, as in the poor governance ones (Figure 3). For the stock of FDI, on the other hand, nearly 60% is in the good governance environments, compared to 25% in the poor governance environments (Figure 4). These patterns together mean that the countries in which China's *share of inward investment* is large tend to be ones with poor governance. Still, note that it is only a minority of Chinese investment that is in those environments.

3. Data on Chinese Outward Direct Investment

The data on Chinese ODI transactions was obtained from the Ministry of Commerce (MOFCOM) and includes deals that were approved by the ministry between January 1, 1998 and December 31, 2012. For each ODI deal, the data set reports the name of the investing firm, the firm's sector of business, the province of origin, and the recipient country of the ODI flow. There is, however, no

information on the amount of the deal or the name of the target for mergers and acquisitions. The raw data contains 2,005 deals at the firm level, covering 49 countries on the African continent.⁶ The top five destination countries for Chinese ODI are: Nigeria, South Africa, Zambia, Ethiopia, and Egypt, with Nigeria taking the clear lead, representing 12% of all deals. Figure 5 depicts the geographical distribution of the number of deals by country. Deals tend to be more concentrated in the East and South African regions, whereas Central and West Africa, with the exception of Nigeria, have relatively fewer deals. In East Africa, countries such as Ethiopia, and to some extent Kenya and Tanzania are relatively resource poor compared to some of the Southern African countries such as Zambia, Angola, and South Africa. Some of the reasons why East Africa stands out as a popular destination for these private Chinese investments are its relatively more developed infrastructure, including ports, and its relative closeness to China. The East Africa Community (EAC), in particular, forms a customs and single market trading union that has invested heavily in infrastructure investments, mostly with loans from the Chinese government, such as the Standard Gauge Rail project originating in Kenya as well as the Karuma Hydroelectric power project in Uganda. These projects will enhance the connectivity between these countries and supply reliable energy in the future years to come, thus, making the region an attractive destination.

Within each transaction, we categorize the types of projects the Chinese investing firm is conducting in the destination countries. By using key words in the deal descriptions provided in the data, we categorize projects into different industries. Since most of the deals involve multiple projects, sometimes in different industries, we obtain a sample of 3,989 projects. For the remainder of the analysis, we use the project-based sample that we categorize into different industries based on the United Nations 34 sector industry classification, which we then further condense into 17

⁶ Chen and Tang (2014) provide a detailed description of the distribution of Chinese ODI outside Africa, and study the causes and consequences of ODI at the firm level.

manufacturing sectors, 7 service sectors, and 1 mining sector. Table 2 presents the country breakdown in terms of number of Chinese investing firms and the number of projects that we identified based on the firm-level deals. Table 3 presents the sectoral distribution in terms of number of projects.

We find that about 60 percent of the projects are in service sectors, with the remaining portion almost evenly split between manufacturing and natural resources. The two sectors that received the most Chinese ODI in terms of the number of deals are business service (1053 deals) and import and export (539 deals). Thus, against popular perception, most of the Chinese ODI deals are not engaging in raw material related projects, but rather, are involved in service sectors. For instance, in oil-rich Nigeria, about two-thirds of the projects are actually in service sectors. In Figure 6, we divide the countries in terms of the resource intensities of their exports. Following the IMF's categorization for oil exporters, non-oil resource intensive countries, and the rest of African economies, we can see that regardless of the degree of raw material export intensity of the country, the majority of Chinese ODI projects tend to be in the service sector.

4. Sectoral Distribution of Chinese Investments in Africa

Next we exploit the transaction-level data to study the distribution of Chinese ODI in Africa. Specifically, we examine whether the distribution of Chinese ODI across countries and sectors is related to various country and sector characteristics. For the country characteristics, we focus on the levels of factor endowment and institutional development. We measure a country's capital abundance as the (log) capital endowment per worker, using data from the Penn World Tables. We measure a country's human capital abundance as the fraction of high-school graduates in the workforce, using data from Barro and Lee (2014). Countries' levels of institutional development are measured by rule of law and political stability, as discussed in Section 2 above.

For the sector characteristics, we explore the varying factor intensity of production across sectors. We measure labor intensity of a sector as the ratio of total wage bill to value added of all firms in the sector, following Romalis (2004). Capital intensity is defined as one minus labor intensity. Skill intensity is defined as the share of non-production workers in the employment of the sector, multiplied by its labor intensity. To construct these measures, we use industry-level data from the database put together jointly by the National Bureau of Economic Research and the U.S. Census Bureau's Center for Economic Studies (CES).⁷ Because of the lack of the required data to construct factor intensity measures for service sectors, we exclude them in the baseline analysis, and include them only at the later part of the analysis when we examine the determinants of Chinese ODI specialization in services.⁸ As such, our baseline analysis focuses on explaining the distribution of Chinese manufacturing ODI in Africa. Despite the prevalence of Chinese ODI projects in services in the continent, such analysis is still important as it can shed light on the low level of industrialization in the continent.

Without information on the value of each ODI deal, we explore the determinants of the investment pattern by using two dependent variables in the following regression analyses: (1) a dummy variable to indicate whether there was any ODI within a sector-country during the sample period (the extensive margin); and (2) the (log) number of ODI deals at the sector-country level (the intensive margin). In Table 4, we regress either of these two variables on country fixed effects and the interaction between a country's capital (human capital) endowment and a sector's capital (skill) intensity. In columns (1)-(3), we use the ODI dummy as the dependent variable and estimate the specification using a Probit model. We find a negative and significant coefficient on the stand-alone

⁷ The idea of using the same measures of factor intensity based on U.S. firms for other countries is originally proposed by Rajan and Zingales (1998).

⁸ Even if we have the same set of data for service firms in the U.S., it is not clear whether we can apply the Cobb-Douglas production functional form to measure factor intensity of a sector.

term of the sector's skill intensity, but a positive and significant coefficient on the interaction between a country's skill endowment and a sector's skill intensity. These results suggest that while Chinese firms are less likely to invest in skill-intensive sectors in Africa on average, they are more likely to do so in the relatively more skill-abundant countries. In other words, African nations that are relatively more successful in investing in human capital tend to attract more Chinese ODI in the skill-intensive sectors. We also find a negative coefficient on the interaction between a country's capital endowment and a sector's capital intensity, but it is not statistically significant.

In columns (4) to (6), we use the (log) number of ODI deals at the sector-country level as the dependent variable. We add 1 to the number of deals in order to include sector-countries with zero ODI deals in the regression sample. To tackle the resulting estimation bias due to sample censoring at zero, we estimate the specification using a Tobit model. We find a positive and significant coefficient on the interaction between a country's skill endowment and a sector's skill intensity, after controlling for country fixed effects. These results suggest that while Chinese ODI tends to be concentrated in low-skill intensive sectors in Africa on average, it is biased toward the more skill-intensive sectors in skill-abundant countries. Together with the results about the extensive margin of Chinese ODI, this finding suggests that Chinese firms tend to exploit the local comparative advantage of the host country when investing abroad.

Interestingly, we find that Chinese firms are less likely to invest in capital-intensive sectors in the more capital-abundant host countries. While this result appears to contradict the predictions based on the Heckscher-Ohlin theory, it is consistent with the idea that Chinese ODI serves as a source of external financing to the continent, especially in the capital-scarce host countries. To the extent that capital is more mobile than labor, the opposing signs on the two interaction terms actually offer a coherent portrait of the main hypothesis of this paper -- Chinese investors are largely profit-driven and are responsive to market conditions, just like investors from other countries.

We have shown in Table 1 that Chinese ODI is attracted to African countries that are politically stable. What extra lessons can we learn from a sector-level analysis? To this end, we split our sample into two subsamples based on whether a country has rule of law that is above or below the continent's median. Similarly, we also split the sample into two based on whether a country is above or below the median value of political stability. We then use the two subsamples to repeat the analysis of Table 4.

Table 5 reports the regression results. In columns (1)-(4), we examine the probability of Chinese ODI across sectors and countries. Supporting the conclusions of the cross-country analysis, we find that host countries' levels of rule of law do not seem to matter for Chinese firms' investments in Africa; however, political stability is crucial. In particular, we find that the results reported in the previous table about how Chinese firms respond to market conditions are mostly observed for the group of politically unstable nations (column (3)). A potential explanation is that in politically unstable business environments, investment is risky but the expected return could be high. Facing a risky investment environment, investors need to be more cautious when choosing projects to invest. Such investment incentives imply that investors will be more motivated to exploit the host country's comparative advantage. The finding that Chinese ODI deals are more concentrated in skill-intensive sectors in the more skill-abundant countries, especially in politically unstable countries, confirms this hypothesis. For the same reason, investors should be driven to seek projects that promise a higher return in a riskier environment. Such hypothesis is confirmed by the positive coefficient on the interaction between a country's capital abundance and a sector's capital intensity, as reported in column (3), when the sample of below-median rule-of-law countries is used. In other words, Chinese ODI is concentrated in the more capital-intensive sectors in countries that are both politically unstable and scarce in capital. No such pattern is found for the more politically stable countries.

By using the (log) number of deals as the dependent variable, we find evidence confirming the same pattern of Chinese ODI at the extensive margin. The last four columns of Table 5 report these regression results based on a Tobit model. Not only do we find that Chinese investors are more responsive to market conditions in politically unstable countries, we also observe the same pattern in countries that have worse rule of law.

So far our sector-level analysis is restricted to manufacturing sectors, due to the data limitation on measuring sectors' factor intensities. In Table 6, we extend our analysis to the entire sample that covers both manufacturing and service sectors. We have already shown the prevalence of service sectors in Chinese ODI in Table 3. We now examine whether and how this concentration of Chinese ODI in services in Africa is related to the host country's economic fundamentals. To this end, we repeat the analysis of Table 4, but instead of including the interactions between a country's factor endowment and a sector's factor intensity as our regressors of interest, as there is no factor intensity measures for service sectors, we use the interactions between a country's factor endowment and the service-sector dummy. The regression results are reported in Table 6. Panel A reports results when the ODI dummy is used as the dependent variable while Panel B reports those when the number of (log) ODI deals is used. As reported in Panel A, we find a positive and marginally significant coefficient on the service dummy after controlling for country fixed effects. This finding is consistent with our earlier point about the predominance of service ODI from China in Africa. A country's economic fundamentals (capital, human capital, and natural resource abundance) do not appear to have any additional effects on the probability of Chinese ODI in service sectors. However, when we split the sample into two subsamples along the median value of the country's rule of law, we find that Chinese firms are more likely to invest in services in the resource-rich countries that also have a low level of rule of law. The finding could be related to our cross-country results that while direct investment

from advanced countries in the region tends to be concentrated in countries with a high level of rule of law, Chinese investors, on the other hand, are not discriminatory in this regard.

The findings that Chinese firms are more likely to invest in services in the resource-rich but institutionally poor countries cannot be explained by the standard factor proportions theory, as we have used to explain the high skill intensity of Chinese ODI in skill-abundant countries. That said, such pattern is consistent with many anecdotes about the co-location of mining and service ODI from China. When Chinese firms and its government invest in mining projects in Africa, they often induce different kinds of service FDI to facilitate not only mining (e.g., construction), but also to meet the demand of Chinese workers and businessmen who work in the region (e.g., wholesale-retail businesses, hotels and restaurants, etc.). The fact that business services, wholesale and retail, and import-export are among the top three service sectors in terms of Chinese ODI may well be related to that reason.

In Panel B of Table 7, we further examine the relation between the host countries' economic fundamentals and the specialization of Chinese ODI in services, using a Tobit model and $\log(1+\text{number of deals})$ as the dependent variable. We find confirming evidence that Chinese ODI is more prevalent in services than in manufacturing on average, regardless of the host country's economic fundamentals. That said, when we split the sample into two subsamples along the median value of the countries' rule of law, once again we find that for countries with a low level of rule of law, their human capital and natural resource endowments are both positively related to the number of Chinese ODI deals in service sectors. There is no such pattern when we split countries based on their levels of political stability. To the best of our knowledge, this mining-induced ODI in services in Africa has not been empirically examined before, despite the recent phenomenon of increasing servicification in the continent. Further research along this line is warranted to understand the continent's progress in industrialization.

5. Concluding Remarks

Our analysis provides a nuanced view of China's direct investment into Africa. First, using aggregate data on China's direct investment in each African country, we debunk a number of popular myths about China's activity on the continent. According to the most recent data, China accounts for about 3% of the stock of direct investment in Africa. No doubt that figure is growing rapidly, but still China's investment is relatively small. Chinese investment is attracted to natural resource wealth, but no more so than Western investment. A final point about the allocation of Chinese investment overall is that it is indifferent to the recipient countries' property rights/rule of law, whereas Western investment tends to stay away from the poor governance environments. Since Chinese investment is equally distributed between good and poor governance environments, whereas Western investment is concentrated in the former, *the share of Chinese investment in the poor governance environments tends to be high.*

The aggregate data is naturally influenced to a large extent by some very large deals, which tend to involve state-enterprise investment in natural resource projects. The second main contribution of our paper is to use MOFCOM's database on all Chinese firms that invested in Africa between 1998 and 2012. We argue that this database gives a more accurate picture of what small- and medium-sized private Chinese firms are doing in Africa. In this database relatively few investments are in the natural resource sectors. Service sector investments dominate, and there are a significant number of investments in manufacturing as well. These investments are spread throughout the continent.

Using the unique firms' transaction-level ODI data, we examine how Chinese ODI is distributed according to the recipient countries' and sector characteristics. We find that Chinese ODI is attracted to politically stable countries, but not necessarily those with good rule of law, consistent with what we found in the aggregate data. We also find evidence that Chinese ODI is profit-driven, just like

investors from other countries. Specifically, our cross-sector regressions show that Chinese firms invest in the more skill-intensive sectors in skill-abundant countries, but the less capital-intensive sectors in capital-abundant countries. These patterns are mostly observed in politically unstable countries, suggesting stronger incentives to maximize profits in tougher environments. Finally, the predominance of Chinese ODI in services appears to be related to host countries' natural resource abundance, which is also consistent with the profit-driven nature of Chinese ODI.

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Figure 1. Total FDI and rule of law, African countries

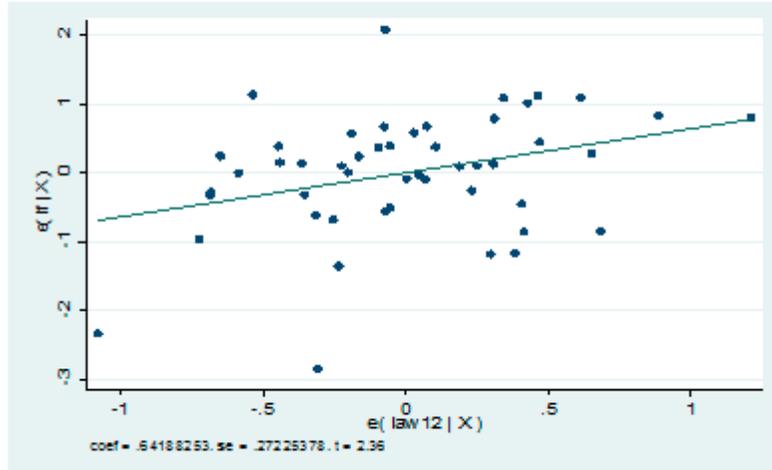


Figure 2. Chinese ODI and political stability, African countries

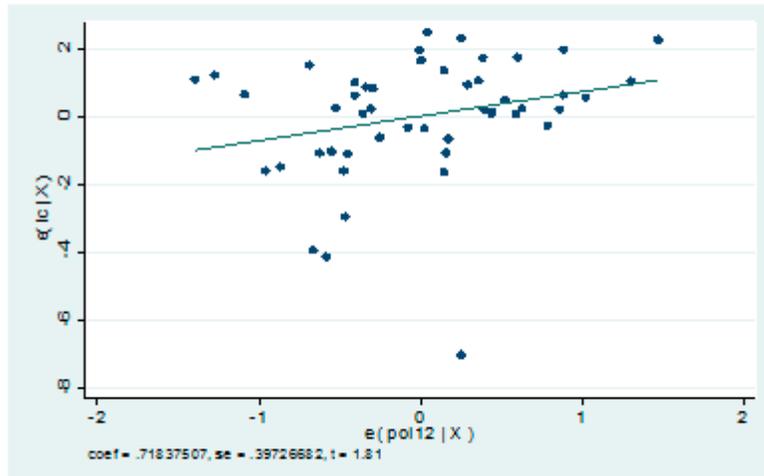


Figure 3. Chinese ODI by governance environment

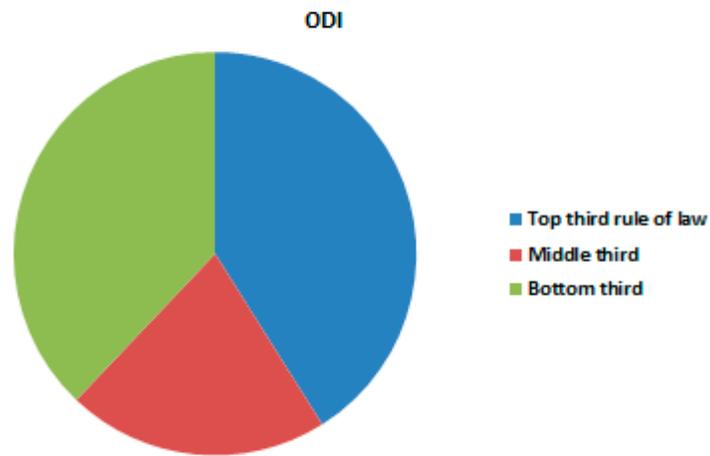


Figure 4. Total FDI by governance environment

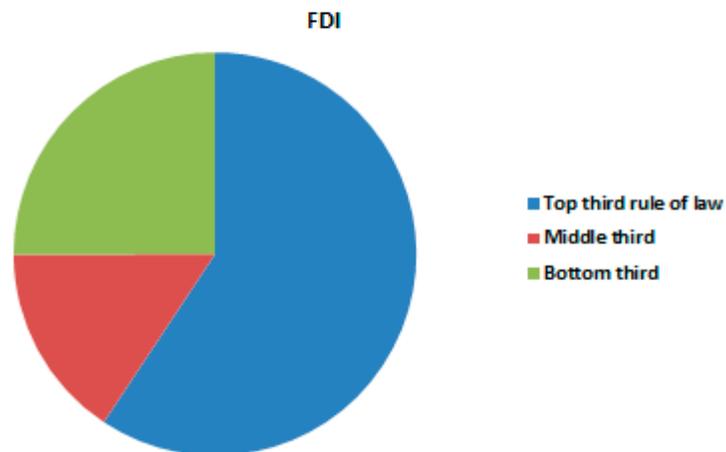
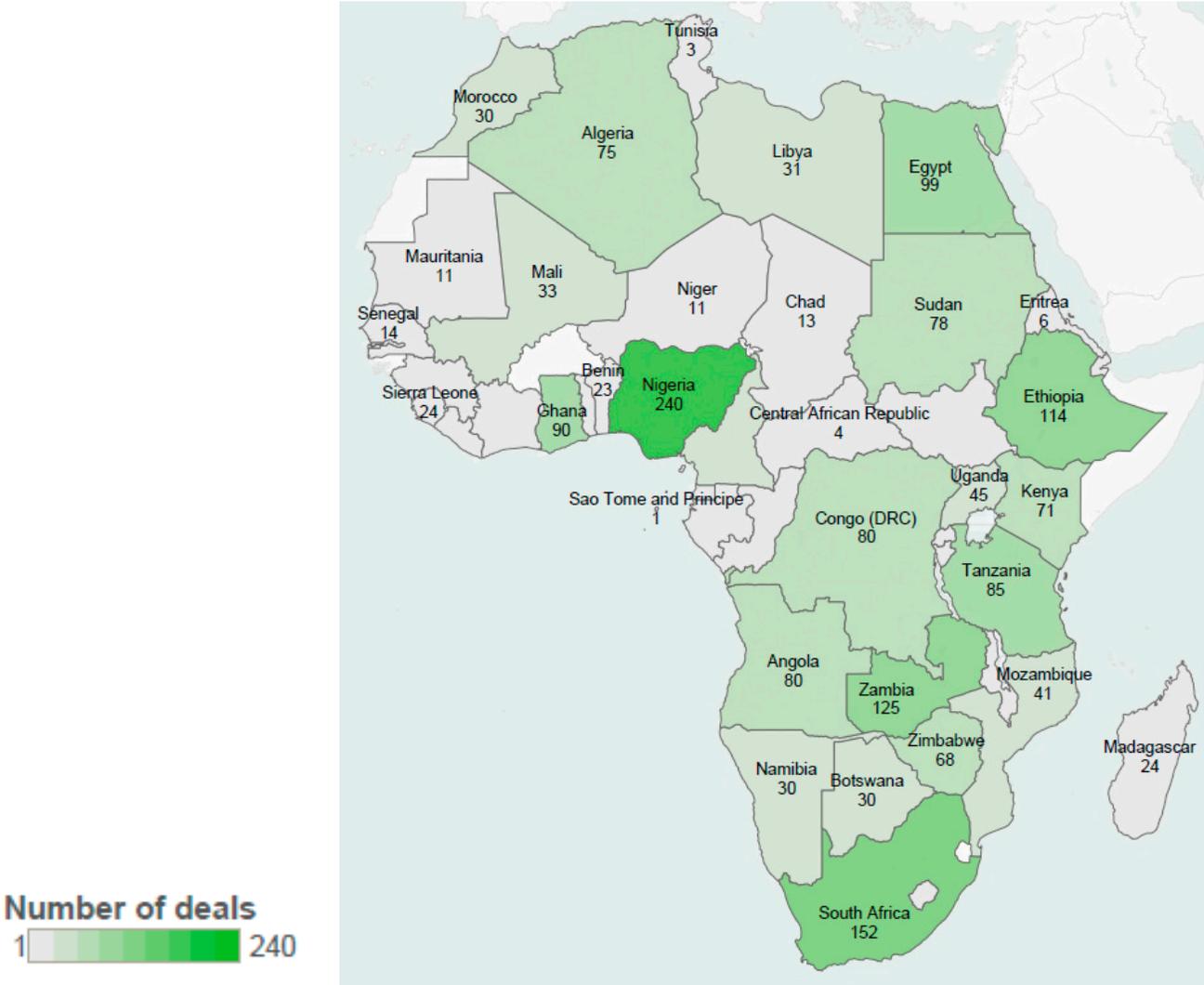
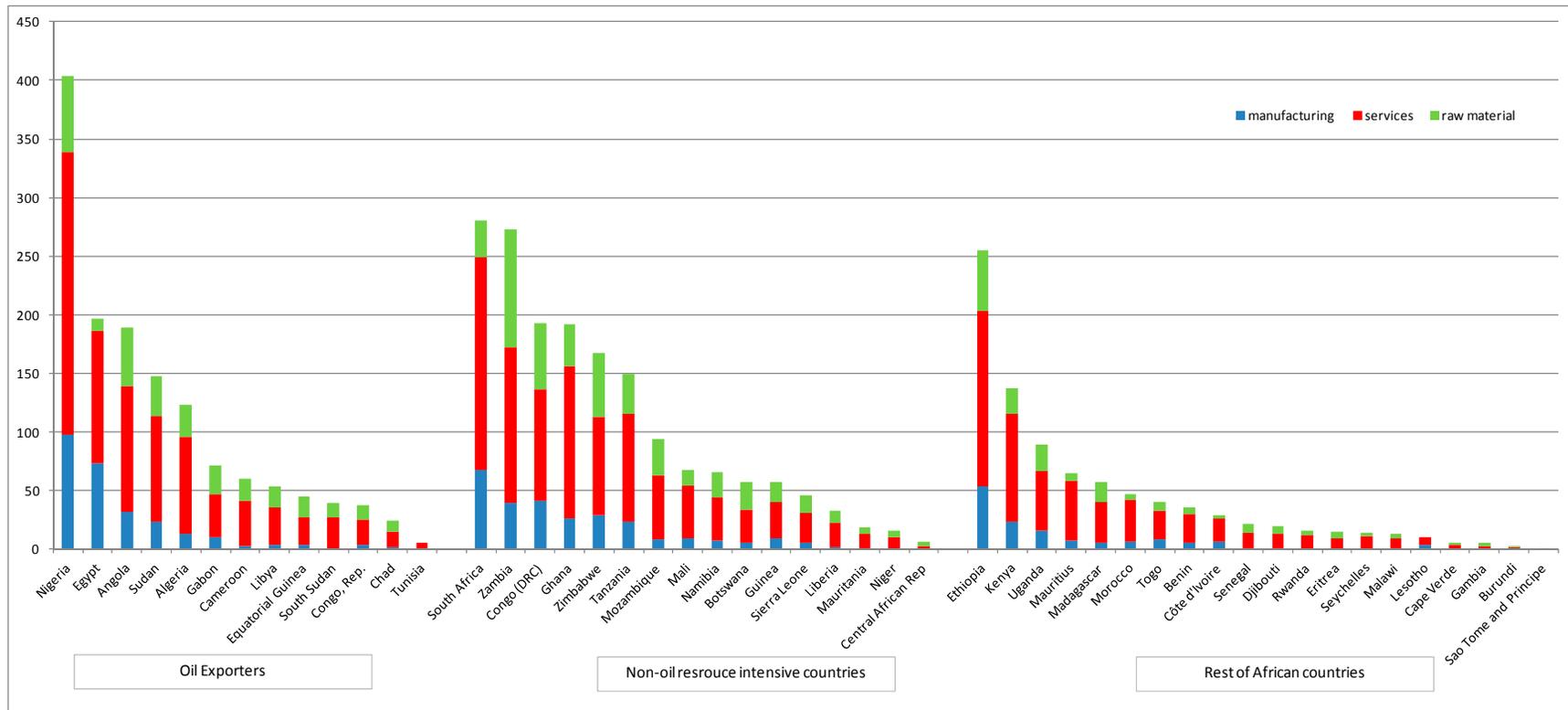


Figure 5. Number of Deals by Country



Source: MOFCOM and authors' calculations.

Figure 6. Distribution of Chinese ODI Projects by Country



Source: MOFCOM and authors' calculations.

Table 1. Allocation of FDI and Chinese ODI among African Countries

Specification	(1)	(2)	(3)	(4)	(5)
Dependent Variable	FDI	Chinese ODI	Chinese ODI	Chinese ODI	Chinese ODI
Number of Countries	49	49	49	49	49
PPP GDP(ln)	.74 (9.24)	.97 (5.59)	1.00 (5.65)	.99 (5.45)	.24 (0.76)
Natural Resource Rents/GDP	0.028 (3.59)	0.036 (2.21)	0.030 (1.71)	0.037 (2.23)	0.052 (3.20)
Rule of Law	.64 (2.36)	--	-.55 (0.37)	--	--
Political Stability	--	--	--	.15 (0.42)	0.72 (1.81)
Population (ln)	--	--	--	--	1.05 (2.82)
R-squared	0.75	0.49	0.50	0.49	0.57

Note: t-statistics in parentheses

Table 2. Top 20 Destination Countries

Country	Number of projects	Number of firms
Nigeria	404	240
South Africa	280	152
Zambia	273	125
Ethiopia	255	114
Egypt	197	99
Congo (DRC)	193	80
Ghana	192	90
Angola	189	80
Zimbabwe	167	68
Tanzania	149	85
Sudan	148	78
Kenya	137	71
Algeria	123	75
Mozambique	94	41
Uganda	89	45
Gabon	71	23
Mali	68	33
Namibia	66	30
Mauritius	65	40
Cameroon	60	28

Source: China's Ministry of Commerce Transaction-level ODI Data.

Table 3. Sector Distribution

Sector ID	Sector Description	Nb of Deals
<u>Agricultural and Manufacturing</u>		
4	mineral products	319
14	base metals and articles of base metal	148
12	articles of stone, plaster, cement, etc.	96
15	machinery and mechanical appliances; electrical equipment; parts thereof.	76
10	textiles and textile articles	75
2	vegetable products	72
3	prepared foodstuffs; beverages, spirits and vinegar; tobacco	64
11	footwear, headgear, umbrellas, etc.	54
5	products of the chemical or allied industries	45
13	other manufacturing	45
1	live animals; animal products	41
16	vehicles, aircraft, vessels and associated transport equipment	40
8	wood and articles of wood.	35
6	plastics and articles thereof; rubber and articles thereof	22
17	miscellaneous manufactured articles	17
9	pulp of wood or of other fibrous cellulosic material	15
7	raw hides and skins, leather, etc.	9
<u>Service</u>		
21	business service	1053
20	wholesale and retail	693
24	import and export	539
18	construction, transportation, storage and postal services	392
22	finance	68
19	information transmission, computer services and software	14
23	social service	12
<u>Mining</u>		
25	petroleum, water and electricity production and supply	45

Source: China's Ministry of Commerce Transaction-level ODI Data (1998-2012).

Table 4. The Effects of Host Countries' Factor Endowment

Dep var	ODI dummy			ln(nb deals + 1)		
	(1)	(2)	(3)	(4)	(5)	(6)
ln(K/L) x k	-1.166 (-1.590)		-1.281 (-1.449)	-1.553*** (-3.235)		-1.671*** (-2.613)
capital intensity (k)	16.84** (2.105)		17.23* (1.747)	21.30*** (3.890)		22.01*** (2.984)
ln(H/L) x s		0.358 (1.185)	0.230 (0.838)		0.367* (1.829)	0.167 (1.010)
skill intensity (s)		-16.29*** (-3.608)	-9.042* (-1.862)		-16.42*** (-4.628)	-6.400* (-1.847)
Country FE	Y	Y	Y	Y	Y	Y
N	704	560	528	704	560	528
ll	-304	-266	-338	-588	-494	-454
R-squared	0.313	0.294	0.328	0.252	0.199	0.225

t statistics in parentheses; * p<0.10; ** p<0.05; *** p<0.01.

Columns (1)-(3) are estimated using a Probit model, while columns (4)-(6) are estimated using a Tobit model. This sample covers 44 countries and 16 manufacturing sectors.

Table 5. Differential Factor Endowment Effects Depending on Countries' Political Environment

Dep var	ODI dummy				ln(nb deals + 1)			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Rule of Law		Political Stability		Rule of Law		Political Stability	
	Low	High	Low	High	Low	High	Low	High
ln(K/L) x k	-1.128 (-0.745)	-0.320 (-0.238)	-1.547* (-1.904)	1.316 (0.593)	-0.618** (-2.487)	0.369 (0.951)	-1.306*** (-7.759)	1.028** (2.491)
ln(H/L) x s	0.230 (0.248)	0.0598 (0.177)	2.044** (2.309)	0.224 (0.743)	-0.362 (-0.491)	0.199 (0.933)	1.025*** (3.424)	-0.112 (-0.507)
capital intensity (k)	17.17 (1.118)	4.956 (0.310)	21.61** (2.471)	-11.74 (-0.480)	8.753*** (3.320)	-3.252 (-0.680)	15.04*** (8.772)	-10.47** (-2.214)
skill intensity (s)	-10.40 (-1.414)	-4.724 (-0.612)	-22.59** (-2.439)	-14.73** (-2.444)	-11.53** (-2.089)	-8.837* (-1.776)	-16.86*** (-4.394)	-4.329 (-1.215)
Country FE	Y	Y	Y	Y	Y	Y	Y	Y
N	256	272	256	272	256	272	256	272
ll	-116	-120	-114	-119	-232	-297	-217	-274
R-square	0.315	0.352	0.328	0.356	0.133	0.060	0.198	0.126

Notes: t statistics in parentheses. * p<0.10; ** p<0.05; *** p<0.01.

Columns (1)-(4) are estimated using a Probit model, while columns (5)-(8) are estimated using a Tobit model. The sample covers 32 countries and 16 manufacturing sectors.

Table 6. Specialization in Service Sectors

Panel A		Dep var = ODI dummy				
Sample	(1)	(2)	(3)	(4)	(5)	
	All	Rule of Law		Political Stability		
		Low	High	Low	High	
Service Dummy	1.862** (0.888)	1.170 (1.342)	2.069* (1.113)	0.950 (1.213)	2.905 (2.490)	
ln(K/L) x Service	-0.120 (0.097)	-0.137 (0.142)	-0.103 (0.115)	-0.0420 (0.100)	-0.227 (0.284)	
ln(H/L) x Service	0.0106 (0.017)	0.0471 (0.031)	-0.00383 (0.017)	-0.00243 (0.031)	0.0153 (0.027)	
ln(M/L) x Service	0.0214 (0.063)	0.200** (0.095)	-0.0257 (0.082)	0.106 (0.100)	0.0302 (0.105)	
Country FE	Y	Y	Y	Y	Y	
N	800	400	400	400	400	
ll	-421	-222	-198	-214	-207	
R-sq	0.2361	0.19	0.2855	0.2191	0.253	

Panel B		Dep Var = ln(nb deals + 1)				
Sample	(1)	(2)	(3)	(4)	(5)	
	All	Rule of Law		Political Stability		
		Low	High	Low	High	
Service Dummy	2.201*** (0.709)	0.483 (0.857)	2.060 (1.264)	1.368 (0.883)	1.760 (1.493)	
ln(K/L) x Service	-0.0589 (0.074)	0.0157 (0.081)	-0.0416 (0.120)	0.00764 (0.080)	-0.0159 (0.167)	
ln(H/L) x Service	0.00124 (0.008)	0.0442** (0.018)	0.000244 (0.007)	-0.0196 (0.024)	0.00168 (0.014)	
ln(M/L) x Service	-0.0549* (0.031)	0.177*** (0.053)	-0.0740** (0.030)	0.0806 (0.088)	-0.0722 (0.056)	
Country FE	Y	Y	Y	Y	Y	
N	800	400	400	400	400	
ll	-851	-428	-430	-417	-440	
R-sq	0.176	0.147	0.1893	0.168	0.1718	

Notes: t statistics in parentheses. * p<0.10; ** p<0.05; *** p<0.01.

Specifications in Panel A are estimated using a Probit model, those in Panel B are estimated using a Tobit model. The panel covers 32 countries and 25 sectors, including 7 service sectors and 1 mining sector.

Appendix

Table A1: Summary Statistics

	10%	25%	50%	75%	90%	mean	nb of obs
<u>Sector Level</u>							
Capital intensity	0.59	0.63	0.66	0.70	0.79	0.68	22
Skill intensity (btw 0 and 1)	0.06	0.07	0.09	0.11	0.12	0.09	22
<u>Country Level</u>							
Rule of law (btw 0 and 1)	0.08	0.22	0.36	0.54	0.68	0.39	47
Political stability (btw 0 and 1)	0.14	0.30	0.54	0.72	0.90	0.52	47
% of secondary sch complete	3.38	6.02	12.13	16.53	26.38	13.42	35
ln(capital per worker)	9.06	9.73	10.61	11.36	12.49	10.66	44