China's Outward Direct Investment in Africa*

Yin-Wong Cheung
University of California, Santa Cruz

and

XingWang Qian
SUNY, Buffalo State College

This Version: June 2010
(Very Preliminary – Please Do Not Cite)

* Cheung gratefully acknowledges the financial support of faculty research funds of the University of California, Santa Cruz. Qian acknowledges the financial support from the Dean of School of Natural and Social Science at Buffalo State.

Yin-Wong Cheung, Department of Economics E2, University of California, Santa Cruz, CA 95064, USA. Phone: (831) 459 4247, Fax: (831) 459 5077, Email: cheung@ucsc.edu.

XingWang Qian, Economics and Finance Department, SUNY Buffalo State, Buffalo, NY 14222, USA. Phone: (716) 878 6031. Fax: (716) 878 6907, Email: qianx@buffalostate.edu

China's Outward Direct Investment in Africa

ABSTRACT

We examine the empirical determinants of China's Outward Direct Investment (ODI) in Africa. Using two data sets, a unique China's approved ODI and a new ODI data set in OECD-IMF standard, we identify some conventional determinants and discover some interesting results of China's ODI activities in Africa. China's ODI seeks the African market, invests more when the local currency is relatively cheap, and prefers to go to countries with better economic conditions. In contrast to conventional wisdom, more corruption seems to draw increased ODI from China. China's ODI targets African energy by implementing two discrete, yet ordered steps: First, it assesses and selects which country to invest in – at this stage, energy outputs in a country does not affect the probability of receiving China's ODI. In the second step, China decides the volume of its ODI in the selected countries – it invests more in selected oil producing African countries with more energy outputs. Apparently, China's "going global" policy has implications for its ODI activity in oil producing African countries.

JEL Classification: F21, F36, O53

Keywords: China's Outward Direct Investment, Africa, Going Global, Energy, Mineral, Corruption

1. Introduction

Against the backdrop of three decades of miracle economic growth in China, there are burgeoning interests in China's economic issues including its economic policies that underpinned the astonishing growth. There are a plethora of studies on China's economic growth, its international trade prowess, its ability to attract productive foreign direct investment (FDI), and its skyrocketing international reserves. In addition, there are intense discussions on issues that come along with China's on-going process of globalizing its economy and its ascendance to be one of the major players in the global economy. These issues include, for example, the global payment imbalances and the valuation of the Chinese currency, renminbi.

With its growing trade surplus and stockpile of international reserves, China is emerging as a global capital provider. China does not only provide capital to the industrialized world via, say, its $900 billion investment in the US Treasury Bill, it is a major financer to the developing world; particularly in areas that are traditionally considered to be risky, such as Africa that is usually shunned by Western investors. Indeed, the 2007 United Nations report (UNCTAD, 2007) points out that China is one of the major capital providers for developing countries in Africa.[1]

Comparing the total world FDI, China's ODI is still relatively small, counted less than 1% in 2008 (Figure 1). In 2002, China initiated its "Going Global" policy that promotes its oversea investments; partly to compete for the global market and resources. As a result, China's ODI was increased almost five times from 33 billion in 2003 to 147 billion US$ in 2008. Its share of FDI from developing countries soared from 9% to 13% in the same period. It is conceived that China's ODI has reached significant levels and is challenging international investment norms, and affecting international relations (Rosen and Hanemann, 2009).

China allocates its ODI portfolio strategically. Compared with Asia, Africa receives a relatively small amount of China's total investment. Nonetheless, China has steadily increased its investment in Africa such that Africa has become the third largest recipients of China's ODI in recent years (Besada et al. 2008). According to the 2008 Statistical Bulletin of China's Outward Foreign Direct Investment, the share of China's ODI in Africa to China's total ODI increased from 2.6% in 2003 to 9.8% in 2008. The substantial increase of China's ODI in Africa stirs

[1] For investments in Africa, Chinese government employs two policy banks, China Export&Import Bank and China Development Bank (CDB), to implement its investment policy. China Exim bank provides trade credits and investment loan targeting to African projects mainly concentrated in long-term infrastructure, energy, and mining. While CDB launched the China-Africa Development Fund to support China's ODI in Africa. See for example Wang (2007) for more details.

strong reactions from the rest of the world – especially the US who is one of China's major competitors for Africa's natural resources.

The increased Chinese investments have created some antagonistic feelings. For instance, it is concerned that the Chinese investment could crowd out African manufacturing industry, which is the main part of Africa's industrialization efforts proposed by the Western world and causes unemployment. Such a hollowing effect could adversely affect Africa's medium- and long-term development prospects and its ability to service debts. The number and quality of African jobs created by Chinese investment are very limited since Chinese firms tend to bring along their own workers from China. Some other concerns include the possible negative impacts of China's ODI on environment and political reforms in Africa.

Yet, the benefits that China's ODI bring to Africa may be enormous. The Chinese capital provides the badly needed funds for developing Africa; a continent that is historically neglected by other international investors. Arguably, China's ODI plays a positive role in improving infrastructures, increasing productivity, boosting exports, and raising the living standards of millions of Africans. Sometimes, China ODI is credited for diversifying the economic activity and creating jobs in manufacturing, mining, processing trade, construction, …, etc.

Although China's activities in Africa have attracted some policy and academic discussions (Besada *et al.*, 2008; Broadman, 2007; Cheung and Qian, 2009; and Wang, 2007), there is a lack of formal econometric analyses of the factors that drive China's ODI in Africa. In the current exercise, we empirically investigate the determinants of China's ODI in Africa and shed some light on the possible implications.

In addition to some canonical determinants including the market seeking motives and political risks, we also incorporate some China specific determinants such as China's import and export from Africa, foreign aid to Africa, China's contract engineering projects in Africa, as well as the infamous "Going Global" policy. In view of the hyped discussion about the quest for African nature resources, we specifically examine the roles of energy (crude oil, natural gas, and coal) and minerals (i.e. bauxite, copper, iron, gold, .., etc.) output in determining China's ODI behavior in Africa.

This paper uses two sets of China's ODI data. The first one contains official data on China's outward foreign direct investment approved by the Chinese authorities. The sample period is from 1991 to 2005. The end of the sample period is dictated by the availability of the

officially approved ODI data. The beginning of the sample period is driven by the common perception that economic considerations are not the main driving forces for China's overseas investment in the pre-1990 period and the fact that not all the data on the African host-countries are before 1990. The second one is ODI data (2003 – 2007) compiled by the Ministry of Commerce of China using the OECD-IMF standard.[2]

Since the ODI data are truncated at zero and below, we use the Tobit (1958) model as the first tool to study their behavior. Then the Heckman (1979) two-stage method that allows us to separate the investment decision into two stages is considered. In essence, we assume the first decision is on whether to invest in a host country. If a positive decision is made, then the second decision is on the amount of committed investment.

To anticipate the results, China's ODI prefers African oil producing countries, notably after the adoption of the "going global" policy. There is evidence of the market seeking motive and the political risk factor. Interestingly, the estimation results indicate that China tends to invest more in an African country with a higher level of corruption. One possible interpretation is that some Western countries (e.g. the US) do not allow their corporations engage in bribery activity in overseas markets and, thus, create an investment vacuum in these corruption loaded countries. China, as a late comer in the game, could find it has less competition in investing these countries.

The remainder of the paper is constructed as follows. In section 2, we briefly discuss the historical relation between China and Africa from both political and economic perspectives. The empirical findings are presented in Section 3. Section 4 offers some concluding remarks.

2. China-Africa Relations

The modern relation between the People's Republic of China (China, henceforth) can be traced back to 1955 Bandung Conference, which called for economic and cultural co-operation within the South, self-determinations and human rights. Ever since, China has begun to cultivate ties by spreading revolutionary ideology and offering economic and military support to the "Third World" African friends. China, however, changed the course of China-Africa relation in the1980s. At that time, instead of exporting revolutionary ideology, China stressed on the

[2] The 2008 OECD-IMF format data were not considered because these data were reported based on definitions different from those of the 2003-7 data.

economic co-operation and development and emphasized the development of friendly relations with other nations without regard to their social systems or ideological orientation. The China-Africa economic tie at that time period, however, is relatively weak. The trade between China and Africa is only about 0.9 Billion, averagely. China's ODI flow to Africa, according to the approved ODI data from Almanac of China's Foreign Economic Relations and Trade, is averagely only about $38 million in 1990s[3]. The China-Africa relation experienced a "great leap forward" in 2000 when the first Tri-annual China-Africa Co-operation Forum (CACF) was held in Beijing, China. The theme of the forum is economic co-operation between China and Africa, which was set in a great scope and ambition, ranging from finance, agriculture to education, and almost every aspect of country affairs. Since then, China has promised and implemented billions of investments and preferential loans to Africa[4], debt relief and cancelation[5], technologies, and trainings. The China-Africa tie was greatly strengthened and the economic interactions have consequently ballooned. The bilateral trade between Africa and China accelerated to 42 billion USD in the 2000s, averagely.

China's ODI in Africa was also on the right trajectory to take off, albeit the absolute amount is relatively small, comparing to FDIs from other countries. It soared from $33 billion in 2003 up to $147 billion in 2008. Africa is the third largest location receiving China's ODI, counted about 9.8% of China's total ODI, which covered almost every single country in Africa. Africa's natural resource sectors, oil and natural gas extraction in particular, are the focal of China's ODI. It counted for more than 40% of China's total ODI to Africa in 2006[6], while business and trade related sectors and manufacturing take up to 33% and 4%, respectively. Indeed, it echoes the common view that Africa's natural resources are the main driver of China's ODI.

---

[3] Due to lack of availability of official aid, including debt relief, and contracted projects data, we cannot assess the values of these two aspects of economic interactions between China and Africa for time periods before 2000.

[4] In 2006 the third CACF, China provided $3 billion preferential loans and $2 billion in preferential buyer credits and set up $5 billion China-Africa Development Fund to support Chinese firms to invest in Africa. In the fourth CACF in 2009, China provided another $10 billion preferential loan to Africa to support infrastructure and social development projects, and another $1 billion to China-Africa Development Fund to expand Chinese investment in Africa.

[5] China canceled two $1.3 billion debts in the first and second CACF; and in the third CACF in 2006, China also canceled all debts relating to interest-free government loans that matured at the end of 2005 for the most indebted and least-developed African countries with diplomatic relations to China.

[6] See for example Kiggunda (2007). China published the sectoral distribution of its total ODI and for some countries and areas, such as Hong Kong, Euro area, the United States, Australia, Russia, APEC; but not for Africa. Kiggunda (2007) provides an estimation of the 2006 sectoral distribution of China's ODI in Africa.

In addition to the trade and ODI, another important economic dimension that China utilized to enhance the China-Africa tie is the contracted projects[7], including contracted engineering projects[8], labor cooperation, and design consultations. China started its contracted engineering projects in the 1970s and maintained a steady, increasing trend. It significantly jumped up at the new chapter of China-Africa relation in the 2000s, when it fulfilled averagely $9 billion of contracted projects, 9 times more that it did in the 1990s (about averagely $1 billion each year). Africa became China's second biggest engineering contract market. Measured in the US dollar unit, China's contracted engineering projects in Africa seem to dwarf the ODI (Figure 3).

In sum, China-Africa relation initiated with ideology similarity and shifted course to greater economic connections to meet the need of economic development both in China and Africa. The pace of China-Africa economic tie build-up is eye-catching, particularly in the 2000s. It already posed to challenge the international economic norms.

3. China's ODI in Africa: Data and Empirical Determinants

In this section, we identify the empirical determines of China's ODI to Africa? Is Africa's oil a key driver that drives China's ODI to its oil rich countries? What is the impact of China's "going global" policy that pushes Chinese investments to Africa? Before answering these questions empirically, it is imperative to address some of issues and unique features of China's ODI data.

3.1. Some China's ODI data issues

While there are many discussions about China's ODI, formal econometrics analyses are in dearth. Searching in the extant literature, we are only able to find three empirical papers on China's ODI, i.e. Buckley et al. (2007), Cheng and Ma (2009), and Cheung and Qian (2009). The primary reason perhaps is the paucity of Chinese ODI data. China has only published its ODI data in a format that is consistent with the OECD-IMF standard since 2003 in *The*

[7] A typical contract project is an agreement between a foreign firm and a host government; and the former builds and operates an engineering project for an agreed period of time before transferring ownership and management rights to the later. The investing foreign firm takes responsibility to raise capital and enjoy management rights and profits during the contract period (See Reina and Tulacz, 2004).

[8] Such as build roads, bridges, schools, shopping centers, housing and office buildings, water conservancy, dams, and power plants, etc.

Statistical Bulletin of China's Outward Foreign Direct Investment and later in *the 2008 Commerce Yearbook*. While it is in OECD-IMF standard and provides country specific time series data, the data set is relatively short in time span, from 2003 – 2008. Moreover, the financial ODI data[9] were added to the year 2008 data, make the 2008 data incompatible with 2003 – 2007 data, where only non-Financial ODI data are compiled. To be consistent, we use 2003 – 2007 OECD-IMF standard ODI data of China.

In addition to the OECD-IMF standard data, the current study utilizes a unique data set – China's approved ODI data - that comprises data on China's outward FDI originated by Chinese enterprises, but approved by Chinese authorities. It spans from 1991 to 2005 and covered 48 of total 54 African countries. Admittedly, there are limitations associated with the approved ODI data, such that it may understate the actual volume of Chinese ODI (Cheung and Qian, 2009). However, this data set provides us some advantages to study China's ODI: 1) compared to the OECD-IMF standard data, it offers longer coverage of time periods; 2) The ODI projects managed by Chinese enterprises, but approved by the authorities, thus, contains market information and reflects China's policy stance. It appears to be the common sense that China's ODI journey to Africa is a mixture of government policy mission and business safari. Although many studies argues that the political dimension of China's ODI is gradually fading away (Besada et al, 2007, P.15), the Chinese government still, arguably, directs China's ODI strategically, as about 70% of total China's ODI is from state-owned enterprises. Therefore, the approved ODI data set gives us leverage to identify both policy and market determinants in one study.

3.2 Empirical specification with the approved ODI data

Before our formal empirical study, a discussion on another feature of China's approved ODI data is essential, which is the key leading us to use Tobit (1958) regression and Heckman (1979) two-stage method in our econometric analyses. Recall that the approved ODI is approved by Chinese authorities. However, Chinese authorities might not approve ODI to an African country every year. For instance, there is no ODI approved to be invested in Algeria from 1991 to 1999. For such a case, the observations of ODI to Algeria from 1991 to 1999 are zeros. Indeed,

[9] The financial ODI include China's direct investment in Banking, Insurance, Securities, and other financial institution sectors.

51% of total observations of China's approved ODI in Africa from 1991 to 2005 are zeros. To utilize such a feature of the approved ODI data, we adopt Tobit (1958) regression and Heckman (1979) two-stage method to analyze the determinants of China's ODI in Africa. Tobit (1958) method, censoring China's ODI data at zero and below, avoids the possible bias caused by the non-negative data structure of China's ODI. While Heckman (1979) method controls the possible selection bias associated with zero-value observations; more importantly, it provides an articulated framework that nicely fits the decision making process of China's ODI – selecting which countries to invest in the first stage, then deciding how much to invest among the selected countries in the second stage.

3.2.1 Tobit (1958) specification

We start with Tobit (1958) regression to investigate the determinants of China's ODI in Africa. According to Tobit (1958), we left censor the approved ODI data at zero and use the maximum likelihood estimation (MLE) to estimate on all observations, including both zero and positive ODI observations. Drawing from the extent empirical studies of FDI, our regression specification is specified below in form of the commonly used "Gravity model" (See Blonigen, 2005, for a survey),

$$ODI_{it} = \alpha + \beta_1 MKT_{it-1} + \beta_2 XCH_{it-1} + \beta_3 ECI_{it-1} + \beta_4 NTR_{it-1} + \beta_5 RISK_{it} + \varepsilon_{it} \quad (1)$$

The dependent variable, ODI_{it}, is China's ODI flow to a host-country *i*, at time *t*, normalized by the host-country's population to facilitate comparison across countries of different sizes.

MKT_{it-1} is a vector containing three market seeking factors of China's ODI - *GDP*, *RGDPpc*, and *RGDPG*. *GDP* is the host-country's gross domestic product, measured in current US dollars, in log value. It represents the market size that the ODI accesses (Frankel and Wei, 1996; Kravis and Lipsey, 1982; Wheeler and Mody, 1992). *RGDPpc* is the host-country's real *per capita* income and is another commonly used indicator of market opportunities (Eaton and Tamura, 1994, 1996; Kinoshita and Campos, 2004; Lane, 2000; Lipsey, 1999). *GDPG* is the host-country's real income growth rate. It is a measure of market growth potential (Billington, 1999; Lee, 2000; Lipsey, 1999). We expect these three variables to have a positive coefficient under the market-seeking strategy. Data on these variables were drawn from the *World*

Development Indicators database provided by the World Bank. A detailed description of the variables used in the study and their sources is given in Appendix A.

The local currency exchange rate of a host country may affect the FDI flow decision. In intuition, FDI flow will be larger if the local currency is cheap (Blonigen, 1997; Froot and Stein, 1991; and Klein and Rosengren, 1994). We therefore include XCH_{it-1} variable, which is measured as the price of the US dollar in the local currency. A higher value *XCH* means a cheaper local currency, thus, attracting more FDI to the host country. We hence expect a positive coefficient associated with *XCH*. The exchange rate data are downloaded from IMF-IFS website.

ECI_{t-1} is a vector comprised of three parallel variables of China's economic interactions with African countries –A host country's trade share with China (*XM*), foreign aid received by a African country (*Aid*) from China[10], and China's contracted projects with an African country (*Proj*). *XM*, measured as the ratio of the host country's trade with China to that country's total trade, is to capture the importance of Africa as China's raw material supplier and the market of Chinese manufacturing goods. More foreign aid (*Aid*) from China may hint a closer relation between the host country and China. It is thus friendlier to Chinese investments. The contracted project, as discussed in Section 2, is another important aspect that China strengthens its economic tie to Africa. The support from the local government is a key factors affecting the contract project business in Africa (Besada et al, 2007, Box 5.14). More Chinese contracted projects indicate more support from local government to Chinese investment. In addition, the existing contracted projects may provide unbiased and better information about the investment environment in the host country. Hence, we may have the conjecture that China's contracted projects in a host African country help promote the ODI. We expect all three variable have positive effect to China's ODI. Data of *XM* are from IMF Direction of Trade (DOT); *Aid* data are from the World Bank, World Developing Indicators; and the data of *Proj* are retrieved from the *Almanac of China's Foreign Economic Relations and Trade* (1992-2008).

Chinese investments in Africa are commonly deemed to primarily target to the rich natural resources (Besada et al, 2007). To investigate this idea, we consider NTR_{it-1}, the natural resource variable vector containing *Engy* and *Minl*, where *Engy* is the energy output (crude oil, natural gas, and coal) scaled by a host country's gross national income (GNI) and *Minl* is the

[10] There is not data of China's foreign aid to individual African country. Instead, we use the total foreign aid received from world, including China, to represent.

mineral output (include bauxite, copper, iron, gold,… etc.) normalized by GNI. Both *Engy* and *Minl* are the proxy to the abundance of the natural resources. If, indeed, China's ODI in Africa is for its natural resources, both energy products and minerals, we shall expect a positive effect of *Engy* and *Minl* to China's ODI in Africa in our regression analysis. Both data on *Engy* and *Minl* are from the World Bank, World Development Indicators.

Historically, many African countries were considered to be politically very risky. These countries were consequently avoided by traditional Western investors and, hence, received less investment. Except for a few oil producing African countries, the majority capital flows into Africa are foreign aids from Western donors. We include $RISK_{it}$, comprising of six different dimensions of political risks, in our regression to assess whether political risks have the similar reduction affect to China's ODI as it did to Western FDIs. Those six political risk variables are the economic condition risks(*Econ*), the political system risks(*Polt*), the confliction risks(*Cnfl*), the social tension risks(*Scnt*), the corruption risks(*Crpt*), and the law and order risks(*Law*). A higher value of each risk index indicates a lower risk level in that country. The data of all risk variables are drawn from the country risk data of *International Country Risk Guide* (ICRG). There are 12 political risk indexes in ICRG country data. We use a naïve method to re-group 12 indexes into six indexes due to the concern of degree of freedom in our regression. For instance, we create *Econ* variable by adding the socioeconomic condition index and the investment profile index of ICRG. Appendix A provides reference of how to create the other five political risk variables.

To facilitate the interpretation and avoid endogeneity issues, the lagged variables are used in the regression exercise, except for six political risk variables. Intuitively, FDI can affect the political risk of a host country (Arezki and Brückner, 2009). However, with regards to China's ODI in Africa, it is still small relative to other FDIs in Africa and it embraces a strict investment policy of "noninterference of internal affair". We hypothesize that China's ODI does not affect an African country's political risk. To be fair, we made an experiment to replace all six political risk variables with their lagged counterparts. The results of political risk variables and all other variables in our regression are not significantly different from those reported in later text.

The panel data Tobit regression with random effect[11] is used to estimate and the results pertaining to specification (1) are presented in Table 1. Due the data availability of the explanatory variables, the political risk variables in particular, we have 31 African countries from 1991 to 2005 in our data sample. For brevity, we dropped very insignificant variables (*p* value >20%) and only report the reduced regression results in Column 2 of Table 1.

The estimates of coefficients are largely consistent with the conventional wisdom, except for the corruption variable. Out of three market seeking factors, only the market size, *GDP*, is estimated positive and significant. It seems that a good size of the African market attracts China's ODI. Indeed, according to a 2005 survey from the Foreign Investment Advisory Service (FIAS) and the Multilateral Investment Guarantee Agency (MIGA) about China's ODI, manufacture is the primary sectors that Chinese firms plan to invest in Africa (45% of total surveyed firms). Due to a relatively high tariff in Africa (UNCTAD, 2005), the ODI may help Chinese manufacturing goods jump over high tariff and expand the African market. The other two market factors, the income level (*RGDPpc*) and the growth potential (*GDPG*), are not the significant reason for China's ODI in Africa. China's ODI is found to invest more when an African currency is cheap. This is might be the case in the 1990s when China did not have a chest of foreign exchange; thus, when investing, China had to gauge the exchange rate changes in its profit equation. However, in the new millennium, with growing trade surplus and stockpile of foreign exchange reserve, the importance of exchange rate has been out-weighted by other factors that affect China's ODI in Africa. Indeed, later in our regression analysis with the ODI data in OECD-IMF standard from 2003 to 2007 (See Table 3), we do not find the exchange rate has a significant effect to China's ODI anymore.

Our estimate results also suggest confirming the conjecture that China's contracted projects promote more of China's ODI to Africa, as a positive and significant coefficient is garnered for *Proj* variable in the regression. It is conceivable that contracted projects, a parallel economic channel to the ODI that China interact with Africa, may elevate China's ODI in Africa from the following three aspects: 1) a host country with more of China's contracted project implies a closer tie to China, both in ideological and economic ties; 2) the existing contracted project activities provide first-hand, detail, and unbiased information about the investment

[11] The fixed effect Tobit regression generates biased estimate, see for example Greene (2004a, 2004b) for discussion.

environment in an African country; 3) many contracted projects maybe the pioneer projects preparing for later large amount of direct investment.

One of the major factors that hamper FDIs to flow in Africa is the political risk. Three surveys, World Business Environment Survey (1999/2000), World Development Report Survey (1996/97), and UNCTAD World Investment Report Survey (1999/2000), found that corruption is the No. 1 constraint on FDIs to Sub-Saharan Africa and many other political risk factors, such as political instability, policy uncertainty, and weak regulatory framework are among the top list of constrains as well. As a result, except for some natural resource rich countries, i.e. Angola, Nigeria, and South Africa[12], even an African country having relatively safe political risk environment attracts few FDIs. Studies do find, however, that improving business climate, an efficient legal system, less corruption, and political stability promote FDI to flow in Africa (Asiedu, 2006; and Morisset, 2000). China's ODI seems to have similar concerns about the African political risks as other investors do. According to the survey from the Foreign Investment Advisory Service (FIAS) and the Multilateral Investment Guarantee Agency (MIGA) (2005), with regards to political risks, 94% of total surveyed Chinese firms perceived Africa as the riskiest region. Ironically, according to the same survey, some 60% of the firms investing in Africa evaluated the policy environment in Africa as "good". This indicates that Chinese firms might perceive and handle the political risk in Africa differently from other investors. Indeed, according to our estimate, among six political risk variables, only two of them are found to significantly affect China's ODI inflows – the better economic conditions, including a better socioeconomic condition and investment profile, draw more China's ODI; interestingly, an African country with worse corruption received increased China's ODI. Apparently, other aspects of political risks seem not to bother China's ODI in Africa. While the result that China's ODI favors better economic condition (*Econ)* is in line with the common sense, the contradictory finding of corruption (*Crpt*) is worth for more explanations. In theory, corruption, acting as an extra tax that imposes on FDI, increases the cost of FDI (Bardhan, 1997); thus deters FDIs. A strand of empirical work, i.e. Abed and Davoodi (2000) and Wei (2000), has confirmed such an intuition. However, there seems no consensus on the effect of corruption to FDI; some studies find no significant effect of corruption (i.e. Wheeler and Mody, 1992), while others, Swaleheen

[12] According to Asiedu (2006), from 2000 to 2002, these three countries absorbed about 65 percent of FDI flow to Sub-Saharan Africa.

and Stansel (2007) for example, find that corruption may positively affect investment and economic growth, when the control for the economic freedom is high. China's ODI perhaps stands in line with Swaleheen and Stansel (2007). The possible reason may be related to the investment situation in Africa. Compared to other FDIs in Africa, particularly in the oil producing African countries where Western FDIs have a strong foothold, China's ODI is a later-comer and relatively small and incompetent. On the other hand, some Western countries (e.g. the US) illegalize their corporations' engagement in bribery activity in overseas markets and, thus, create an investment vacuum in these corruption loaded countries. China deploys its ODI tactically. Rather than directly competes with strong Western FDIs, China's ODI goes to more corrupted countries where lacks of other strong FDIs, such as Sudan. Therefore, it is plausible that more corrupted African countries receive more China's ODI.

Overall, we identify a few determinants of China's ODI in Africa. We do not, however, find a significant effect of African natural resource to China's ODI – both natural resource variables, *Engy* and *Minl*, are not significant. Recall that the approved ODI contains both market information and Chinese government policy orientation; we thus suspect that we might miss some key determinants that related to Chinese ODI policy to Africa. China's "going global" policy, vigorously implemented after 2002, promotes Chinese enterprises for international operation to improve resource allocation and enhance global competitiveness (WIR, 2006). As a focal point of "going global" policy, China's ODI has been signified and pushed to take off since 2002. Further, the "going global" policy directs more ODI to the natural resource sector to improve the resource allocation of fast growing Chinese economy; for example, 40% of 2006 total ODI in Africa is directed to extractive sectors. To capture the "going global" policy effect and China's resource allocation preference, we augment specification (1) by adding two dummy variables (*GG* and *Oil*) and a set of interaction variables (*GG*Oil*, *GG*Engy(-1)*, *GG*Minl(-1)*, *Oil*Engy(-1)*, and *GG*Oil*Engy(-1)*). *GG*, a time dummy for "going global" policy (I(t>=2002) = 1; otherwise 0.), is to capture the "going global" policy effect; *Oil*, African oil producing country dummy, is to screen out African oil producing counties and capture the preference of China's ODI to African oil producing countries. *GG*Oil*, *GG*Engy(-1)*, *GG*Minl(-1)*, *Oil*Engy(-1)*, and *GG*Oil*Engy(-1)* are created to identify the possible effect of oil country after the *GG* policy, energy output after the *GG* policy, minerals output after the *GG* policy, oil country's energy output, and oil country's energy output after the GG policy, in determining

China's ODI in Africa, respectively. The reduced regression results of the augmented specification (1) are presented at Column 3 of Table 1. The newly added dummy variables and most interaction variables are not significant, except that *GG*Oil* gets a positive and significant coefficient, indicating that the "going global" policy prefers oil producing African countries and directs more China's ODI there. Interestingly, both the energy (*Engy*) and minerals (*Minl*) output still do not significantly affect China's ODI in Africa, even after integrating China's "going global" policy. Adding policy dummy variables and interaction variables does not affect the results of most other standard variables. Only the significance of *GDP* variable is reduced and becomes insignificant at 10% level.

3.2.2 The specification of Heckman (1979) method

Under Tobit (1958) specification, a zero-value observation, i.e. at year, *t*, an Africa country, *i*, did not receive any China's approved ODI, is treated as zero China's ODI inflow. These zero ODI observations are censored to control the possible bias, and put together with all other positive ODI observations to estimate results. It is a one-step econometrics treatment. However, the decision making of China's ODI perhaps comprises of two discrete, yet ordered steps[13]. In the first step, Chinese authorities assess the ODI host African country and decide whether or not to invest. After a positive investment decision to a host African country, in the second step, the authorities decide the volume of ODI to be approved and invested in that country. Empirically, this two-step decision making process of China's approved ODI can be nicely captured by Heckman (1979) two-stage method. In this sub-section, we implement Heckman (1979) method to re-investigate the determinant of China's ODI in accordance with the specification (1); and to be consistent, we also work on the augmented specification by adding policy dummies and interaction variables.

In the first stage (also called as the selection stage) of Heckman (1979), China's ODI selects which countries to invest. We assume that the decision of whether to invest is based on the assessment of cost-benefit from China's perspective. If the benefit outstrips the cost, China's ODI decides to invest; otherwise not to invest. We adopt all independent variables in specification (1), which presumably affect the cost and/or benefit of China's ODI; and lay out the first stage of Heckman (1979) method as

[13] See also, for example, Razin et al (2004).

$$D_{it} = \alpha + \beta_1 MKT_{it-1} + \beta_2 XCH_{it-1} + \beta_3 ECI_{it-1} + \beta_4 NTR_{it-1} + \beta_5 RISK_{it} + \mu_{it} \quad (2)$$

D_{it} is the latent dependent variable. It is a dummy variable, equaling to 1 if there is China's ODI at year *t*, in country *i* (I($ODI_t > 0$) =1; otherwise, 0.)[14]. All independent variables are the same as specification (1). As we have cross-sectional time series panel data, we take advantage of the method proposed by Wooldrige (1995), who tailored Heckman (1979) procedure to the panel data analysis. A panel data Probit regression with random effect[15] is performed on specification (2) with all observations, including zero and positive ODI observations. The second column of Table 2 gives the results. Again, very insignificant variables (*p* value >= 20%) are dropped from the regression. The results are similar to those of Tobit regression in Section 3.2.1. China's ODI is more likely to go to an African country with larger market, cheaper local currency, and better economic conditions. Both energy and minerals output do not affect the probability that China's ODI invests in an African country. The corruption (*Crpt*) variable is negative and significant; evidently, China's ODI is more likely to invest in a corrupted African country. However, the existing contracted projects seem not to increase the likelihood of China's ODI; we do not estimate a significant coefficient to *Proj* variable.

The first stage of Heckman (1979) provides the economic means of our empirical analysis, that is, what determine the likelihood of China's ODI; it also helps control a technical issue of zero-censored data – selection bias problem. To correct the selection bias problem, Heckman (1979) calculates an inverse Mills ratio for each country *i*, at year *t*, from the first stage regression. The inverse Mills ratio, hence contains information about the unobserved factors that determine China's ODI in an African country. It is then added to the second stage regression of Heckman (1979) and treated as an independent variable to control for the effect of unobserved factors that affect China's decision about how much to invest in the second stage. We refer readers to Heckman (1979) for detail discussion about the inverse Mills ratio.

In the second stage, China decides the volume of its ODI to be invested in a selected African country. Again, the decision in this stage is based upon the assessment of cost-benefit of

---

[14] Razin *et al*. (2004) use lagged dummy variable D_{it-1}. They assume that FDI is more likely to invest if there are FDI in the previous year. Because the FDI in previous year indicates lower lump-sum setup cost of the new FDI. Lagged dummy variable D_{it-1}, however, causes potential endogenity problem.

[15] Similar to the fixed effect Tobit regression, the fixed effect Probit regression generates biased estimate, see for example Greene (2004a, 2004b) for discussion.

China's ODI. All independent variables in specification (2), which presumably have effects on the cost and/or benefit of China's ODI, are adopted in the second stage regression as well. In addition, the inverse Mills ratio that is calculated from the first stage is also included in the regression. Thus, the second stage regression is set as

$$ODI_{it} = \alpha + \beta_1 MKT_{it-1} + \beta_2 XCH_{it-1} + \beta_3 ECI_{it-1} + \beta_4 NTR_{it-1} + \beta_5 RISK_{it} + Mills_{it} + \upsilon_{it} \quad (3)$$

where ODI_{it} is the dependent variable, with only positive ODI observations included. Except for the inverse Mills ratio, $Mills_{it}$, all other independent variables are same as in specification (2) (see also, Razin et al, 2004). Technically, according to Wooldridge (1995, p.120), this does not affect the ability to correct for the selection bias. We, therefore, follow Wooldridge (1995) and essentially run a pooled data OLS with each variable in demeaned value; moreover, we add country and time dummy to control the country and year effect[16]. The column 3 of Table 2 contains the results of the second stage Heckman (1979) procedure. The inverse Mills ratio, $Mills_{it}$, is estimated to be significant, hence we have evidence that there are indeed unobserved factors in the first stage selecting process that affect China's ODI decision in the second stage. Adding the inverse Mills ratio, $Mills_{it}$, ensures that the coefficient estimates in the second stage are purged of bias resulting from the possible selection bias problem.

The energy output (*Engy*) is assigned a positive and significant coefficient. This confirms the conventional view that China's ODI is going for African oil. Yet, our results suggest a little more sophisticated view of China's ODI strategy for African oil than the straightforward conventional view. If we combine the estimate results in both stages of Heckman (1979), we find that an African country with large energy production alone does not increase the likelihood that China's ODI invests there. However, if selected by China's ODI, an African country with more oil output draws more China's ODI.

Among the selected African countries, China invests more ODI with a country where the local currency is cheap and there are more Chinese contracted projects. Although China's ODI invests more in more corrupted selected African countries, it concerns other aspects of political risks. Countries with stable political system and less social tensions attract more China's ODI, which is in line with the finding of Asiedu (2006) and Morisset (2000).

[16] The country and year effect results are not report in the result tables for brevity.

To capture China's "going global" policy effect and China's preference of African oil in determining China's ODI in Africa, we add two dummy variables (*GG* and *Oil*) and a set of interact variables (*GG*Oil*, *GG*Engy(-1)*, *GG*Minl(-1)*, *Oil*Engy(-1)*, and *GG*Oil*Engy(-1)*) and replicate the two-stage procedure of Heckman (1979). As the results showed in Column 4 and 5 in Table 2, except for *GG*Oil*, all other newly added policy dummy and interaction variables are insignificant. *GG*Oil* is estimated to be significantly positive on both stages. Bearing the mission of improving the resource allocation for sustainable economic growth at home, China's "going global" policy pushes China's ODI not only to be more likely to invest in African oil producing countries, but also to allocate more in oil producing countries among the selected African countries.

The significance of energy output (*Engy*) variable is reduced and become marginally insignificant; and the results of other control variables are largely not affected by adding policy interaction terms.

3.3 Empirical specification with the new ODI data in IMF-OECD standard

Although the approved ODI data provide long time period coverage for us to investigate the behavior of China's ODI, it may suffer some problems, such that it may significantly under-state the true volume of China's ODI (Cheung and Qian, 2009). To be cautious with our results, we use an alternative China's ODI data compiled by *the Ministry of Commerce of China* in IMF-OECD standard to repeat the empirical analysis. It is serving as a robustness check. This data set covers 33 African countries from 2003 to 2007. Although it is relatively short in time series, there are three potential benefits for using this alternative ODI data set: 1, it follows IMF-OECD standard, therefore our results can be comparable with other FDI papers in the literature; 2, China's ODI started to jump up from 2003 (Figure 1). It hints that some new features of China's ODI might have occurred since then. Using the data from 2003 is more likely to discover the possible new features; 3, Recall that China's noticeable involvement (i.e. billion dollar acquisitions[17]) in Africa energy sector really only starts from recent years. Has China changed its strategy in questing African oil recently? To answer this question, we can discover some

[17] For example, in April 2006, China National Offshore Oil Corporation (CNOOC) completed a USD 2.3 billion deal to by a 45% interest in an offshore oil-mining in Nigeria.

evidences from analyzing the ODI data set in OECD-IMF standard and comparing with what we found in the previous section.

Similar to the approved data, there are zero-value observations (about 16% of total observations) in this alternative ODI data set – that is, no China's ODI flow at year *t* to country *i*. To be consistent, we should perform both Tobit (1958) and Heckman (1979) two-stage regression in this section. However, after executing Heckman (1979) procedure, we find that the inverse Mills ratio is estimated to be statistically insignificant. It is indicative that the selection bias is absent in this alternative data set regressions – i.e. there is no unobserved factors that affect China's ODI behavior in Africa. In this case, our standard estimation procedure (e.g. Tobit (1958) regression) is sufficient to identify proper determinants of China's ODI in Africa. We therefore drop Heckman (1979) method and only report the results from Tobit (1958) regression. The results of panel data Tobit regression with random effect are reported in Table 3. Although there are many similar results as those of in Section 2.2, where we use the approved ODI data, there are some salient differences. Contrast to the results in Table 1, the energy output of African countries turns up to be a significant factor attracting more China's ODI from 2003. The result echoes China's noticeably capital operations for its energy quest in Africa and the hypered discussions of China's oil safari in Africa in recent years (Downs, 2007, Frynas and Paulo, 2006). A decade ago, the hottest topic about African oil is the rivalry of the US and France[18] for oil; few people care about a minor player in Africa - China. However, this time it is China that elicits the most anxiety. Besides the strategic quest for oil in Africa, China's ODI is also believed to carry a mission for other raw materials, such as iron, copper etc., to satisfy its raw material needs for the high-speed economic development. For example, besides three oil producing countries, Algeria, Nigeria, and Sudan, two mineral rich African countries, South Africa and Zambia, are on the top five lists of China's ODI receivers in 2007. As expected, the mineral output (*Minl*) emerges to be significant for the first time in our empirical exercise in our regression estimate. A higher mineral output is found to draw more ODIs from China, supporting the view that questing minerals is another reason that China heavily invests Africa in the new millennium. Furthermore, the magnitude of coefficient to *Minl* is much larger than that to the *Engy* variable, suggesting that a unit increase in mineral output can draw much more China's ODI than a unit increase in energy output do. This is probably not surprising, since while the competition in African energy sector is

[18] See for example Frynas and Paulo (2006).

really fierce and the game is still dominated by major international oil companies (IOCs), the fight in mineral extractive sector in Africa is relatively mild and thus more accessible to Chinese investments; hence, comparing to energy output, same amount increases in mineral output can raise more China's ODI. We also estimate a negative and significant effect of law and order (*Law*), so does the corruption (*Crpt*) variable; that is, our estimate results indicates that China's ODI prefers more corrupted and worse law and order African nation to invest. While the result of corruption (*Crpt*) estimate is interesting as we discussed in section 3.2.1, the same signed coefficients estimation for both *Crpt* and *Law* seems to be reasonable, since corruption is usually associated with poor law and order. Take an example of Africa, the correlation between *Crpt* and *Law* is as high as 55%. Some countries, such as Nigeria, reaches 85%. Interestingly, the exchange rate (*Exch*) variable becomes insignificant. It perhaps highlights a fact that for a nation embracing burgeoning current account surplus, the marginal cost of investments caused by exchange rate fluctuation becomes negligible. China actually is willing to pay significantly much higher cost, usually inflated price, in order to get access to African oil and mineral sector[19]. Moreover, many investment projects that China bid are the projects not commercially viable and abandoned by international oil companies (IOCs). Consequently, China has to pay extra costs in order to produce oil and/or mineral on those projects. Compared to such costs, the cost from exchange rate fluctuation is simply trivial.

Other results are similar to those in Section 3.2. China's ODI in found to go to bigger African market and a country having better economic condition; the existing contracted projects promote increased China's ODI.

Recall we find that African oil producing counties have significant favor from China's ODI in the previous section. Is this favor continuing in the new millennium? To check the answer, we add a related dummy variable, *Oil*, and an interaction variable, *Oil*Engy(-1)*, to extend our regression analysis. In Column 2 of Table 3, we report the results. The dummy variable for African oil producing countries is automatically dropped from regression, as we perform random effect Tobit regression. The interaction term, *Oil*Engy(-1)*, which capture the effect of energy output from African oil producing countries to China's ODI, is estimate to have a significantly positive effect to China's ODI. This confirms our finding in the section 3.2 that China's ODI favors African oil nations; it is further suggestive that more china's ODI goes to oil

[19] See Frynas and Paulo (2006) for more discussion.

producing Africa with higher oil output. In addition, we find a negative effect of *Engy*, albeit insignificant[20]. It seems that in the new millennium China's ODI focuses on the oil in African oil producing nations so intensively that it almost ignore other Africa nations with fewer energy output.

While it does not affect the estimation of other variables, adding the interaction variable reduces the significance of economic condition (*Econ*) variable. It turns in to marginally insignificant in 10% level.

In sum, China's ODI keeps some of its routine behaviors in Africa after 2003; i.e. seeking African market, favoring better economic condition, and preferring more corruption. It does develop some new features, however. For instance, it focuses on African nations rich in natural resources, both energy and minerals; but it is more responsive to the mineral output. Moreover, it focuses so intensively on African oil producing nations that it reduces the involvements in the energy sector in other non-oil producing nations.

4. Concluding Remarks

We examine the empirical determinants of China's ODI in Africa. These determinants include the canonical economic factors, some China-Africa specific factors, and Chinese government policy factors that affect China's ODI in Africa. Both China's officially approval ODI data and the ODI data reported according to the OECD-IMF standard are used in our empirical exercise.

Some canonical economic factors are found to be significant determinants of China's ODI in Africa. For example, China's ODI tends to go to countries with a good market size and potential, with a relatively cheap local currency, and with better economic conditions. In line with the natural resource seeking strategy, China's ODI responses to energy and minerals output of a host country. Apparently, China does not make the "invest and not-to-invest" decision based on a country's energy output. Once a positive investment is made, however, China tends to invest more in countries with a higher energy output.

China's ODI reacts negatively to the political risk factor – a result that is in accordance with theory and intuition. On the attitude towards the level of corruption in a host country, our

[20] The *Engy* variable should be dropped according to our rule of 20% insignificant. However, for the purpose of interpreting the economic meaning, we keep it in the regression. Nevertheless, dropping *Engy* variable does not affect the results substantially, both qualitatively and quantitatively.

findings indicate that corruption in Africa tend to draw in China's ODI. Further analyses are warranted to understand the link between corruption and China's ODI in Africa.

Although the Chinese economy has been transiting gradually from a centrally planned economy to a market force driven one since the adoption of the open door policy in the 1978, government policies still play a significant role in affecting China's economic activities. Apparently, there is no exception in the ODI arena. The "going global" policy is a typical example. Under the directive of deploying investments in overseas markets to support the economic development at home, China's "going global" policy induces a higher volume of ODI in African countries and, to complete domestic rising demand, a higher concentration in countries with oil production and energy output.

In passing, we note that there are a few issues related to our ODI data. For instance, two data sets used in our empirical exercises are compiled according to different methodologies. Encouragingly, the results generated by these two different data sets using two different econometric methods are quite comparable and compatible. Our empirical results are quite robust.

Perceived as a win-win strategy, the economic cooperation between China and Africa has been pushed forward since the milestone event – the first China-Africa Co-operation Forum (CACF) – in 2000. China's super-charged export industries need to find new markets besides the developed world. At the same time, China requires natural resources to sustain its dramatic economic growth. On the other hand, Africa offers good market opportunities and has abundant natural resources - both energies and minerals. The economic cooperation essentially creates a China and Africa strategic partnership that matches the comparative advantages of these two parties. While our analyses offer some insights into the factors affecting China's investment decision, further research is warranted to broaden our understanding of the ties and the related economic interactions between China and Africa.

Appendix A: Data – Definition and Sources

The appendix lists the definitions of the variables used in the study and their sources.

Variable Definition

ODI	China's approved outward direct investment scaled by the host country's population. [Source: Editorial Broad of the Almanac of China's Foreign Economic Relations and Trade (1992-2006)]; China's outward direct investment in IMF-OECD standard scaled by the host country's population. [Source: Statistical Bulletin of China's Outward Foreign Direct Investment, the Ministry of Commerce, China (2005 – 2008)]
GDP	The host country's nominal GDP in current US dollar (log value). [Source: World Bank, World Development Indicators]
RGDPpc	The host country's real per capita GDP in constant 2000 US dollar (log value). [Source: World Bank, World Development Indicators]
GDPG	Host country's real GDP growth rate. [Source: World Bank, World Development Indicators]
Engy	The energy depletion (% of GNI) is equal to the product of unit resource rents and the physical quantities of energy extracted. It covers crude oil, natural gas, and coal. [Source: World Bank, World Development Indicators]
Exch	The exchange rate of African country (the price of US$ in local currency). [Source: IMF-IFS]
Minl	The mineral depletion (% of GNI) is equal to the product of unit resource rents and the physical quantities of minerals extracted. It refers to bauxite, copper, iron, lead, nickel, phosphate, tin, zinc, gold, and silver. [Source: World Bank, World Development Indicators]
XM	The share of an African country's international trade with China to the total trade of that African country. [Source: IMF, Direction Of Trade (DOT)]
Aid	The per capita foreign aid received by the host African country (log value). [Source: World Bank, World Development Indicators]
Proj	The "contracted projects" between China and the host African country in USD (per capita in log value). [Source: Editorial Broad of the Almanac of China's Foreign Economic Relations and Trade (1992-2008)]
Econ	The economic condition risk index of a host country, calculated as the sum of socioeconomic condition index and investment profile index of ICRG. [Source:

International Country Risk Guide (ICRG)]

Polt The political system risk of a host country, calculated as the sum of government stability, military in politics and democratic accountability index of ICRG. [Source: International Country Risk Guide (ICRG)]

Cnfl The confliction risk index of a host country, calculated as the sum of internal conflict and external conflict index of ICRG. [Source: International Country Risk Guide (ICRG)]

Sctn The social tension index of a host country, calculated as the sum of religious tensions and ethnic tensions index of ICRG. [Source: International Country Risk Guide (ICRG)]

Crpt The corruption risk index of a host country, calculated as the sum of corruption and bureaucracy quality index of ICRG. [Source: International Country Risk Guide (ICRG)]

Law The law and order risk index of a host country. [Source: International Country Risk Guide (ICRG)]

GG A time dummy variable for China's "going global" policy. I(t>=2002) = 1; otherwise 0.

Oil The oil producing African country dummy variable. Those countries are Algeria, Angola, Congo Republic, Egypt, Gabon, Libya, Nigeria, Sudan.

Reference:

Abed, Geoge T. and Hamid R. Davoodi, 2000, "Corruption, Structural Reforms and Economic Performance in the Transition Economies." IMF Working Paper No. 132. Washington: International Monetary Fund.

Ai, Chunrong and Edward Norton, 2003, "Interaction Terms in Logit and Probit Models," Economic Letters, 80, 123-129.

Arezki, Rabah and Markus Brückner, 2009, "Oil Rents, Corruption, and State Stability: Evidence From Panel Data Regressions," IMF Working Paper, 09/267.

Asiedu, Elizabeth, 2006, "Foreign Direct Investment in Africa: The Role of Natural Resources, Market Size, Government Policy, Institutions and Political Instability," *The World Economy*, 29, 1, 63 – 77.

Bardhan, Pranab K. (1997) "Corruption and Development: A Review of Issues." *Journal of Economic Literature* 25: 1320–46.

Bera, Anil, Carlos Jarque, and Lung-Fei Lee, 1984, "Testing the Normality Assumption in Limited Dependent Variable Models," *International Economic Review*, 25, 3, 563-578.

Blonigen, Bruce A., 1997, "Firm-Specific Assets and the Link Between Exchange Rates and Foreign Direct Investment," *American Economic Review,* 87, 3, 447-65.

Blonigen, Bruce, 2005, "A Review of the Empirical Literature on FDI Determinants," *Atlantic Economic Journal*, 33, 4, 383 - 403.

Buckley, Peter. J., Jeremy Clegg, Adam Cross, Xin Liu, Hinrich Voss, and Ping Zheng, 2007, "The Determinants of Chinese Outward Foreign Direct Investment", *Journal of International Business Studies*, 38, 499-518

Cheng, Leonard K. and Zihui Ma, 2009, "China's Outward FDI: Past and Future," *manuscript*, Hong Kong University of Science and Technology.

Cheung, Yin-Wong and Xingwang Qian, 2009, "Empirics of China's Outward Direct Investment," *Pacific Economic Review*, 14, 3, 312-341.

Downs, Erica S., 2007, "The Fact and Fiction of Sino-African Energy Relations," *China Security*, 3, 3, 42 - 68.

Eaton, Jonathan and Akiko Tamura, 1994, "Bilateralism and Regionalism in Japanese and U.S. Trade and FDI Patterns," *Journal of the Japanese and International Economies* 8, 478-510.

Eaton, Jonathan and Akiko Tamura, 1996, "Japanese and US Exports and Investment as Conduits of Growth," *NBER Working Paper* 5457.

Frankel, Jeffrey A. and Shang-Jin Wei, 1996, "ASEAN in a Regional Perspective," *UC Berkeley Working paper* C96-074.

Froot, Kenneth A. and Jeremy C. Stein, 1991, "Exchange Rates and Foreign Direct Investment: An Imperfect Capital Markets Approach," *Quarterly Journal of Economics*, 106(4): 1191-1217.

Frynas, Jedrzej G. and Manuel Paulo, 2006, "A New Scramble for African Oil? Historical, Political, and Business Perspectives," *African Affairs*, 106, 423, 229 – 251.

Greene, William H., 2004a, "Fixed Effects and Bias Due to the Incidental Parameters Problem in the Tobit Model," *Econometric Reviews*, 23, 2 , 125 - 147.

Greene, William H., 2004b, "The Behavior of the Fixed Effects Estimator in Nonlinear Models," *Econometrics Journal*, 7, 98 –119.

Heckman, James J., 1979, "Sample Selection Bias as a Specification Error," *Econometrica*, 47, 1, 153-161.

Kinggundu, N. Moses, 2007, "A Profile of China's Outward Foreign Direct Investment to Africa," Proceedings of ASBBS (The American Society of Business and Behavioral Sciences), Vol. 15, 1.

Kinoshita, Yuko and Nauro F. Campos, 2004, "Estimating the Determinants of Foreign Direct Investment Inflows: How Important are Sampling and Omitted Variable Biases?" Bank of Finland, *BOFIT Discussion Papers* 10/2004.

Klein, Michael W., and Eric S. Rosengren, 1994, "The Real Exchange Rate and Foreign Direct Investment in the United States: Relative Wealth vs. Relative Wage Effects," *Journal of International Economics*, 36(3-4): 373-89.

Kravis, Irving B. and Robert E. Lipsey, 1982, "Location of Overseas Production and Production for Export by U.S. Multinational Firms," *Journal of International Economics* 12, 201-223.

Lane, Phillp, R., 2000, "International Investment Positions: A Cross-Sectional Analysis," *Journal of International Money and Finance* 19, 513-534.

Lipsey, Robert E., 1999, "The Location and Characteristics of US Affiliates in Asia," *NBER Working Paper* 6876.

Morisset, Jacques, 2000, "Foreign Direct Investment in Africa, Policies Also Matter," The World Bank, Policy Research Working Paper, 2481.

Razin, Assaf, Yona Rubinstein, and Efraim Sadka, 2004, "Fixed Costs and Bilateral FDI Flows: Conflicting Effe

Reina, Peter and Cary J. Tulacz, 2004, "The Scope is More Important in the Increasing International Engineering Contract Market," *Engineering News Record* (New York), 23, 7 – 10.

Swaleheen, Mishfiq and Dean Stansel, 2007, "Economic Freedom, Corruption, and Economic Growth." *Cato Journal* 27, 3: 343 – 58.

UNCTAD (United Nations Conference on Trade and Development), 2005, "Global Investment Prospects Assessment," Geneva: United Nations.

UNCTAD, 2007, *Asian Foreign Direct Investment in Africa: Towards a New Era of Cooperation among Developing Countries*, United Nations, New York and Geneva.

Wei, Shang-Jin, 2000, "How Taxing Is Corruption on International Investors," *Review of Economics and Statistics* 82, 1–11.

Wheeler, David and Ashoka Mody, 1992, "International Investment Location Decisions: The Case of U.S. Firms," *Journal of International Economics* 33, 57-76.

Wooldridge, Jeffrey M., 1995, "Selection Corrections for Panel Data Models under Conditional Mean Independence Assumptions," *Journal of Econometrics*, 68, 115 – 132.

Figure 1: China's Outward Direct Investment

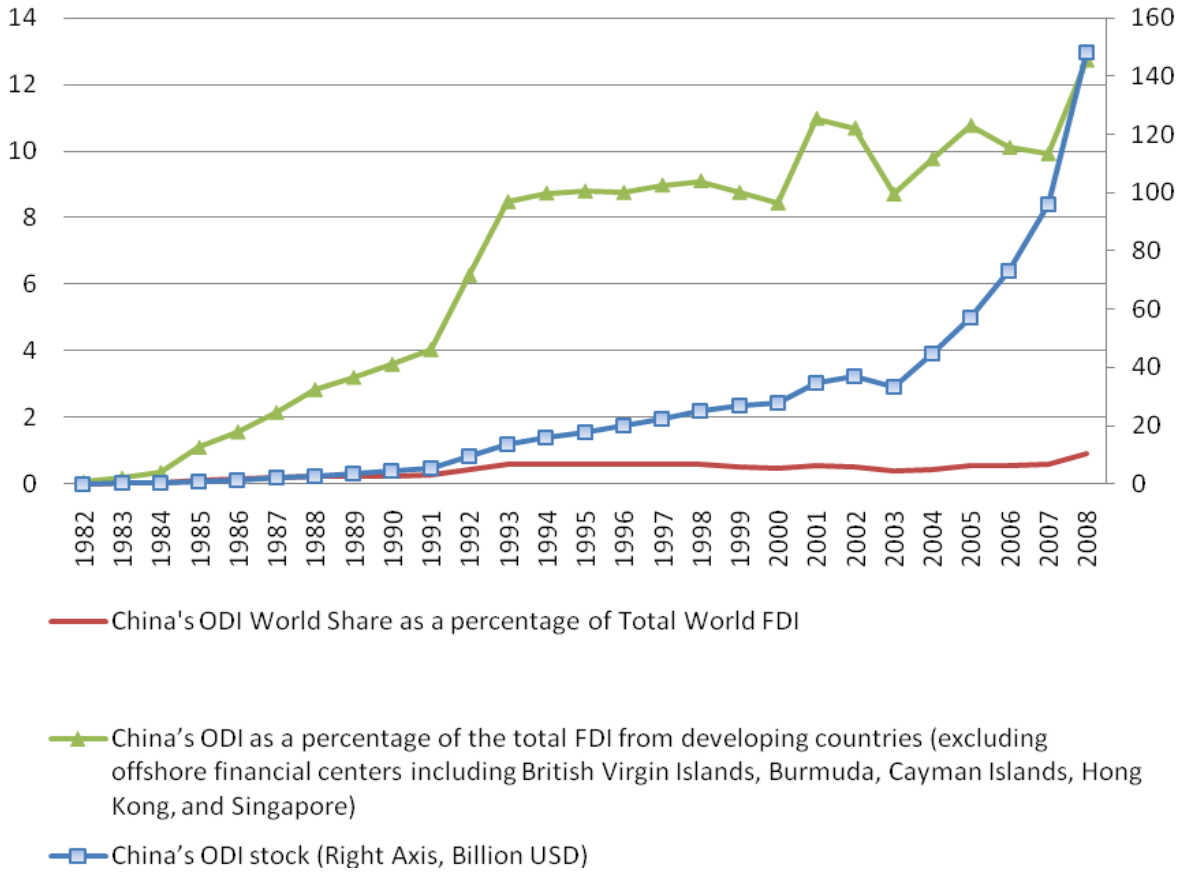

Figure 2: China's Outward Direct Investment in Africa (Flow Data)

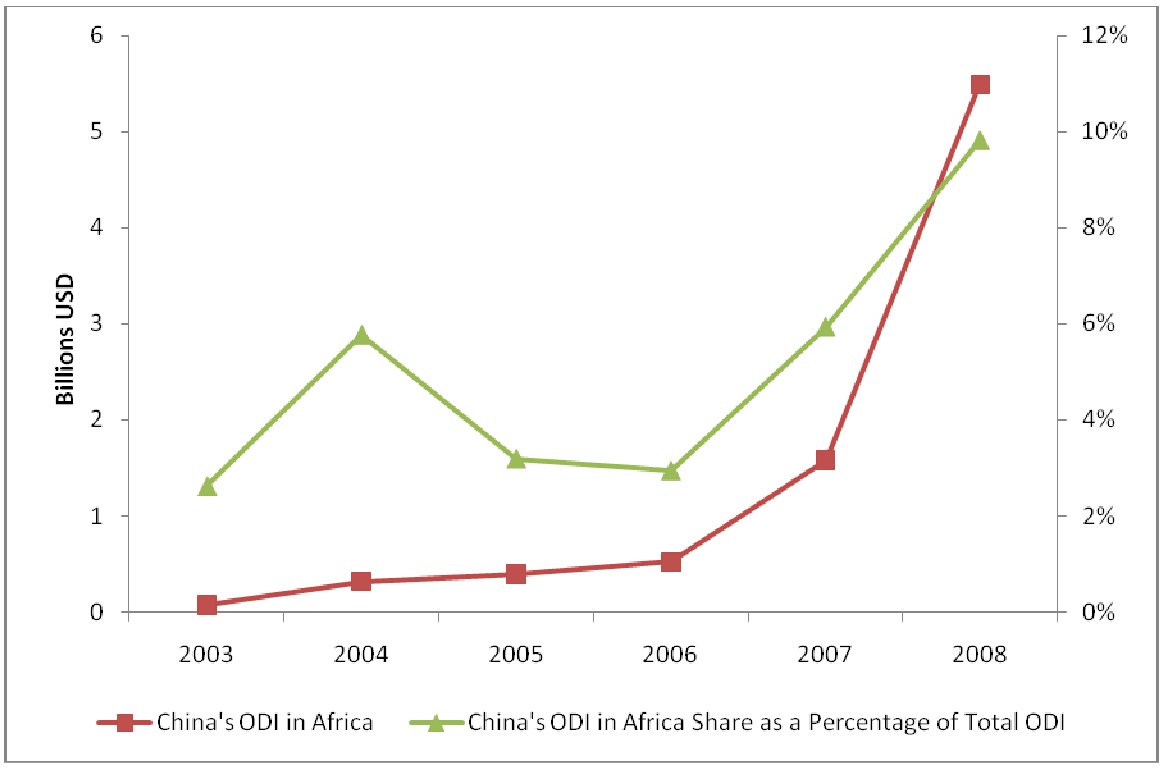

Figure 3: China's Trade with Africa, Contracted Projects, and Outward Direct Investment in Africa

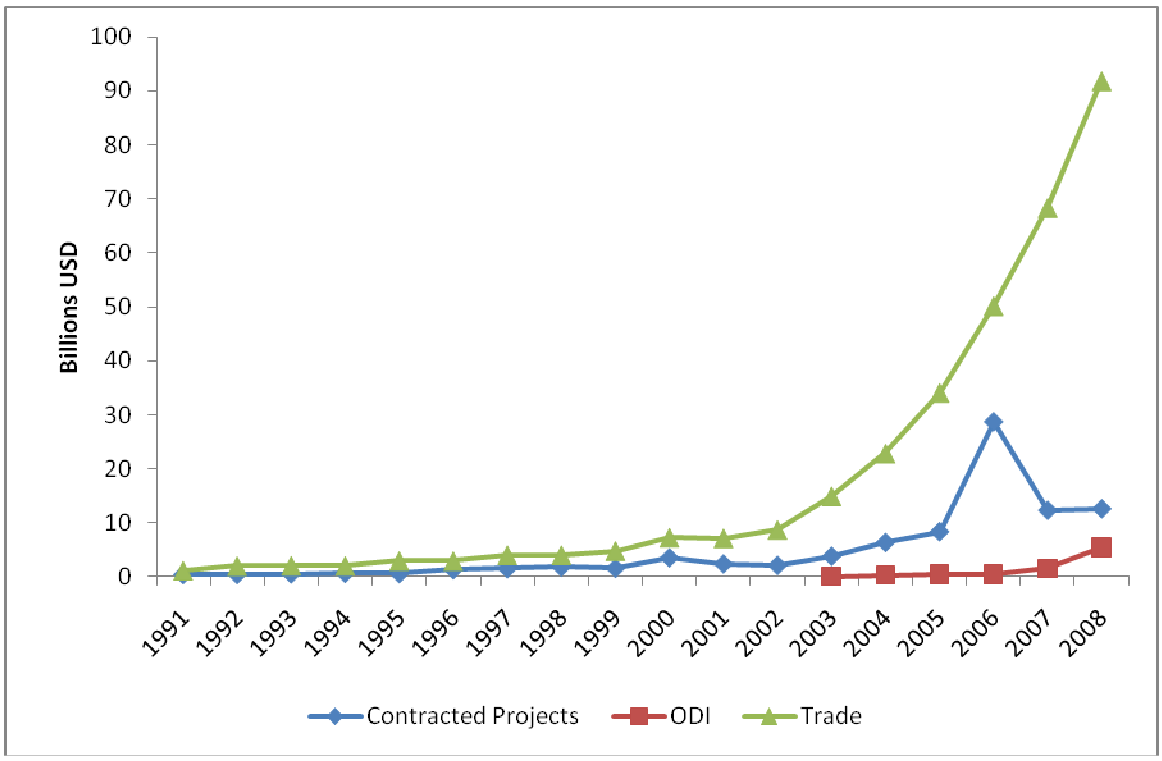

Table 1: The empirical determinants of China's Outward Direct Investment in Africa – Tobit (1958) with the Approved ODI Data (1991-2005)

	Tobit-1	Tobit-2
GDP(-1)	0.183*	0.1300
	(0.10)	(0.10)
Exch(-1)	0.377***	0.386***
	(0.15)	(0.14)
Proj(-1)	0.016***	0.013**
	(0.01)	(0.01)
Econ	0.263***	0.246***
	(0.07)	(0.07)
Crpt	-0.258***	-0.214***
	(0.06)	(0.06)
GG*Oil		1.123***
		(0.33)
Constant	-5.250**	-4.174**
	(2.12)	(2.12)
Pseudo R-squares	0.05	0.06
LR Test	27.64	29.77
Obs.	462	462

Note: The table reports the result of the reduced form of random effect Tobit panel regression in Specification (1). All insignificant (> 20% in *p*-value) variables are dropped, except for variables associated with interaction terms. The column "Tobit-1" reports the results of regression in Specification (1); "Tobit-2" column presents the results with both "*GG*" dummy and the interaction variable "*GG*Engy(-1)*". Robust standard errors are in the parentheses. "***", "**" and "*" denote significance at the 1%, 5% and 10% levels, respectively. Adj. Pseudo R-squares is the adjusted McFadden's R-squares.

Table 2: The empirical determinants of China's Outward Direct Investment in Africa – Heckman (1979) with the Approved ODI Data (1991-2005)

	Heckman – 1		Heckman – 2	
	First Stage	Second Stage	First Stage	Second Stage
GDP(-1)	0.337***		0.304***	
	(0.10)		(0.10)	
Exch(-1)	0.356**	0.494***	0.367**	0.526***
	(0.16)	(0.16)	(0.16)	(0.16)
Proj(-1)		0.025***		0.024***
		(0.01)		(0.01)
Econ	0.289***		0.266***	
	(0.07)		(0.07)	
Polt		0.206***		0.200***
		(0.06)		(0.06)
Sctn		0.117*		0.122**
		(0.06)		(0.06)
Crpt	-0.319***	-0.368***	-0.281***	-0.349***
	(0.06)	(0.09)	(0.07)	(0.09)
Engy(-1)		0.018*		0.014
		(0.01)		(0.01)
GG*Oil			0.978**	1.053*
			(0.39)	(0.54)
Mills		0.601***		0.629***
		(0.19)		(0.20)
Constant	-8.279***	2.238***	-7.595***	2.108***
	(2.26)	(0.56)	(2.31)	(0.57)
R-squares	0.10	0.24	0.10	0.25
Norm Test	3.02		3.25	
Obs.	462	217	462	217

Note: The table reports the result of estimation in Specification (2) and (3). All insignificant (> 20% in p-value) variables are dropped, except for variables associated with interaction terms. The column of "Heckman, first stage" gives the results of Heckman (1979) first stage regression; the column of "Heckman, second stage" gives the results of Heckman (1979) second stage regression; the coefficient of interaction variables, i.e. *GG*Oil*, is estimated based on Ai and Norton (2003). Robust standard errors are in the parentheses. "***", "**" and "*" denote significance at the 1%, 5% and 10% levels, respectively. † the number in columns "First stage" report the adjusted MacFadden's Psudo R-Squares; the number in column "Second stage" report the adjusted R-Squares. Bera, Jarque, and Lee (1984) Normality Test is done after Heckman first stage regression. All results are insignificant and do not reject null hypothesis of normal distribution. Country and year effect are omitted to save space.

Table 3: The empirical determinants of China's Outward Direct Investment in Africa – Tobit (1958) with the OECD-IMF format ODI data (2003 – 2007)

	Africa	Africa Oil
GDP(-1)	0.292***	0.389***
	(0.11)	(0.12)
Proj(-1)	0.007*	0.007*
	(0.00)	(0.00)
Engy(-1)	0.016*	-0.042
	(0.01)	(0.04)
Minl(-1)	0.657***	0.647***
	(0.09)	(0.08)
Econ	0.273**	0.204
	(0.13)	(0.13)
Crpt	-0.490***	-0.491***
	(0.17)	(0.17)
Law	-0.394***	-0.445***
	(0.15)	(0.15)
Oil*Engy(-1)		0.058*
		(0.03)
Constant	-5.398**	-6.974***
	(2.39)	(2.56)
Pseudo R-squares	0.14	0.15
Obs.	131	131

Note: The table reports the result of the reduced form of random effect Tobit panel regression in Specification (1). All insignificant (> 20% in *p*-value) variables are dropped, except for variables associated with interaction terms. The column "Africa" reports the results of regression in Specification (1); "Africa Oil" column presents the results with both "*GG*" dummy and the interaction variable "*GG*Engy(-1)*". Robust standard errors are in the parentheses. "***", "**" and "*" denote significance at the 1%, 5% and 10% levels, respectively. Adj. Pseudo R-squares is the adjusted McFadden's R-squares.