China's Outward Direct Investment and Its Oil Quest*

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ABSTRACT

We investigate the empirical determinants of China's outward direct investment (ODI) in conventional oil producing countries. Using China's approved ODI data and a new ODI data set in the OECD-IMF standard, we find that China's ODI seeks foreign markets and is averse to political risks. Interestingly, corruption attracts investments from China. We also find that China's reliance on imported oil pushes and the "going global" policy promotes China's ODI to quest for more foreign oil. A host country's energy output does not affect its probability of receiving China's investment. However, after China decides to invest, it tends to invest more in oil countries with a relatively high level of energy output. Subject to the different investment strategies that China implements, the behavior of China's ODI in the Middle East, Africa, and other oil producing countries is different. While China's ODI has put more weight on Africa and other oil nations, it has reduced its degree of reliance on the Middle East area. Nevertheless, the Middle East remains China's main source of imported oil.

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1. Introduction

The People's Republic of China (henceforth, China) has experienced a miracle of economic development since it "opened its door" in 1978. Three decades of astonishing growth have propelled China to become the second largest economy in the world. However, behind such a miracle, there are numerous challenges and issues that China has to confront and resolve. Such issues include the shortage of domestic natural resources, a widening income inequality, the global payments imbalance, and the valuation of the Chinese currency, renminbi, among others. How China resolves those issues has profound implications for both China and the global economic outlook.

China's global quest for energy to ease the shortage of the domestic supply, particularly of oil and gas, is eliciting increased attention. Once a top oil producer in Asia, China became a net oil importer in 1993. Decades of rapid economic growth caused soaring demands for oil, resulting in China's inability to produce enough domestic oil to meet the desired consumption. The domestic oil demand-supply gap has continued to widen ever since; in 2008, 45% of total oil consumption in China relied on imported foreign oil (Figure 1). Energy security therefore quickly became an imperative issue that imposed serious risks, potentially hampering China's long-term economic growth.

In response to this situation, the Chinese government has initiated and implemented a series of policy directives to secure a stable energy supply, notably the infamous "going global" policy that promotes Chinese enterprises for international operations to improve resource allocation and enhance global competitiveness (UNCTAD, 2006). Under the "going global" policy, China's national oil companies [1](NOCs), perceived as "China Inc.", stepped up to invest globally and acquire oil and gas quite aggressively. As expected, billion-dollar energy deals emerged all over the world (The Economist, 2008). For instance, Sinopec offered over $2 billion to secure the right to explore for oil in three parcels of Angola's territorial waters in 2006. [2]

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[1] They are China National Petroleum Corporation (CNPC), China Petroleum and Chemical Group (Sinopec), and China National Offshore Oil Corporation (CNOOC).

[2] There are also some failed attempts and aborted deals, e.g. CNOOC's failed acquisition of Unocal in the US in 2005.

China's global oil quest has consequently stirred growing uneasiness, controversy, and criticisms from the rest of the world. Some complained that China's huge and growing appetite for oil contributed to the oil price hike in 2005. Others found that China's economic arrangement with "rogue" oil states, e.g. Sudan, enabled China to gain an unfair advantage in the competition for both oil and regional influences. Still others believe that Chinese NOCs, shipping the equity oil[3] exclusively to China, rather than selling on the world oil market, significantly reduce the capacity of the world oil market to respond flexibly to oil demand shocks, hence jeopardizing global energy security (Downs, 2000; Kreft, 2006; The Economist, 2008).

There has been a plethora of discussions and studies on China's global oil quest, its oil policies, and the implication of those oil policies (e.g. Dawns, 2000 and 2007; Klar and Volman, 2006; Lee and Shalmon, 2007). Most of them, however, only provide anecdotal arguments about China's oil quest and lack formal econometric analysis on its determinants. In this study, we empirically investigate the factors that determine China's outward direct investment (ODI) in the conventional oil producing countries, including oil producers in Middle East, Africa, Russia and Central-Asia, and Latin America.

In light of the hyped discussion about China's global energy quest, we specifically examine the role of energy[4] in determining China's investment in oil producing countries. We also control for other relevant factors, including some canonical determinants (the market-seeking motives and political risks) and some China-specific determinants (the exports of oil countries to China, China's total imports of crude oil, and the infamous "going global" policy).

Further, we separate the entire country sample into three sub-samples: the Middle East, Africa, and other oil producing countries, and study them individually. It is believed that the strategies that China uses to deploy its ODI are different in different regions (Lee and Shalmon, 2007; Chen, 2008). For example, although the Middle East remains China's main source of oil supply and accounts for about 50% in 2008, China is diversifying away from it due to the prolonged instability in the area, e.g. the Gulf War. Africa, on the other hand, has received

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[3] The equity oil is the proportion of oil production that a concession owner has the legal and contractual right to retain. The "concession" means the operating right to explore and develop petroleum fields in consideration for a share of production in-kind (equity oil).

[4] In the current study, "energy" includes oil, gas, and coal. The majority part of "energy" produced in a conventional oil country, however, is comprised of oil and gas.

increased oil involvement from China's ODI, especially after the implementation of the "going global" policy in 2002 (Cheung *et al.*, 2010). In addition to the Middle East and Africa areas, China's ODI also aggressively engages in oil operations in other areas such as Central Asia and Latin America. According to China Industry Warning Net (2006), China had allocated 15% and 11% of its total oil related ODI to Russia-Central-Asia and Latin America by mid 2006, [5] respectively.

This paper uses two sets of China's ODI data - the approved ODI data and the new ODI data in the OECD-IMF standard. The former contains official data on China's outward foreign direct investment initiated by Chinese enterprises, and approved by the Chinese authorities. The sample period is from 1991 to 2005. The latter is the ODI data (2003 – 2007) compiled by the Ministry of Commerce of China according to the OECD-IMF standard.[6]

Both ODI data sets contain the flow data of China's ODI and are censored at zero from below. Thus, we first use the Tobit (1958) model to study their behavior. Then we consider the Heckman (1979) two-stage method that allows us to separate the investment decision into two stages. Essentially, we assume the first stage decision is whether or not to invest in a host country. If China decides to invest, the decision in the second stage is then over the amount of committed investment.

China's ODI is found to go to oil producing countries with high energy output, notably after the implementation of the "going global" policy. China's surging demand for oil and its increasing reliance on imported foreign oil have pushed China's ODI to quest for more foreign oil. There is evidence of the market-seeking motive and the political risk effect. Interestingly, the estimated results indicate that China tends to invest in corrupted oil producing countries. In line with some anecdotal evidence, China's ODI behaves differently in different oil regions. While stepping up the quest for oil in Africa and other regions, e.g. Russia-Central-Asia and Latin America under the directive of the "going global" policy, China has been reducing the over-dependence on the Middle East. In addition, rather than concentrate in a few major Middle East

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[5] There is no updated information available for more recent years, e.g. 2008.

[6] We do not consider the 2008 OECD-IMF format data, because these data were reported based on the definition different from those of the 2003-7 data.

oil countries, China's ODI has diversified across countries in that region. Nevertheless, the Middle East is still the major oil supplier for China.

The remainder of the paper is organized as follows. In section 2, we briefly discuss the evolution of China's oil and energy production and consumption. The empirical model specifications and results are presented in Section 3. Section 4 concludes.

2. The Background of China's Energy Production and Consumption

Three decades of economic boom have resulted in a surge in China's demand for energy, which spans the whole spectrum of energy – coal, oil, gas, electricity, hydropower, nuclear power, and other renewable energy sources as well. Thanks to its vast reserves, coal supplies about 70% of China's total energy need (Figure 2). Although China's demand for electricity has soared and keeps growing, it is conceivable that electricity will remain only a fraction of China's total energy supply. The use of natural gas accounted for about three percent of China's total energy consumption in 2006 (EIA, 2009). It is likely to play a larger role in meeting the country's energy need, as the Chinese government promotes the use of more natural gas (primarily because of the concern over China's growing dependency on oil imports and widespread environmental degradation caused by coal). The rapid pace of economic growth has particularly led to dramatic growth in the demand for oil. In the past three decades, China's consumption of oil increased fivefold from 1.7 in 1982 to 8.2 million barrels per day in 2009, making China the second-largest oil consumer in the world.

China had been a net oil importer in the 1950s and early 1960s, receiving the bulk of its imports from the former Soviet Union. However, the discovery of the Daqing oil field in 1959 transformed China into Asia's largest oil producer, enabling China not only to become self-sufficient in oil by the mid-1960s, but also to begin to export small amounts of oil in 1970s.

Despite the expansion of oil production, the demand continued to outstrip the supply; as a result, China started to import oil in 1993. Since then the volume of imports has continuously increased, and eventually China began to rely heavily on foreign oil and imported 45% of its total oil supply in 2008.

One main reason for this is the very limited nature of China's domestic oil output. Despite its vastness in geographic area, China has never discovered large oil reserves. Its

traditional fields in and around Daqing and Shengli are turning old and their production is either flat or declining. New efforts in developing offshore oil fields in both the South China and East China Seas so far have been unimpressive. The newer discoveries in the Junggar and Tarim basins, in contrast to its initial optimistic estimation, turned out to be modest. Therefore, substantial imports of oil to meet the widening gap between the demand and domestic supply are inevitable (EIA, 2009).

Up until 2008, China's net oil imports were 3.6 million barrels per day, ranking China the third-largest oil importer in the world. International Energy Agency (IEA) forecasts that China will import almost 13.2 million barrels per day by 2025 (EIA, 2006). That means China would have to import some 80% of its oil supplies. The Middle East remains the primary source of China's oil imports (about 50% of the total oil imports in 2008); and Africa contributes a significant and increasing amount of oil to China, accounting for about 30% in 2008. In terms of individual countries, Saudi Arabia and Angola were China's two largest sources of oil imports. Together they accounted for more than one-third of China's total crude oil imports (Figure 3).

The increasing dependence on oil imports has stirred a strong sense of insecurity in the Chinese government and has promoted concerns that an interruption of oil supplies or unexpected price hikes could put the brakes on economic growth, which would eventually result in political and social instability (IEA, 2000).

In response, China has launched an "all-out" program of domestic reform and a global energy import security strategy. On one hand, it aims to keep production going in traditional oil fields in northeastern China while expanding the production in the western part of China. In addition, developing offshore oil field exploration in both the South China and East China seas has been raised as a high priority mission. On the other hand, China has implemented a "going global" strategy to encourage and financially support China's NOCs to secure more foreign oil and gas equities, diversify import sources, build pipelines, and sign long-term provision contracts with energy producing countries.

The "going global" strategy focuses not only on purchasing oil in the international energy market, but more importantly, seeking to accelerate China's access to long-term foreign energy equity assets (Leverett and Bader, 2005). Access to foreign oil assets could diversify China's oil supply sources and avoid international price fluctuations. Furthermore, in 2003, China's State

Council issued a directive of "leapfrog strategy in the energy field" through 2020 to reinforce the "going global" policy and secure more oil supplies from overseas (Bremner *et al.*, 2004). As a result, Chinese equity oil investments are all over the world. For instance, CNPC held international assets in 29 oil countries at the end of 2008. The overseas equity production represented roughly 29% of China's total oil production in 2008 (EIA, 2009).

China's aggressive policies in response to its foreign oil dependence are likely to pose implications not only to the world energy market, but also to the global economy and security issues.

3. Data and Empirical Determinants

In this section, we discuss two data sets of China's ODI, the approved ODI data (1991 – 2005) and China's ODI data in OECD-IMF standard (2003 – 2007). Then we use Tobit (1958) and Heckman (1979) methods to analyze the determinants of China's ODI in conventional oil producing countries.

3.1. China's ODI Data

While China's ODI has been extensively discussed, there are only a few formal econometrics analyses in the literature, including Buckley *et al.* (2007), Cheng and Ma (2009), Cheung and Qian (2009), and Cheung *et al.* (2010). [7] The primary reason perhaps is because of the issues associated with the quality and availability of Chinese ODI data. China has published two ODI data sets. However, they have different definitions and different time period coverage; and each has its own limitations.

The first ODI data set, China's approved ODI data, is comprised of data on China's ODI approved by Chinese authorities. Since the Chinese government published the host country specific approved ODI data starting from 1992 and ending in 2006, the approved ODI data cover sample periods from 1991 to 2005. There are some limitations associated with the approved ODI data, such as that it may understate the actual volume of Chinese ODI (Cheung and Qian, 2009).

[7] Most studies on China's ODI are policy-oriented or descriptive in nature, including two early studies on China's ODI, Sung (1996) and Wall (1997), as well as Asia Pacific Foundation of Canada (2005, 2006), UNCTAD (2003, 2007), Wang and Bio-Tchané (2008), Wong and Chan (2003), and Wu and Chen (2001).

This data set, nevertheless, provides us some advantages in studying China's ODI. First, it offers longer time period coverage, allowing us to study the evolution of China's ODI in oil producing countries. Second, the ODI projects are managed by Chinese business enterprises, but approved by the authorities. Thus, the approved ODI data contain market information and reflect China's policy stance.

It appears to be common sense that the energy quest of China's ODI in oil producing countries is a mixture of government policy mission and business venture (Downs, 2007; Lee and Shalmon, 2007). Although many studies argue that the political dimension of China's ODI is gradually fading away (Besada *et al.*, 2007, Page 15), the Chinese government still, arguably, directs China's ODI, as about 70% of total China's ODI is from state-owned enterprises[8]. Therefore, the approved ODI data set gives us the leverage to identify both the policy and market determinants of China's ODI simultaneously.

Besides the approved ODI data, China has also published its ODI data in a format in accordance with the OECD-IMF standard since 2003 in *The Statistical Bulletin of China's Outward Foreign Direct Investment* and later in the *2009 China Commerce Yearbook*. While it is in the OECD-IMF standard and provides country specific time series data, the data set is relatively short in time periods, from 2003 – 2008. The data from 2003 to 2007 are comprised of non-Financial ODI data. But, the financial ODI data[9] were added to the year 2008 data, making the 2008 data incompatible with 2003 – 2007 data. Thus we use 2003 – 2007 OECD-IMF standard ODI data for China in the current exercise.

3.2 Results Based on the Approved ODI Data

In this subsection, we use the Tobit (1958) and Heckman (1979) methods to study the determinants of China's ODI in oil producing countries based on China's approved ODI data. Both methods consider a unique feature of China's approved ODI data; that is, the data set comprises non-negative observations, and many of them are zeros -- 61% of total observations

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[8] According to *the 2008 Statistical Bulletin of China's Outward Foreign Direct Investment*, state-owned enterprises account for 69.6% of total China's ODI stock in 2008.

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

are zeros. Recall that the approved ODI is approved by Chinese authorities. However, Chinese authorities might not approve any ODI to an oil producer 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.

Technically, the Tobit method, censoring China's ODI data at zero from below, avoids the possible downward bias of OLS regression due to the non-negative data structure of China's ODI. It is conceivable that China's ODI decision is made in two ordered steps: first, it decides in which countries to invest; if it decides to invest, the second step determines the amount to be invested in a selected country. Heckman's two-stage method provides a convenient framework to model such a decision making process. We study the factors determining the invest-or-not-to-invest decision in the first stage; in the second stage, we examine what determines the amount of investment.

In specifying the empirical models, we consider some commonly identified determinants of FDI (e.g. market-seeking motives, resource-seeking motives, and political risks, etc.), and some China specific factors, for example, China's reliance on foreign oil and the competition from other FDIs.

It is conceivable that oil producing countries' abundant resource of oil and gas is one of the important factors that attract Chinese investments. We thus investigate how energy abundance of an oil producing country affects China's ODI behavior. *Engy* is selected to proxy the energy abundance. It is measured as the return in dollar units from the energy output (crude oil, natural gas, and coal) scaled by a host country's gross national income (GNI). [10] We expect a positive effect of *Engy* to China's ODI in oil producing countries. Data on *Engy* are from the *World Development Indicators* database provided by the World Bank. A detailed description of all variables used in the current study and their sources is listed in Appendix A.

China's ODI is found to have market-seeking motives in other studies, e.g. Cheung and Qian (2009). Does China's ODI also seek markets in oil producing countries? To answer this question, we study three market-seeking factors of China's ODI -- the host-country's gross

[10] There are other proxies for the energy abundance. For instance, the data on the ratio of total fuel exports to total merchandise exports from the *World Development Indicators* database. However, these data are not available for many of our sample countries.

domestic product (*GDP*), the real *per capita* income (*RGDPpc*), and the real income growth rate (*RGDPG*). *GDP* represents the market size that the ODI accesses (Frankel and Wei, 1996; Kravis and Lipsey, 1982; Wheeler and Mody, 1992). *RGDPpc* is another commonly used indicator of market opportunities and is a typical measure for the level of infrastructure as well (Eaton and Tamura, 1994, 1996; Kinoshita and Campos, 2004; Lane, 2000; Lipsey, 1999). Finally, *GDPG* is a measure of market growth potential (Billington, 1999; Lee, 2000; Lipsey, 1999). These three variables are expected to have positive coefficients under the market-seeking strategy.

FDIs are adversely affected by political risks, particularly in the developing countries. In the oil producing countries, it is commonly believed that oil countries are associated with all kinds of political risks, such as state instability, corruption, and poor law and order (Atkinson and Hamilton, 2003; Ross, 1999). High levels of corruption and poor law and order are two prominent components of the political risks that affect FDIs in oil nations (Ross, 1999). We consider *RISK*, a vector comprised of six dimensions of political risk indexes, in the regression to assess how political risks impact China's ODI in oil countries. These six political risk indexes are the economic condition risk index (*Econ*), the political system risk index (*Polt*), the confliction risk index (*Cnfl*), the social tension risk index (*Scnt*), the corruption risk index (*Crpt*), and the law and order risk index (*Law*). A higher value of each risk index indicates a lower risk level in that country. The six risk indexes are constructed from the 12 country risk indexes from the *International Country Risk Guide* (ICRG). For example, we create the *Econ* variable by adding the socioeconomic condition index and the investment profile index of ICRG. Appendix A provides the details of how we create the other five political risk indexes.

The two-way causality relation between FDI and trade is a traditional topic in the FDI literature (Aizenman and Noy, 2006). We expect such a two-way interaction between trade and FDI between China and oil producing countries. It is conceivable that the primary purpose of China investing it ODI in an oil country is to produce oil and export the majority of it back to China (IEA, 2000). Therefore, the export from the ODI host country to China could be a good proxy in capturing the possible effect of trade on the ODI. Thus, *XP*, measured by the exports from an oil producing country to China over the total exports of that country, is used in our regression.

In addition, some of China's specific factors are also expected to play important roles in determining China's ODI in oil producing countries. China has been increasingly reliant on foreign oil due to its surging demand against the limited domestic supply for oil, pushing China to work out a "going out" strategy to encourage its NOCs to invest overseas and secure more foreign oil. We consider the reliance on foreign oil to be a push factor that presses China to be actively involved in investing in oil producing countries. To evaluate the importance of such a push factor in determining China's ODI, we include a proxy variable for China's reliance on foreign oil, *OilM*, measured by China's import of crude oil (thousand barrels per day) divided by China's total oil consumption (thousand barrels per day). It is expected that a greater reliance on foreign oil pushes China to seek more foreign oil supplies via ODI.

In the business of acquiring foreign oil, China is a late comer (Downs, 2007). Most oil industries in conventional oil producing countries are tied up by the US and European interests. To avoid direct competition with international oil companies (IOCs), such as Exxon and Shell, China circumvents those locations with a strong foothold of IOCs and looks for the areas that are outside of the IOCs' spheres of influence. We incorporate *SFDI*, a variable measured as the existing stock of FDIs from countries other than China, to capture the potential competition that China's ODI could encounter when investing in an oil country. A higher value of *SFDI* indicates more competition from the existing interests of IOCs.

3.2.1 Tobit Specification

We construct the Tobit regression equation as the following to study China's ODI behavior in oil producing countries:

$$ODI_{it}^{*} = \alpha + \beta_1 Engy_{it-1} + \beta_2 MKT_{it-1} + \beta_3 RISK_{it} + \beta_4 XP_{it-1} + \beta_5 OilM_{t-1} + \beta_6 SFDI_{it-1} + \nu_{it} \qquad (1)$$

where $ODI_{it}^{*} = ODI_{it}$ if $ODI_{it} > 0$ and $ODI_{it}^{*} = 0$ if $ODI_{it} \leq 0$. The variable, ODI_{it}, is China's ODI flow to a host-country *i*, at time *t*, normalized by the host-country's population. All the relevant factors that are discussed in the previous subsection are included as the explanatory variables. Three market-seeking factors, *GDP*, *RGDGpc*, and *RGDPG* are contained in *MKT* vector; six political risk dimensions are in the vector of *RISK*.

To avoid possible endogeneity issues, we use the lagged values of all explanatory variables in the regression except for the six political risk variables. We postulate that China's ODI does not affect an oil country's risk characteristics due to China's proclaimed foreign policy principle of "non-interference in internal affairs." In addition, China's ODI is small compared with the total FDI in oil producing countries. Hence, the contemporaneous political risk variables could be considered exogenous.[11]

The panel data Tobit regression with random effects[12] is used and the estimate results pertaining to specification (1) are presented in Table 1. We have a total of 29 conventional oil producing countries[13] from 1991 to 2005 in our data sample. For brevity, we dropped very insignificant variables (e.g. *p* value >20%) [14]and report the results in Column "Tobit-All-1" of Table 1.

The estimated coefficients are largely consistent with the conventional wisdom, except for the corruption (*Crpt*) and energy output (*Engy*) variables. Out of three market-seeking factors, only the market size, *GDP*, is estimated to be both positive and significant. That is, an oil producing country with a larger market attracts China's ODI. The other two market factors, the income level (*RGDPpc*) and the growth potential (*GDPG*), are not the significant reasons for China's ODI in oil countries.

One of the major factors that limit FDI to flow to many oil producing countries is the political risk. A US government report acknowledged that increased oil investment is being hampered by widespread corruption, outmoded investment laws, internal disorder and conflict, and a systemic lack of governmental transparency in oil nations (Klare and Volman, 2006).

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[11] As a robustness check, we have also considered lagged political risk variables. The results are qualitatively similar to those reported in the text, and hence are not reported for brevity.

[12] The fixed effects Tobit panel data regression generates biased estimates, see for example Greene (2004a, 2004b) for a discussion.

[13] The selection of 29 conventional oil producing countries (Appendix B) follows IMF papers and reports, e.g. Arezki and Brückner (2009), Policy Development and Review Department of IMF (2005), and WEO (2008), etc.

[14] To reveal the energy seeking information about China's ODI, the *Engy* variables are included even if they are insignificant more than 20%. Nevertheless, dropping the insignificant *Engy* variables does not affect the results of other variables.

In contrast to the common view, the estimate of the corruption variable, *Crpt*, reveals interesting information. We find that an oil producing country with worse levels of corruption received a higher amount of China's ODI. The plausible reason may relate to the strategy that China's ODI carried out to compete against IOCs. Being a relatively small competitor and the late comer in the foreign oil game, China strategically avoids direct confrontation with other FDIs in some oil countries where IOCs have a strong foothold (Downs, 2007). Chinese ODI, instead, goes to "rogue" states, such as Sudan and Iran, which are traditionally shunned by IOCs due to a high level of political risk. In addition, some western countries (e.g. the US) do not permit their corporations to engage in bribery activities in foreign markets, which creates an investment vacuum in these corruption loaded countries. China thus finds less competition when investing in these countries (Cheung *et al.*, 2010). Apparently, other aspects of political risks seem not to significantly affect China's ODI to invest in oil producing countries.

In theory, the FDI promotes the trade, and the trade, in turn, positively feeds back to the FDI (Aizenman and Noy, 2006). Our result is in accordance with such a feed-back theory. We find that an oil country exporting more to China draws more ODI from China. Indeed, in contrast to China's super-charged exporting prowess to other countries, China is consistently in trade deficits against most oil producing countries. The trade deficits to the group of 29 oil countries in our sample reached as high as $39 billion in 2008. To conduct the booming business of exporting oil to China, including both purchased oil and the equity oil, more Chinese investments in oil producing countries are needed. Moreover, building secure and convenient ways to ship the acquired oil is also crucial to China's global oil quest, which may require China's ODI to build transportation tools such as pipelines that allow China to ship oil safely and smoothly. [15]

China's reliance on foreign oil ($OilM_{t-1}$) yields a positively significant estimate. It is in line with the notion that increased dependence on foreign oil pushes China's ODI to acquire more oil in a more stable way than simply purchasing oil from international markets (Downs,

[15] For instance, China started to invest in a 620 mile pipeline from northern Kazakhstan to Xinjiang, China, in 2006 and it is scheduled to complete in 2011. The pipeline eventually leads to the oil field in Iran. And in 2009, China signed an agreement with Myanmar to build a pipeline crossing Myanmar as an alternative transport route for crude oil from the Middle East and Africa that would bypass the potential sea lane choke point of the Strait of Malacca (EIA, 2009).

2000). Although purchasing oil from the international energy markets is still the main channel through which China satisfies its energy thirst, Chinese energy planners appear to have a strong distrust of energy markets (Lieberthal and Herberg, 2006). Many believe that the United States, a major political competitor who controls critical energy transport sea lanes and has enormous power in the global oil industry and institutions, exerts a powerful influence on global oil prices and flows. This concerned many Chinese leaders as to the threats from the US over China's energy weakness and insecurity via international energy markets. Hence, there appears a strong perception among Chinese energy planners and analysts that long-term equity holdings on overseas oil fields will increase China's control over the imported oil (Downs, 2000; Kreft, 2006). Accordingly, the ODI, a long-term investment, became the primary tool that the Chinese government utilizes to quest for stable foreign oil supplies.

Overall, we identify a few determinants of China's ODI in oil producing countries. We do not, however, find a significant effect of energy output on China's ODI – the *Engy* variable is not estimated to be significant. Recall that, in Section 2, China's "going global" policy has signified and pushed China's ODI to quest for oil globally since 2002. To capture the "going global" policy effect, we augment specification (1) by adding a policy dummy variable, *GG* (I(t>=2002) = 1; otherwise 0) and an interaction variable (*GG*Engy(-1)*) to capture the "going global" policy effect and its implication for the energy output of oil producing countries. The regression results of the augmented specification (1) are presented in the "Tobit-All-2" and "Tobit-All-3" columns of Table 1, respectively. The "*GG*" variable in "Tobit-All-2" yields a positive and significant result, confirming that the "going global" policy promotes more ODI to oil nations to secure China's oil supply. Further, as shown in "Tobit-All-3", the estimate of the "*GG*Engy(-1)*" variable indicates that the "going global" policy not only pushes China's ODI to oil producing countries, but also concentrates China's ODI in oil nations more abundant in energy output. Adding the policy dummy variable and the interaction variable does not affect the results of other standard variables, except that the push factor, *OilM(-1)*, becomes insignificant.

3.2.2 Heckman Method

In this subsection, we utilize the Heckman (1979) method to examine the determinants of China's ODI in oil producing countries. Conceivably, the decision making of China's ODI

perhaps is comprised of two discrete, yet ordered steps. In the first step, China assesses the host oil country and decides whether or not to invest. After a positive decision to invest in a host country, in the second step, China decides the amount of ODI to be invested in that country. The Heckman two-stage method offers an empirical framework to sequentially analyze such a decision making process.

In the first stage of the Heckman method, China selects which country to invest its ODI and the selection specification is constructed as

$$D_{it} = \alpha + \beta_1 Engy_{it-1} + \beta_2 MKT_{it-1} + \beta_3 RISK_{it} + \beta_4 XP_{it-1} + \beta_5 OilM_{t-1} + \beta_6 SFDI_{it-1} + \nu_{it} \quad (2)$$

D_{it} = 1 if $ODI_{it} > 0$; zero otherwise. In essence, we assume that the likelihood of China to invest in an oil exporting country is determined by the factors used in the censored regression (1). Given the panel data of our sample, we adopt the Wooldrige (1995) method that tailors the Heckman (1979) procedure for panel data analysis. A panel data Probit regression with random effects[16] is performed on the entire sample.

The second column of Table 2 gives the results. Again, very insignificant variables (*p* value > 20%) are dropped from the regression. Except for *cnfl* and *RGDPpc*, the results are similar to those of the Tobit regression in Section 3.2.1. China's ODI is found to be more likely to go to an oil producing country with larger market size, more exports to China, and more corruption. The level of energy output does not significantly affect the probability that China invests in an oil producing country.

The confliction risk variable, *Cnfl*, is only marginally insignificant at the 10% level with a positive sign. We thus have weak evidence that China's ODI inclines to invest in oil countries with less conflict, including both internal and external conflict.

The estimated coefficient on real GDP per capita (*RGDPpc*) suggests that an oil nation with a lower level of real income is more likely to receive China's ODI. It seems counter-intuitive at a brief glance; however, if one considers *RGDPpc* as a proxy for the level of infrastructure, the result seems reasonable. That is, China's ODI tends to go to an oil nation with poor infrastructure. Indeed, China usually offers "oil-for-infrastructure" deals in order to bid oil

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

deals over IOCs. American and European IOCs, with a century of operating in oil-rich nations, often focus on taking out crude oil and reselling oil products back to those countries and the rest of the world, while failing to build up the infrastructure and therefore raising people's living standard in those oil countries. China, on the other hand, is more willing than Western IOCs to establish an entire chain of an oil industry, including local refinery facilities, petrochemical industries, as well as other infrastructure that is not directly related to oil exploration, such as roads, bridges, and dams, etc. Oil nations are, consequently, willing to offer oil deals to China in exchange for such infrastructure build-ups (Jakobson and Zha, 2006).

The first stage of the Heckman enables us to identify what determines the likelihood of China's ODI; it also allows us to generate an inverse Mills ratio that contains information on the unobserved factors associated with the selection process on zero-censored data. The inverse Mills ratio is then added to the second stage regression of the Heckman method as an explanatory variable to control for the possible effect of unobserved factors that affects China's decision on the amount of ODI to be invested.

The regression equation for the second stage of the Heckman method is specified as the following,

$$ODI_{it} = \alpha + \beta_1 Engy_{it-1} + \beta_2 MKT_{it-1} + \beta_3 RISK_{it} + \beta_4 XP_{it-1} + \beta_5 OilM_{t-1} + \beta_6 SFDI_{it-1} + \beta_7 Mills_{it} + \nu_{it} \quad (3)$$

where ODI_{it} is comprised of only positive ODI observations. Except for the inverse Mills ratio, $Mills_{it}$, all other explanatory variables are the same as in specification (2). A panel data regression with fixed effects is performed to estimate equation (3). The column "Second stage" in "Heckman-All-1" of Table 2 contains the estimation results.

Even though we considered the same set of explanatory variables, the significant determinants in the second stage are not identical to those in the first stage. This suggests that the factors driving the amount of investment are not necessarily the same as those determine the invest-or-not-to-invest decision. The two-stage procedure offers a convenient framework to scrutinize China's investment behavior in oil producing countries.

The inverse Mills ratio, $Mills_{it}$, is estimated to be insignificant, thus we have no statistical evidence that there are unobserved factors in the first stage selecting process that affect China's ODI decision in the second stage. Albeit insignificant, 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 variable (*Engy*) has a positive and significant coefficient. This confirms that a higher energy output draws more China's ODI to an oil producing country. However, our results suggest a sophisticated view of China's ODI strategy in seeking for oil in oil producing nations. If we combine the estimate results in both stages of the Heckman method, we find that an oil country with a large energy production alone does not increase the likelihood that China's ODI invests. However, once selected by China, an oil country with more energy output draws a higher volume of China's ODI.

In addition to the corruption effect, the Heckman method also reveals other aspects of political risks that China's ODI may consider. A selected oil producing country with a stable political system and less social tensions attracts China's ODI, which is in line with the finding of Arezki and Brückner (2009) and Asiedu (2006). Both the negative and significant estimates for "*Crpt*" and "*Law*" suggest that, among the selected oil countries, China invests more ODI to countries loaded with corruption and poor in law and order. Such a result perhaps is not surprising as poor law and order is usually associated with a high level of corruption (Cheung *et al.*, 2010).

To evaluate China's "going global" policy effect, we add the policy dummy variable (*GG*) and both "*GG*" and its interaction term "*GG*Engy(-1)*" to equation (2) and (3). These regression results are reported in "Heckman-All-2" and "Heckman-All-3" in Table 2, respectively. As indicated in the "First stage" of "Heckman-All-2", the "going global" policy does not increase the likelihood of China to invest its ODI in an oil producing country. However, once a positive investment decision is made to invest in an oil country, the "going global" policy directs Chinese enterprises to place a higher amount of its ODI in that country ("Second stage" of "Heckman-All-2"). We find similar results when both the policy dummy and its interaction variable are included in the regressions ("Heckman-All-3").

The significance of the inverse Mills ratio in both regressions suggests the existence of unobserved factors that affect China's ODI behavior in oil nations. It allows us to control the selection bias associated with the approved ODI data.

Augmenting the model by including "*GG*" and its interaction term "*GG*Engy(-1)*" does not change the results of other variables, except for *Engy(-1)*, the significance of which is reduced to be marginally insignificant at the 10% level.

Comparing the results of the Tobit and Heckman regressions, we notice a few differences in the composition of the significant explanatory variables. For instance, the push factor of China's ODI – China's reliance on foreign oil, *OilM*, is a significant factor in the Tobit regression, but not in the Heckman procedure. On the other hand, the real income level, *RGDPpc*, is significant in the Heckman, but not in the Tobit regression. The different results of *OilM* may attribute to the different estimating procedures. The procedure of the Heckman method is to assess the probability that an individual country receives China's ODI in the first stage and then evaluate how much ODI to be invested in the second stage. With respect to each individual host country of China's ODI, the aggregated foreign oil reliance of China might be an unobserved factor that is essentially contained in the inverse Mills ratio. We thus are not able to isolate the detailed pushing effect of *OilM* in the Heckman method.

Arguably, the two-stage Heckman procedure is the finer method than the Tobit method in analyzing China's ODI in oil producing countries. Under the scenario that both China and oil nations prefer "oil-for-infrastructure" deals, it is plausible that *RGDPpc*, a proxy for the infrastructure level, may only increase the probability of China's ODI to get an oil deal; it is however less likely to affect how much of China's ODI is to be placed in that country after the first stage decision. The Tobit method, as a one-stop treatment, may be too coarse to capture such a detailed decision making process.

Three components of political risks, *Polt*, *Sctn*, and *Law*, are significant in the second stage of the Heckman regression in Table 2, whereas they are insignificant in the Tobit regression in Table 1. Such differences perhaps, again, attribute to the finer specification of the Heckman than the Tobit method.

3.2.3 Empirical Results from Individual Country Groups

China has carried out a strategy of diversifying energy sources and markets, which is similar to the energy policy pursued by the United States and Japan decades ago (Downs, 2000). Diversity is deemed to be the foundation of stability in natural resource supply in China (Gu, 1998). As such, an important goal of Chinese investment in oil producing counties is to diversify China's oil import channels[17].

Among numerous oil sources, it is not surprising that the Middle East remains the main source for China's oil import. The Middle East possesses more than 61% of world proved oil reserves and has the lowest production costs. It currently produces 24 million barrels per day and keeps growing, projected to reach 35 million barrels per day by 2020. [18] Much of this growth will be targeted towards Asian markets, from which China takes a lion's share. Further, most of China's refinery facilities are better suited to handle crude oil from the Middle East. In fact, 50% of China's total imported oil in 2008 was from the Middle East.

Despite relying heavily on the Middle East oil, China has been strategically diversifying and reducing its dependence on the Middle East region primarily due to 1) the volatile political situation, especially, the prolonged gulf war; 2) that the oil transportation sea-lanes stretching from the Persian Gulf to the South China Sea are controlled by the US Navy, which theoretically jeopardizes the security of the oil supply (Khan, 2008).

Meanwhile, African oil has gained weight on the equation of China's diversification strategy. Up until 2008, about 30% of China's imported oil was from Africa. This seems to be an interesting move in China's diversification game, since Africa accounts for only about 9% of the world proved oil reserve. However, as noted by the U.S. Department of Energy (DoE), Africa is believed to hold significant undiscovered oil reserves and possesses great upward potential of oil output. Not only China, but also other major oil consumers, such as the U.S. and Europe have paid extraordinary interest to African oil. Moreover, in contrast to other oil nations, African countries are open to foreign investments in oil exploration and production, which is particularly attractive to China's ODI that is on mission to secure long-term oil supply.

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[17] "Kao duoyuanhua baozhang Zhongguo youqi gongying" ("Rely on diversification to guarantee China's oil and gas supply"), *Zhongguo shiyou bao (China Oil News)*, 12 January 2000, p. 1; "Di san zhi yan kan Zhongguo shiyou" ("The third eye looks at China's oil"), *Zhongguo shiyou bao (China Oil News)*, 18 January 2000, p. 2.

[18] OPEC database, 2006.

In addition, China has comparative advantages over others in gaining oil deals in Africa. For example, China takes a "win-win" tactic when interacting with African oil nations. In order to get deals with African oil nations, China usually offers comprehensive packages as an exchange, such as debt cancellations (Cheung *et al.*, 2010) and the "oil-for-infrastructure" package. Such an exchange essentially establishes a China-Africa strategic partnership that matches the comparative advantages of both parties. On one hand, China discovers a new market for its super-charged export industry and expertise in infrastructure building. It also receives the much needed natural resources supply from Africa. On the other hand, Africa also finds a new market for its natural resources and takes advantage of Chinese goods and China's expertise on infrastructure build-up in raising African people's living standard, which Western nations have failed to do for more than a century. Besides, China's embraced investment policy of "no strings attached" or "non-interference in internal affairs" is especially welcomed by many African oil nations, authoritarian African nations, in particular.

Some political risks, for instance, the possible interruption of China's oil transporting sea lanes from the U.S. Navy, have pushed China to seek oil resources other than those from the Middle East and Africa. An obvious solution is the neighboring oil countries, such as Russia and Kazakhstan, where transportation interruption from the U.S. is largely absent (Guo, 2006; He, 2008). In fact, Kazakhstan is China's biggest equity oil producer. It accounted for 33% of China's total oversea equity oil production in 2006 (Downs, 2008). Another solution that China pursues is to go to oil nations that have weak ties or are against the US or Europe; such countries include Venezuela (Tu, 2008).

To investigate whether China's ODI takes different approaches to quest for oil in different regions, we fit regression models, both the Tobit and Heckman models, to the sample of the Middle East, the sample comprised of African oil producing countries, and the sample of the rest of the conventional oil producers, to study the different behaviors of China's ODI in each individual region. The results are presented in Table 3 through Table 8.

The coefficient estimates are supportive of the conjecture that factors determining China's ODI in the Middle East, Africa, and the rest of oil nations are not the same. In the Middle East countries (Table 3 and 4), China's ODI expresses a strong market-seeking motive - both *GDP* and *RGDPpc* are significantly positive. Indeed, China's approach to the Middle East

is not to simply treat it as an oil resource destination, but as an important part of a greater interdependent trade relationship (Lee and Shalmon, 2007). The bilateral trade volume between China and the Middle East increased from $2.4 billion in 1991 to $142 billion in 2008.

Supplying about 50% of China's foreign oil need, the Middle East oil exporters serve as the major oil imports suppliers to satisfy China's fast-growing foreign oil appetite. China's ODI is one of the primary tools that China can utilize to sustain the oil supply from the Middle East. The estimated positive effect of *XP* and *OilM* on China's ODI in Middle East countries lends support to such a conjecture. China's ODI flows to the Middle East to facilitate the increasing exports volume from the Middle East countries (*XP*) and the growing foreign oil need (*OilM*) pushes China's ODI to invest more in the Middle East countries. Further, as suggested from the result in the "Second stage" column of "Heckman-Mdest-2" in Table 4, China's "going global" policy directs more of China's ODI to the selected Middle East countries to maintain the important position of the Middle East as China's major oil suppliers.

While the Middle East remains China's major oil suppliers, China has strategically reduced its over-reliance on that region to trim down the risk of possible oil supply interruption due to the traditional political instability in the Middle East. Indeed, China's oil import share from the Middle East has reduced from 61% in 1998 to 50% in 2008. [19]

Furthermore, China's ODI might diversify across the Middle East oil countries. All the estimated coefficients of the *Engy* variable in the Tobit regression (Table 3) and five out of six from the Heckman regression (Table 4) are negative, though most are insignificant. It suggests, albeit the evidence is rather weak, that China's ODI does not concentrate in a few Middle East oil producers with high energy output. Further, China's "going global" policy does not seem to promote the ODI to concentrate in the Middle East oil producers with higher energy output either. As shown in columns of "Tobit-Mdest-2" and "Tobit-Mdest-3" in Table 3, both *GG* and "*GG*Engy(-1)*" are negative, although insignificant. A similar result is also obtained in the "Heckman-Mdest-3" in Table 4.

All these results point out that China's ODI has been diversifying across the Middle East oil countries and reducing its over-reliance on a few major oil exporters. More interestingly, the diversification move is not a recent event. In the "Second stage" of "Heckman-Mdest-3" in Table

[19] See Lewis (2002) and EIA (2009).

4, we find statistically significant evidence that China's ODI had been reducing its involvement in the Middle East oil producers with high energy output before the launch of "going global" policy in 2002.

The estimated results of *Polt* and *Law* in Table 3 indicate that, in questing for oil in the Middle East, China place more of its ODI in the Gulf states where the political system is unstable and poor in law and order.

As shown in Tables 5 and 6, the regression results for the African country samples are quite different from those of the Middle East samples. The significant estimate for *RGDPpc* (Table 6) suggests that the "oil-for-infrastructure" has drawn China's ODI to Africa, where the infrastructure level is rather poor. *SFDI(-1)*, the proxy for the degree of competition that China's ODI could face, garners a negative and significant coefficient, indicating that an African oil country that had many other FDIs deters China's ODI. This again attests to China's investment strategy – avoiding direct competition against Western FDIs and investing in countries that lack influence of other FDIs. Indeed, the estimate of *Crpt* echoes such a strategy – China's ODI goes to more corruption loaded African oil countries where fewer Western FDIs are present.

Although China's ODI invests in corrupted African oil countries, it does seem to prefer a country with better economic conditions for business. Both estimates for *OilM* and *Engy* are in accordance with the anecdotal evidence that China has moved up the priority to rely more on the African oil. The "going global" policy strengthens such a strategic move (Table 6).

With regard to the sample of conventional oil producers other than the Middle East and Africa (we label these oil countries "Others"), we would like to point out three prominent results that are different from those of either the Middle East or Africa. First, rather than avoid competition, China's ODI actively competes against other FDIs for oil in "Others", e.g. Russia, Kazakhstan, Ecuador, etc.

Second, the "going global" policy seems to change the course of China's ODI in questing for oil in "Others". As shown in the "Tobit-Others-3" in Table 7, the variable "*Engy(-1)*" gets a coefficient of -0.15 and the interaction term "*GG*Engy(-1)*" has a coefficient with a value of 0.21; both are significant. That is, prior to the implementation of "going global" policy, China's ODI goes away from "Others" with high oil output; however, the "going global" policy has changed such a pattern and significantly pushed China's ODI to quest for oil in high-oil-output

"Others". In other words, the "going global" policy directs $0.21 more ODI per capita if an oil nation in "Others" increases its energy output by 1%. This result is confirmed by the Heckman method ("Heckman-Others-3" in Table 8).

Third, interestingly, the values of the coefficients on *XP* are more than 10 times as large as the ones estimated with the Middle East samples. The possible interpretation is that, concerning the transportation security associated with the imported oil from the Middle East, China has made extraordinary efforts[20] to secure oil import from the "Others", in order to diversify the risk of possible oil supply interruption and the consequent energy insecurity.

In sum, splitting the country samples allows us to identify some similar patterns of China's ODI across different regions, e.g. a market-seeking motive in all three regions. More importantly, it helps us to discover some unique behaviors of China's ODI that serve to diversify the risk of oil supply interruption and hence, provide a better energy security for China's sustainable economic growth.

3.4 Results Based on the ODI Data in IMF-OECD Standard

In this subsection, we report the empirical results based on China's ODI data in IMF-OECD format. The data set covers 29 oil producing countries from 2003 to 2007. Despite the relatively short time dimension, the dataset covers the period in which China experienced a strong growth in its overseas investment activity (Cheung and Qian, 2009) and a drastic increase in its appetite for oil (Figure 1). These data could therefore offer us a close scrutiny of the link between China's overseas investment and its quest for foreign oil during this growth period.

Similar to the approved data, there are zero-value observations (about 15% of total observations) in this new ODI data set. To be consistent, we should perform both Tobit and Heckman two-stage regressions in this section. However, due to the limited number of observations in this new data set, the Heckman method, especially the second stage regression, may suffer from insufficient degrees of freedom. For instance, there are only 26 observations in the Middle East sample (Table 9). We therefore drop the Heckman (1979) method and only report results from the Tobit regression. The results of the random effects panel data Tobit

[20] Most efforts that have been seen are multi-billion dollar investments in pipeline enabling China to directly ship oil and gas across the Chinese border, for example, the pipeline from Kazakhstan to Xinjiang in western China.

regression for the sample of all countries, the Middle East, Africa, and "Others" are reported in the "Tobit-All", "Tobit-Mdest", "Tobit-Afr", and "Tobit-Others" columns of Table 9, respectively.

Overall, the results are consistent with the findings based on the approved ODI data. For instance, we find a strong presence of the market-seeking motive of China's ODI in oil producing countries. A higher level of exports from oil nations to China requires a higher level of China's ODI. In addition a greater reliance on imported foreign oil pushes more of China's ODI to oil countries. Finally, China's ODI goes to those countries with relatively abundant in energy output and to more corrupted oil countries.

The results for different country samples are largely in line with those in the previous section, with a few exceptions. For example, in "Tobit-Mdest", the estimate of *SFDI(-1)* indicates that China flexed its ODI muscle in the Middle East countries to compete with other FDIs during 2003 - 2007 time period; we did not find such a competitive spirit of China's ODI in the previous section. The plausible interpretation could be: 1) the Middle East region is in the dominating position in the world energy supply market. Walking away from the Middle East would only worsen China oil security position. It is therefore realistic to compete against other FDIs in order to get a share of the Middle East oil pie; 2) although perceived as a small competitor and a late comer, China has two advantages over others in getting the Middle East oil: it offers a paucity of political packages to the negotiation table that the Middle East countries are unable to get from Western countries and it has an enormous market for Middle East goods and services (Lee and Shalmon, 2007).

The significant estimates for three political risk components, *Econ*, *Cnfl*, and *Law*, reveal the complicated behavior of China's ODI in the Middle East. While evidence that China's ODI prefers a country with less conflict is in line with the conventional wisdom, the fact that better economic conditions deter China's ODI is intriguing. It might be related to China's routine strategy - going to "rogue" oil states where there is less competition and it is relatively easy to set foot. Those "rogue" states usually have relatively bad economic conditions for the FDI business. The negatively significant estimate for *Law* lends credit to such an interpretation.

Interestingly, the *SFDI(-1)* in the "Others" sample has an opposite sign from its counterpart estimations in Tables 7 and 8. Did China shift the strategy of investment in "Others"

during 2003 – 2007? We may need data over a longer time period to answer this question. At this moment, one plausible explanation may again point to China's involvement with "rogue" state, such as Venezuela, where other FDIs, particularly those from the US, retreated substantially after Mr. Chavez took power in 1998.[21]

Comparing the results from the three individual samples, we also notice a few common determinants of China's ODI. For example, China's ODI seeks markets; more of China's ODI goes to facilitate the higher exports to China from oil countries; and of course, an abundance of energy output in an oil producing country significantly attracts China's ODI to quest for energy there.

In sum, China's ODI keeps some of its routine behaviors in oil producers after 2003; e.g. market seeking, favoring energy abundance, and preferring more corruption. It has, however, developed a few new features in investing in different regions. For instance, facing rough reality, China's ODI leverages its own advantages to compete actively in the Middle East against other FDIs; in contrast, it still plays as a weak competitor to avoid the brutal competition in other regions.

4. Concluding Remarks

In this paper, we examine the empirical determinants of China's ODI in conventional oil producing countries. These determinants include the canonical economic factors and some China specific factors, e.g. the push factor and Chinese government policy that affect China's ODI in oil countries. Both China's officially approved ODI data and the ODI data reported following the OECD-IMF standard are used in our empirical exercise.

Some common economic factors are found to be significant determinants of China's ODI in oil producing countries. For example, China's ODI tends to go to oil countries with a large market size and more exports to China. In line with the natural resource-seeking strategy, China's ODI responses positively to the energy output of a host oil country. Heavily relying on foreign oil has pushed China's ODI to secure the oil supply that underpins China's long-term economic growth. Apparently, China does not make the "invest or not-to-invest" decision based

[21] According to UNCTAD FDI statistics, the FDI inflow to Venezuela continuously declined from about 5 billion in 1998 to about -0.6 billion dollars in 2006.

on a country's energy output. Once a positive investment decision is made, however, China tends to invest more in oil countries with a higher energy output.

China's ODI is generally averse to political risks – a result that is in accordance with theory and intuition. In terms of the level of corruption in a host country, our findings indicate that corruption in oil producing countries tends to draw in China's ODI.

Although the Chinese economy has been transitioning gradually from a centrally planned economy to one that is market driven since the adoption of the open door policy in 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 overseas to support the economic development at home, China's "going global" policy induces a higher volume of ODI to oil countries and a higher concentration in countries with higher oil production.

Subject to the different investment strategies that China implemented, the behavior of China's ODI in the Middle East, Africa, and other oil producing countries is different. While diversifying globally to reduce the risk of oil supply interruption, China's ODI has put more weight in Africa and other oil nations, and has been diversifying away from and across the Middle East region; nevertheless, the Middle East remains China's main source of imported oil.

We note that there are a few issues related to the ODI data. For instance, the 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 robust.

China has been diversifying its ODI activities globally. The options for China's ODI are rather limited, however, due to the highly competitive nature of the global energy market. As a late comer, China's ODI has to confront much stronger FDIs in traditional oil producing countries, such as in the Middle East. This obviously puts China in a disadvantaged position.

Consequently, China has to consider other options for its ODI. One option is connecting to the "rogue" states that Western FDIs deliberately avoid due to the political risk. Other options include going to some non-traditional oil producing countries that produce limited energy that, for IOCs, is not commercially viable. Such non-traditional oil producers include Equatorial Guinea and Cameroon, etc.

To better understand China's ODI in questing for oil, we need access to better information about the "rogue" states and include more data samples of non-traditional oil producers. Therefore, while our analyses offer some insights into the factors affecting China's investment decisions, further research is warranted to broaden our understanding of the related economic and political interactions between China and the oil producing nations.

Appendix A: Data – Definition and 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* and *China Commerce Yearbook*, 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]
OilM	China's imports of crude oil (thousand barrels per day) divided by China's total consumption (thousand barrels per day). [Source: Energy Information Administration (EIA)]
XP	The share of exports of an oil producing country to China to the total exports of that country [Source: IMF, DOT]
SFDI	The total FDI stock in a host country except China's ODI (log value). [source: UNCTAD FDI Statistics]
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]
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.

Appendix B: the list of conventional Oil Producing Countries

African Oil Producers:

Algeria, Angola, Congo Republic, Egypt, Gabon, Libya, Nigeria, Sudan.

Middle East Oil Producers:

Bahrain, Iran, Iraq, Kuwait, Oman, Qatar, Saudi Arabia, Syria, United Arab Emirates, Yemen.

Other Oil Producers:

Azerbaijan, Brunei, Colombia, Ecuador, Indonesia, Kazakhstan, Mexico, Norway, Russia, Trinidad and Tobago, Venezuela.

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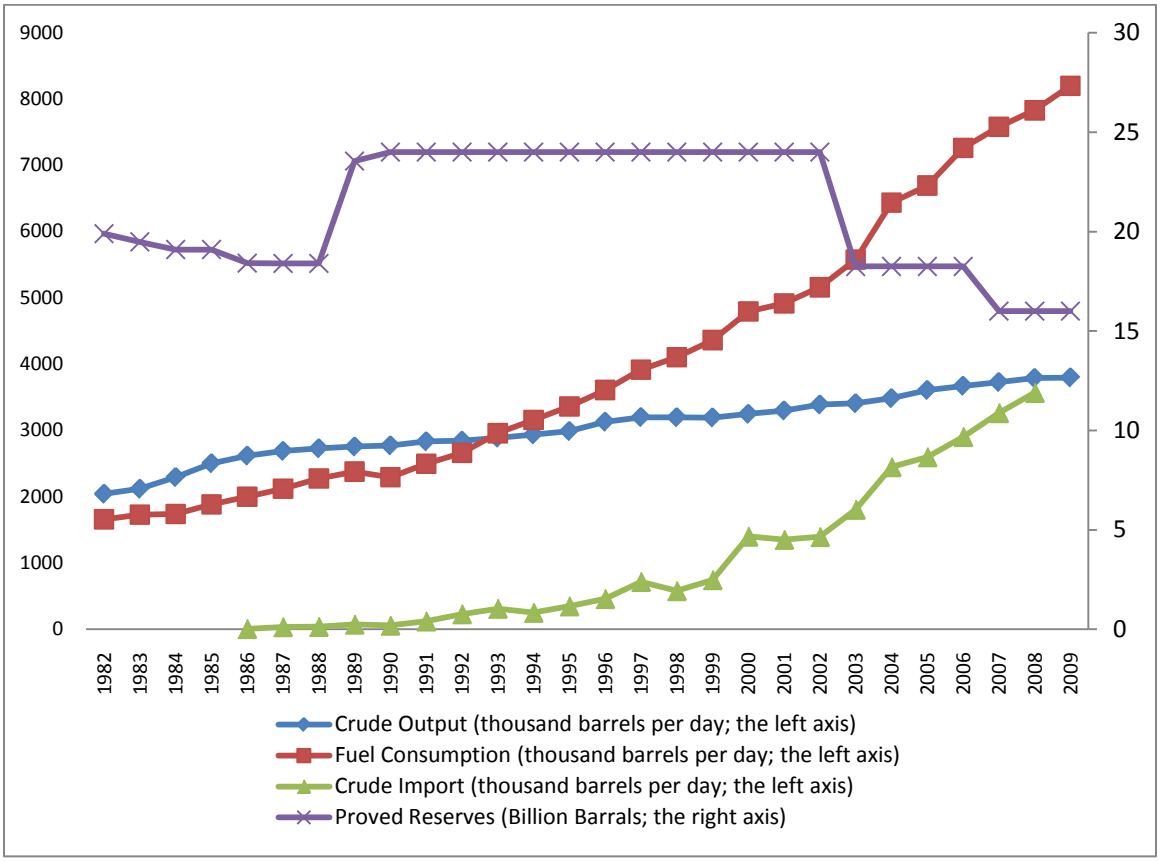
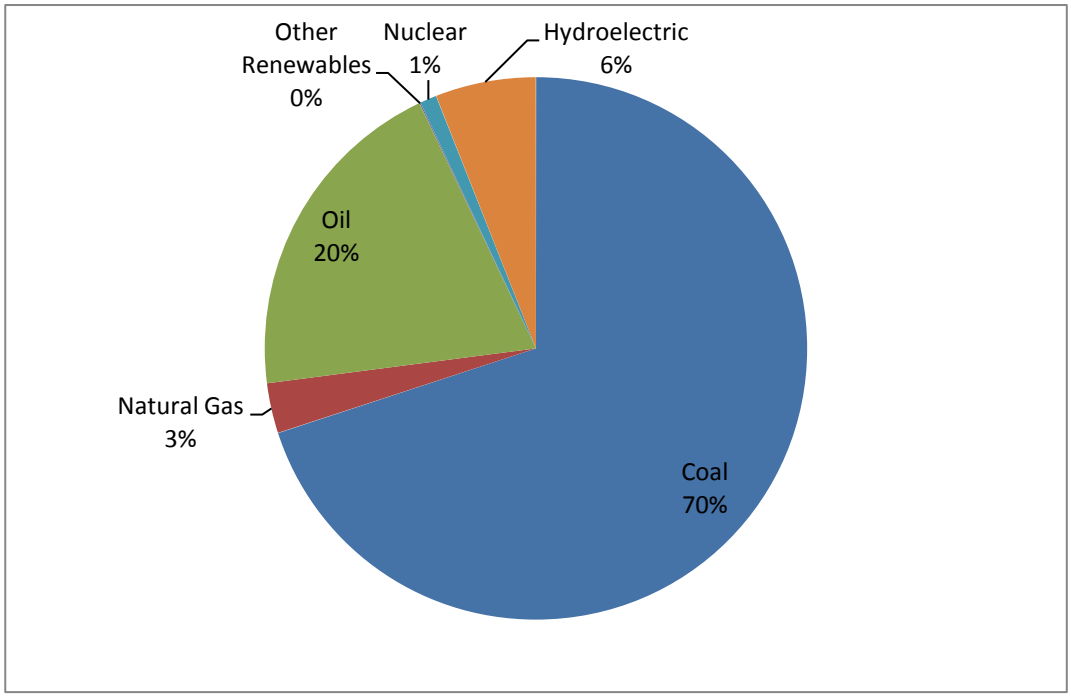
Figure 1: China's Oil Output, Consumption, and Imports



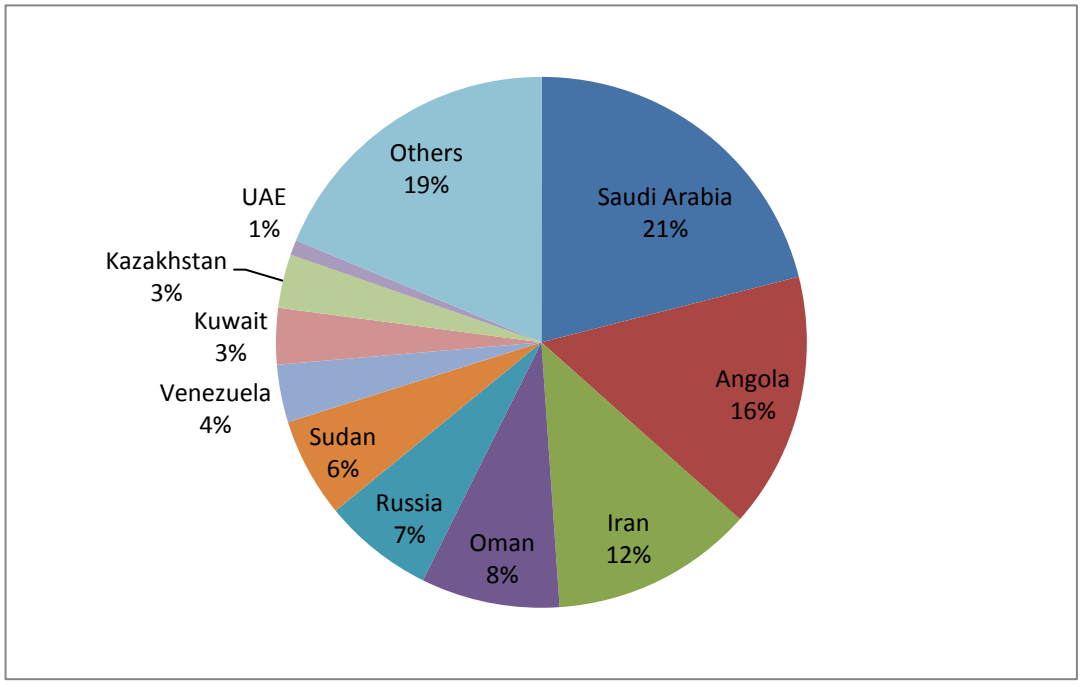
Source: Energy Information Administration (EIA).

Figure 2: Total Energy Consumption in China, By Type (2006)



Source: International Energy Annual (2006), Energy Information Administration (EIA).

Figure 3: China's Crude Oil Imports, By Source (2008)



Source: International Energy (2009), Energy Information Administration (EIA).

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

	Tobit-All-1	Tobit-All-2	Tobit-All-3
GDP(-1)	1.516***	1.542***	1.660***
	(0.43)	(0.41)	(0.44)
XP(-1)	6.056***	5.983***	5.043***
	(1.79)	(1.78)	(1.80)
OilM(-1)	0.931*		
	(0.55)		
Engy(-1)	0.039	0.042	0.026
	(0.04)	(0.04)	(0.04)
Crpt	-1.108***	-1.125***	-1.050***
	(0.33)	(0.31)	(0.31)
GG		1.203**	-1.204
		(0.59)	(1.08)
GG*Engy(-1)			0.121***
			(0.05)
Constant	-30.571***	-33.336***	-36.048***
	(11.07)	(10.32)	(10.93)
Adj. Pseudo R-squares	0.11	0.12	0.12
Obs.	345	345	345

Note: The table reports the result of random effect Tobit panel regression in Equation (1). All insignificant (> 20% in p-value) variables are dropped, except for variables associated with interaction terms. The column "Tobit-All-1" reports the results of regression in Equation (1); The column of "Tobit-All-2" gives the results of regression with "*GG*" dummy; "Tobit-All-3" column presents the results with both "*GG*" 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^2 is the adjusted McFadden's.

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

	Heckman-All-1		Heckman-All-2		Heckman-All-3	
	First stage	Second stage	First stage	Second stage	First stage	Second stage
GDP(-1)	0.822***		0.792***		0.822***	
	(0.16)		(0.16)		(0.17)	
RGDPpc(-1)	-0.345**		-0.389**		-0.396**	
	(0.16)		(0.16)		(0.17)	
XP(-1)	5.434***		5.168***		4.964***	
	(1.69)		(1.70)		(1.71)	
Engy(-1)	0.012	0.037*	0.010	0.024	0.007	0.028
	(0.01)	(0.02)	(0.01)	(0.02)	(0.01)	(0.02)
Cnfl	0.150		0.141		0.121	
	(0.09)		(0.09)		(0.10)	
Polt		0.488***		0.453***		0.463***
		(0.13)		(0.12)		(0.11)
Sctn		0.545***		0.614***		0.566***
		(0.14)		(0.20)		(0.16)
Crpt	-0.455***	-0.766***	-0.392***	-0.693***	-0.372***	-0.636**
	(0.11)	(0.25)	(0.12)	(0.25)	(0.13)	(0.23)
Law		-1.086***		-1.012**		-0.998**
		(0.33)		(0.39)		(0.36)
GG			0.324	1.378**	-0.189	0.085
			(0.25)	(0.52)	(0.49)	(0.50)
GG*Engy(-1)					0.030	0.074***
					(0.04)	(0.03)
Mills		0.675		1.791**		1.853**
		(0.68)		(0.86)		(0.84)
Constant	-17.243***	0.875	-16.397***	-0.668	-16.961***	-0.925
	(3.75)	(1.83)	(3.80)	(1.87)	(3.97)	(1.87)
Adj.R-squares†	0.37	0.26	0.37	0.31	0.37	0.32
BJL test	0.94		1.19		1.28	
Obs.	334	150	334	150	334	150

Note: The table reports the result of estimation in Equation (1) and Equation (2) using Heckman (1979) two-stage method. All insignificant (> 20% in p-value) variables are dropped, except for variables associated with interaction terms. The columns of "Heckman-All-1" report the results of regressions in Equation (1) and (2); The columns of "Heckman-All-2" give the results of regression controlling "going global" policy with "*GG*" dummy; "Heckman-All-3" 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. The coefficient of interaction variable "*GG*Engy(-1)*" in column "Heckman-All-3" is reported as the marginal effect of "*GG*Engy(-1)*" (Ai and Norton, 2003).

† the numbers in the column "First stage" report the adjusted MacFadden's Psudo R-Squares; the numbers in the 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.

Table 3: The empirical determinants of China's Outward Direct Investment in Middle East oil producing countries – Tobit (1958) with the Approved ODI Data (1991-2005)

	Tobit-Mdest-1	Tobit-Mdest-2	Tobit-Mdest-3
GDP(-1)	3.056***	3.064***	3.027***
	(0.86)	(0.88)	(0.86)
RGDPpc(-1)	1.587**	1.586**	1.642**
	(0.77)	(0.77)	(0.77)
XP(-1)	13.358*	13.414*	13.605*
	(8.01)	(8.09)	(8.14)
OilM(-1)	2.126	2.172	2.178
	(1.38)	(1.67)	(1.67)
Engy(-1)	-0.140	-0.139	-0.113
	(0.15)	(0.15)	(0.16)
Polt	-1.038*	-1.039*	-1.062*
	(0.60)	(0.60)	(0.60)
Law	-4.280***	-4.280***	-4.325***
	(1.33)	(1.33)	(1.34)
GG		-0.089	2.101
		(1.83)	(6.05)
GG*Engy(-1)			-0.098
			(0.26)
Constant	-53.910**	-53.944**	-53.937**
	(21.54)	(21.63)	(21.04)
Adj.Pseudo R-squares	0.09	0.09	0.09
Obs.	106	106	106

Note: The table reports the result of random effect Tobit panel regression in Equation (1). All insignificant (> 20% in p-value) variables are dropped, except for variables associated with interaction terms. The column "Tobit-Mdest-1" reports the results of regression in Equation (1); The column of "Tobit-Mdest-2" gives the results of regression with "*GG*" dummy; "Tobit- Mdest -3" 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^2 is the adjusted McFadden's.

Table 4: The empirical determinants of China's Outward Direct Investment in the Middle East oil producing countries – Heckman (1979) with the Approved ODI Data (1991-2005)

	Heckman-Mdest-1		Heckman-Mdest-2		Heckman-Mdest-3	
	First stage	Second stage	First Stage	Second stage	First Stage	Second stage
GDP(-1)	1.112***	4.765**	0.969***		0.917***	1.217
	(0.33)	(1.44)	(0.31)		(0.30)	(0.88)
XP(-1)	4.644*	8.809	3.878		3.927	
	(2.45)	(4.89)	(2.42)		(2.53)	
OilM(-1)				0.731***	0.355	0.836*
				(0.15)	(0.43)	(0.42)
Engy(-1)	0.004	-0.007	-0.015	-0.017	-0.018	-0.037*
	(0.03)	(0.03)	(0.04)	(0.02)	(0.04)	(0.02)
Crpt		0.890***		0.846***		0.934**
		(0.14)		(0.22)		(0.27)
Law	-0.625**	-2.934**	-0.542**	-1.740***	-0.669**	-1.773***
	(0.28)	(0.81)	(0.26)	(0.18)	(0.28)	(0.24)
GG			0.289	1.633**	1.558	2.224
			(0.43)	(0.64)	(1.74)	(1.34)
GG*Engy(-1)					-0.016	-0.034
					(0.02)	(0.05)
Mills		5.326*		2.715***		2.917***
		(2.18)		(0.62)		(0.68)
Constant	-25.131***	-109.454**	-21.002***	6.818***	-20.023***	-22.901
	(7.86)	(34.59)	(7.27)	(1.78)	(7.49)	(22.19)
Adj.R-squares	0.11	0.21	0.14	0.21	0.19	0.22
BJL test	1.51		1.32		1.15	
Obs.	117	35	117	35	106	34

Note: The table reports the result of estimation in Equation (1) and Equation (2) using Heckman (1979) two-stage method. All insignificant (> 20% in p-value) variables are dropped, except for variables associated with interaction terms. The columns of "Heckman-Mdest-1" report the results of regressions in Equation (1) and (2); The columns of "Heckman-Mdest-2" give the results of regression controlling "going global" policy with "*GG*" dummy; "Heckman-Mdest-3" presents the results with both "*GG*" 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. The coefficient of interaction variable "*GG*Engy(-1)*" in column "Heckman-Mdest-3" is reported as the marginal effect of "*GG*Engy(-1)*" (Ai and Norton, 2003).

† the numbers in the column "First stage" report the adjusted MacFadden's Psudo R-Squares; the numbers in the 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.

Table 5: The empirical determinants of China's Outward Direct Investment in African oil producing countries – Tobit (1958) with the Approved ODI Data (1991-2005)

	Tobit-Africa-1	Tobit-Africa-2	Tobit-Africa-3
SFDI(-1)		-0.740*	-0.727*
		(0.44)	(0.44)
OilM(-1)	3.691***	2.258**	2.336**
	(1.04)	(1.13)	(1.14)
Engy(-1)	0.078	0.096**	0.103**
	(0.05)	(0.05)	(0.05)
Econ	1.282***	1.272***	1.191***
	(0.40)	(0.38)	(0.39)
Crpt	-1.140	-1.143*	-1.063
	(0.73)	(0.71)	(0.71)
GG		2.325**	1.325
		(1.00)	(1.47)
GG*Engy(-1)			0.045
			(0.05)
Constant	5.347	2.706	2.556
	(3.67)	(3.72)	(3.78)
Adj. Pseudo R-squares	0.11	0.12	0.12
Obs.	95	95	95

Note: The table reports the result of random effect Tobit panel regression in Equation (1). All insignificant (> 20% in p-value) variables are dropped, except for variables associated with interaction terms. The column "Tobit-Africa-1" reports the results of regression in Equation (1); The column of "Tobit-Africa-2" gives the results of regression with "going global" dummy; "Tobit-Africa-3" column presents the results with both "*GG*" 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^2 is the adjusted McFadden's.

Table 6: The empirical determinants of China's Outward Direct Investment in African oil producing countries – Heckman (1979) with the Approved ODI Data (1991-2005)

	Heckmam-Africa-1		Heckman-Africa-2		Heckman-All-3	
	first stage	second stage	first stage	second stage	first stage	second stage
RGDPpc(-1)	-0.722***		-0.867 **		-0.819*	
	(0.24)		(0.41)		(0.48)	
Engy(-1)	-0.003	0.078***	0.002	0.124***	0.003	0.138***
	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)
Econ	0.539***		0.594**	1.801***	0.606**	2.000***
	(0.19)		(0.26)	(0.33)	(0.25)	(0.31)
Cnfl	0.219*					
	(0.12)					
Sctn		0.455**				
		(0.16)				
Crpt	-0.811***	-1.281***	-0.568**	-2.707***	-0.626**	-3.076***
	(0.18)	(0.28)	(0.26)	(0.44)	(0.28)	(0.47)
Law		-1.301**				
		(0.52)				
SFDI(-1)				-0.527***		-0.460**
				(0.12)		(0.14)
GG			1.341*	3.735***	2.237	3.323***
			(0.75)	(0.57)	(1.40)	(0.37)
GG*Engy(-1)					-0.007	0.053**
					(0.01)	(0.02)
Mills		-1.018*		4.283***		5.406***
		(0.43)		(0.74)		(0.84)
Constant	3.455***	8.313***	4.242*	-0.576	3.996*	-1.943**
	(1.24)	(1.28)	(2.23)	(0.79)	(2.11)	(0.77)
Adj.R-squares	0.33	0.38	0.37	0.40	0.39	0.51
BJL test	0.07		1.58		1.58	
Obs.	101	55	95	51	95	51

Note: The table reports the result of estimation in Equation (1) and Equation (2) using Heckman (1979) two-stage method. All insignificant (> 20% in p-value) variables are dropped, except for variables associated with interaction terms. The columns of "Heckman-Africa-1" report the results of regressions in Equation (1) and (2); The columns of "Heckman-Africa-2" give the results of regression controlling "going global" policy with "*GG*" dummy; "Heckman-Africa-3" presents the results with both "*GG*" 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. The coefficient of interaction variable "*GG*Engy(-1)*" in column "Heckman- Africa -3" is reported as the marginal effect of "*GG*Engy(-1)*" (Ai and Norton, 2003).

† the numbers in the column "First stage" report the adjusted MacFadden's Psudo R-Squares; the numbers in the 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.

Table 7: The empirical determinants of China's Outward Direct Investment in other oil producing countries – Tobit (1958) with the Approved ODI Data (1991-2005)

	Tobit-Others-1	Tobit-Others-2	Tobit-Others-3
GDP(-1)	0.984***	1.024***	1.075**
	(0.36)	(0.36)	(0.46)
SFDI(-1)	0.594*	0.721*	0.607
	(0.33)	(0.39)	(0.43)
XP(-1)	64.439***	66.490***	56.023***
	(12.03)	(12.58)	(15.99)
Engy(-1)	-0.072	-0.071	-0.150*
	(0.07)	(0.07)	(0.09)
Sctn	0.733***	0.687***	
	(0.26)	(0.26)	
Crpt	-1.566***	-1.618***	-1.473***
	(0.33)	(0.34)	(0.37)
GG		-0.641	-4.294**
		(1.07)	(1.76)
GG*Engy(-1)			0.212**
			(0.09)
Constant	-28.421***	-29.426***	-23.201*
	(10.39)	(10.46)	(12.58)
Adj.Pseudo R-squares	0.24	0.24	0.23
Obs.	114	114	114

Note: The table reports the result of random effect Tobit panel regression in Equation (1). All insignificant (> 20% in p-value) variables are dropped, except for variables associated with interaction terms. The column "Tobit-Others-1" reports the results of regression in Equation (1); The column of "Tobit-Others-2" gives the results of regression with "*GG*" dummy; "Tobit-Others-3" 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^2 is the adjusted McFadden's.

Table 8: The empirical determinants of China's Outward Direct Investment in other oil producing countries – Heckman (1979) with the Approved ODI Data (1991-2005)

	Heckman-Others-1		Heckman-Others-2		Heckman-Others-3	
	First stage	Second stage	First stage	Second stage	First stage	Second stage
GDP(-1)	1.010***		0.981***		1.139***	
	(0.29)		(0.28)		(0.33)	
XP(-1)	41.348***	37.407**	41.118***	13.110***	39.798***	
	(15.08)	(11.41)	(15.11)	(2.96)	(14.06)	
SFDI(-1)		0.675**				
		(0.29)				
Engy(-1)	0.045	-0.053	0.042	-0.041	0.034	-0.104
	(0.04)	(0.07)	(0.04)	(0.06)	(0.04)	(0.07)
Polt		0.768**		0.987**		0.708*
		(0.30)		(0.39)		(0.32)
Sctn		0.871**		0.932**		0.165
		(0.34)		(0.34)		(0.16)
Crpt	-0.394***	-0.777***	-0.432***	-0.957***	-0.398**	-0.998***
	(0.15)	(0.19)	(0.15)	(0.19)	(0.16)	(0.17)
Law		-1.417*		-1.378		
		(0.60)		(0.84)		
GG			-0.392	1.504***	-1.052	-1.864**
			(0.51)	(0.32)	(0.74)	(0.61)
GG*Engy(-1)					0.009	0.206***
					(0.01)	(0.06)
Mills		0.625		0.511		0.715
		(1.55)		(2.54)		(1.76)
Constant	-22.339***	-10.372*	-21.940***	-8.497*	-25.272***	-1.392
	(6.86)	(5.25)	(6.63)	(4.48)	(7.83)	(4.29)
Adj.R-squares	0.17	0.49	0.20	0.50	0.24	0.47
JBL test	1.94		2.77		1.42	
Obs.	114	48	114	48	114	48

Note: The table reports the result of estimation in Equation (1) and Equation (2) using Heckman (1979) two-stage method. All insignificant (> 20% in p-value) variables are dropped, except for variables associated with interaction terms. The columns of "Heckman-Others-1" report the results of regressions in Equation (1) and (2); The columns of "Heckman-Others-2" give the results of regression controlling "going global" policy with "*GG*"; "Heckman-Others-3" presents the results with both "*GG*" 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. The coefficient of interaction variable "*GG*Engy(-1)*" in column "Heckman- Others -3" is reported as the marginal effect of "*GG*Engy(-1)*" (Ai and Norton, 2003).

† the numbers in the column "First stage" report the adjusted MacFadden's Psudo R-Squares; the numbers in the 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.

Table 9: The empirical determinants of China's Outward Direct Investment in oil producing countries – Tobit (1958) with the OECD-IMF format ODI data (2003 – 2007)

	Tobit-All	Tobit-Mdest	Tobit-Afr	Tobit-Others
GDP(-1)	1.263***	1.409***	1.476***	1.415***
	(0.31)	(0.45)	(0.57)	(0.46)
RGDPG(-1)		0.600***		
		(0.21)		
SFDI(-1)		1.679***		-0.968**
		(0.49)		(0.45)
XP(-1)	2.951**	10.330	1.942**	36.739***
	(1.40)	(6.51)	(0.92)	(12.89)
OilM(-1)	8.018**	10.231*		
	(3.31)	(5.53)		
Engy(-1)	0.049*	0.204*	0.061**	0.115*
	(0.03)	(0.12)	(0.03)	(0.06)
Econ	0.355	-1.370**		
	(0.26)	(0.55)		
Cnfl	0.520	2.491**		
	(0.40)	(1.06)		
Sctn				0.718**
				(0.29)
Crpt	-1.073***		-1.801**	
	(0.38)		(0.84)	
Law		-1.893**		
		(0.76)		
Constant	-19.593*	-44.873***	-28.596**	-34.539***
	(10.61)	(14.31)	(13.76)	(12.43)
Pseudo Adj.R-squares	0.12	0.29	0.07	0.15
Obs.	94	26	31	37

Note: The table reports the result of random effect Tobit panel regression in Equation (1). All insignificant (> 20% in p-value) variables are dropped. The column "Tobit-All" reports the results of regression with all country samples; the column of "Tobit-Afr" gives the results of regression with African countries sample; "Tobit-Mdest" column presents the results with the Middle East oil producing countries sample; and the column "Tobit-Others" reports the results of regression with all other oil producing countries sample. Robust standard errors are in the parentheses. "***", "**" and "*" denote significance at the 1%, 5% and 10% levels, respectively. Adj. Pseudo R^2 is the adjusted McFadden's.