

China's Outward Direct Investment and Its Oil Quest

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What we do in the paper

- ▶ Investigating the empirical determinants of China's ODI in oil producing countries and shedding some insights on the possible implication.
- ▶ Using two sets of China's ODI data: the approved ODI data (1991- 2005) and the new ODI data in OECD-IMF standard (2003 – 2007).
- ▶ Using two econometric methods: Tobit (1958) and Heckman (1979) two-stage method.

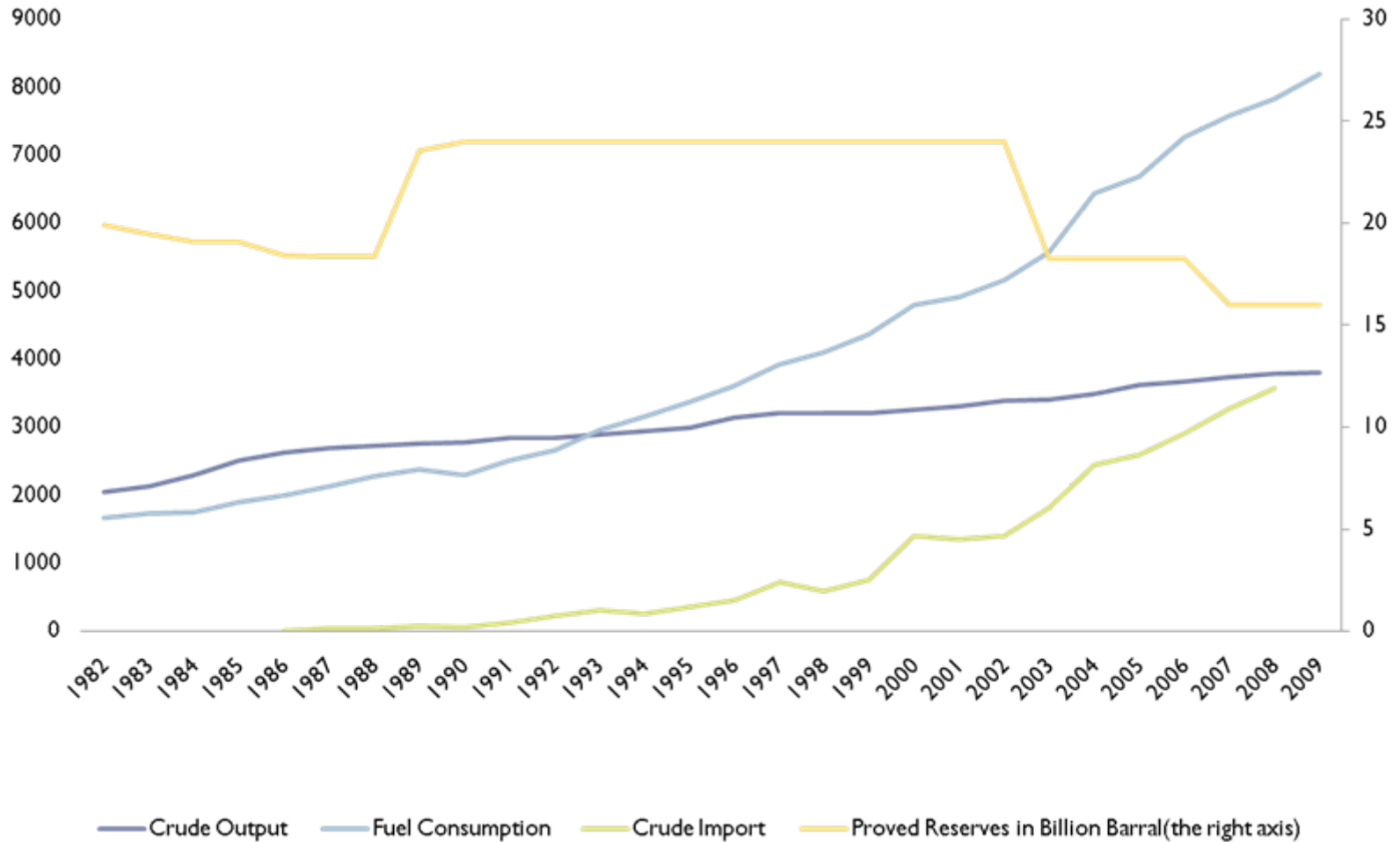
Preview the findings

- ▶ Seeking market in oil producing countries;
- ▶ Concerning political risks;
 - ▶ Corruption attracts Chinese ODI
- ▶ Heavy reliance on foreign oil pushes China to seeking more oil resources, especially under the directive of “going global” policy;
 - ▶ China’s ODI targets energy resource by implementing two steps:
 - ▶ First, “invest and not-to-invest”; at this stage, a country’s energy output does not affect the probability of receiving China’s ODI;
 - ▶ Second ,the volume of its ODI in the selected countries – it invests more in selected oil producing African countries with more energy outputs.
- ▶ While diversifying its oil quest globally, China implements different investment strategy in different region, e.g. the Middle East, Africa, and other conventional oil countries.

Motivation

- ▶ China has experienced a miracle economic growth over last three decades, about 9% annually;
- ▶ Many Issues accompany such a economic miracle;
- ▶ the drastic economic growth demands for the soaring oil; while its limited domestic oil output failed to meet the demand;
- ▶ Resulting in China's heavy reliance on foreign oil. It imports 45% of total oil consumption; No. 3 oil importer in the world.

China's Oil Situation





China's responding policy

- ▶ Launching “All out” program
 - ▶ Maintaining domestic oil output; Developing exploration in South China sea, East China sea, and Western part of China.
 - ▶ Implementing “going global” policy to promote Chinese investment (ODI from Chinese national oil companies in particular) in overseas: to secure more foreign oil equities and diversify oil import sources.
- ▶ The global implication of China's responding policy and its controversy
 - ▶ China's huge oil appetite contributed the oil price hike in 2005;
 - ▶ It's involvement with “rogue” oil state, e.g. Sudan is unfair to others;
 - ▶ China's direct control of some oil productions reduces the stability of global energy market.

China's ODI data

- ▶ There are very few of empirical studies in China's ODI (Besada et al., 2008; Broadman, 2007; Cheung and Qian, 2009; and Wang, 2007).
 - ▶ The paucity of China's ODI data.
- ▶ The approved ODI (1991 – 2005)
 - ▶ Initiated from Chinese enterprises, but approved by Chinese government – containing information of both markets and government policy stance.
 - ▶ A unique feature: Non-negative with many zeros (61%)
- ▶ The ODI in OECD-IMF standard (2003 – 2007)
 - ▶ Likely to identify the new feature of China's ODI after the “going global” policy.

Econometrics methods

- ▶ Tobit (1958): left censor the data at zero and use MLE;
- ▶ Heckman (1979) two-stage procedure
 - ▶ In the first step, China's ODI decides to invest or not;
 - ▶ If a positive decision is made in the first step, China decides the volume of ODI to be placed in the second step.

Tobit Model – the approved ODI data

- ▶ The “Gravity model” (Blonigen, 2005)

$$ODI_{it} = \alpha + \beta_1 MKT_{it-1} + \beta_2 RISK_{it} + \beta_3 OilM_{t-1} + \beta_4 SFDI_{it-1} + \beta_5 XP_{it-1} + \beta_6 Engy_{it-1} + v_{it}$$

- ▶ *ODI*: China’s approved ODI normalized by the host country’s population;
- ▶ *MKT*: *GDP*, *RGDPpc*, and *RGDPG* (Frankel and Wei, 1996; Eaton and Tamura, 1994, 1996; and Lipsey, 1999);
- ▶ *RISK*: 6 political risks from ICRG - the economic condition risk(*Econ*), the political system risk(*Polit*), the confliction risk(*Cnfl*), the social tension risk(*Scnt*), the corruption risk(*Crpt*), and the law and order risk(*Law*);
- ▶ *OilM*: China’s imports of crude oil divided by China’s total consumption;
- ▶ *SFDI*: The total FDI stock in a host country except China’s ODI;
- ▶ *XP*: The share of export to China;
- ▶ *Engy*: The energy output (oil, gas, and coal) (% of GNI).
- ▶ Lagged one time period to control the endogeneity issue, except for *RISK*.

Tobit Model – the approved ODI data

	Tobit-All-1	Tobit-All-2	Tobit-All-3
GDP(-1)	1.516*** (0.43)	1.542*** (0.41)	1.660*** (0.44)
XP(-1)	6.056*** (1.79)	5.983*** (1.78)	5.043*** (1.80)
OilM(-1)	0.931* (0.55)		
Engy(-1)	0.039 (0.04)	0.042 (0.04)	0.026 (0.04)
Crpt	-1.108*** (0.33)	-1.125*** (0.31)	-1.050*** (0.31)
GG		1.203** (0.59)	-1.204 (1.08)
GG*Engy(-1)			0.121*** (0.05)
Adj. Pseudo R-squares	0.11	0.12	0.12
LR test	42.42	43.38	48.64
Obs.	345	345	345



Heckman (1979) Method – the approved ODI data

- ▶ Heckman (1979) controls the possible selection bias; more importantly, it fits the ODI decision making procedure (Razin *et al.*, 2004).
- ▶ In the first stage, China assesses the ODI host country and decides whether or not to invest.
- ▶ After a positive investment decision to a host country, in the second stage, China decides the volume of ODI to be approved and invested in the selected country.

Heckman (1979) Method – the approved ODI data

▶ The first stage

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

- ▶ D_{it} is the latent dependent variable - $I(ODI_t > 0) = 1$; otherwise, 0.
- ▶ All other independent variables are the same as those in Tobit (1958) specification.
- ▶ Panel data Probit regression with random effect.
- ▶ What determine the likelihood of China's ODI in an oil country.

Heckman (1979) Method – the approved ODI data

▶ The second stage

$$ODI_{it} = \alpha + \beta_1 MKT_{it-1} + \beta_2 RISK_{it} \\ + \beta_3 OilM_{t-1} + \beta_4 SFDI_{it-1} + \beta_5 XP_{it-1} + \beta_6 Engy_{it-1} + Mills_{it} + v_{it}$$

- ▶ ODI_{it} : with positive ODI observations.
- ▶ $Mills_{it}$: the inverse Mills ratio, controlling the unobserved effects that affect China's ODI behavior.
- ▶ All other independent variables are the same as in the first stage.
- ▶ Run pooled regression with de-meanned observations (Wooldridge, 1995)

Heckman (1979) Method – the approved ODI data

	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*** (0.16)		0.792*** (0.16)		0.822*** (0.17)	
RGDPpcc(-1)	-0.345** (0.16)		-0.389** (0.16)		-0.396** (0.17)	
XP(-1)	5.434*** (1.69)		5.168*** (1.70)		4.964*** (1.71)	
Engy(-1)	0.012 (0.01)	0.037* (0.02)	0.010 (0.01)	0.024 (0.02)	0.007 (0.01)	0.028 (0.02)
Cnfl	0.150 (0.09)		0.141 (0.09)		0.121 (0.10)	
Polt		0.488*** (0.13)		0.453*** (0.12)		0.463*** (0.11)
Sctn		0.545*** (0.14)		0.614*** (0.20)		0.566*** (0.16)
Crpt	-0.455*** (0.11)	-0.766*** (0.25)	-0.392*** (0.12)	-0.693*** (0.25)	-0.372*** (0.13)	-0.636** (0.23)
Law		-1.086*** (0.33)		-1.012** (0.39)		-0.998** (0.36)
GG			0.324 (0.25)	1.378** (0.52)	-0.189 (0.49)	0.085 (0.50)
GG*Engy(-1)					0.030 (0.04)	0.074*** (0.03)
Mills		0.675 (0.68)		1.791** (0.86)		1.853** (0.84)
Adj.R-squares [†]	0.37	0.26	0.37	0.31	0.37	0.32
14BJL test	0.94		1.19		1.28	
Obs.	334	150	334	150	334	150

The diversification of China's ODI

- ▶ Diversifying the oil import resource is deemed to be the foundation of China's oil supply stability(Gu, 1998);
- ▶ China is believed to diversify its energy sources and markets globally (Lee and Shalmon, 2007; and Chen, 2008).

The different diversification strategies

▶ The Middle East

- ▶ Remains as the main resource of China's imported oil (50% in 2008);
- ▶ China has been diversifying away from the Middle East, due to 1) the prolonged volatile political situation; 2) unsecured oil transportation – the US controls sea-lans.

▶ Africa

- ▶ Gaining weight in China's ODI portfolio (30% in 2008)
 - ▶ Holding significant undiscovered oil reserve;
 - ▶ Open to foreign investment in oil exploration and production;
 - ▶ Willing to accept China's "oil-for-infrastructure" deals.

▶ Other conventional oil countries

- ▶ Neighboring countries that helps to avoid the issues related to the oil transportation at unsecured sea-lans.

the results from the Middle East samples

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



the results from Africa samples

	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)
Adj. Pseudo R-squares	0.11	0.12	0.12
Obs.	95	95	95



the results from “Others” samples

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

Tobit Model - The ODI data in OECD-IMF standard

- ▶ Using the ODI data in OECD-IMF standard (2003 – 2007) is Likely to identify the new feature of China's ODI after the “going global” policy.
- ▶ 15% are zero-ODI observations
- ▶ Not report Heckman results, as inverse mills ratio is not significant and our concern over lacking of degree of freedom.

Tobit Model - The ODI data in OECD-IMF standard

	Tobit-All	Tobit-Mdest	Tobit-Afr	Tobit-Others
GDP(-1)	1.263*** (0.31)	1.409*** (0.45)	1.476*** (0.57)	1.415*** (0.46)
RGDPG(-1)		0.600*** (0.21)		
SFDI(-1)		1.679*** (0.49)		-0.968** (0.45)
XP(-1)	2.951** (1.40)	10.330 (6.51)	1.942** (0.92)	36.739*** (12.89)
OilM(-1)	8.018** (3.31)	10.231* (5.53)		
Engy(-1)	0.049* (0.03)	0.204* (0.12)	0.061** (0.03)	0.115* (0.06)
Econ	0.355 (0.26)	-1.370** (0.55)		
Cnfl	0.520 (0.40)	2.491** (1.06)		
Sctn				0.718** (0.29)
Crpt	-1.073*** (0.38)		-1.801** (0.84)	
Law		-1.893** (0.76)		
Pseudo Adj.R-squares	0.12	0.29	0.07	0.15
LR test	2.44*	0.00	3.57**	0.00
Obs.	94	26	31	37

Concluding remarks

- ▶ We find some canonical and China specific determinants of China's ODI in oil producing countries.
 - ▶ Market seeking motive;
 - ▶ Concern over political risk
 - ▶ Reliance on foreign oil pushes and corruption attracts China's ODI
 - ▶ More energy production in selected oil countries draws more China's ODI.
- ▶ Nevertheless, there are some issues
 - ▶ The ODI data issue (Cheung and Qian, 2009)
 - ▶ Limited knowledge about “rogue” oil states and some newly involve non-conventional oil producers may limit our understanding China's ODI behavior in oil countries. Further research needed in order to broader our understanding to China's ODI.