STRATEGIC ACQUISITIONS: DETERMINANTS OF CHINESE OUTWARD DIRECT INVESTMENT IN THE AGRIFOOD INDUSTRY

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Abstract

We analyze Chinese outward direct investment (ODI) in the farm and processed food sectors between 2001 and 2013. Our findings underscore the importance that assessments of ODI should consider both standard theoretical determinants of cross-border flows, such as GDP and geographical distance, as well as political and institutional factors that affect host country risk. Determinants also differ in their importance dependent upon the specific subsector (farm vs. processed food vs. others) under consideration.

Introduction

In the 15 years since China's accession to the World Trade Organization (WTO), its outward

direct investment (ODI) has grown tremendously and become an important component of the

country's development strategy. When China joined the WTO in 2001, only 21 ODI transactions

were completed; by 2013, the last year for which data are available, approximately 6,500

transactions were completed and there was a stock of Chinese investment in over 100 countries

(see Figure 1). While about half of all ODI flows involve manufacturing industries, Chinese

outward investment is increasingly diversified across sectors. The source of these investments is

also changing; while historically ODI was primarily undertaken by China's state owned

enterprises, 41% of the value of China's ODI was undertaken through private firm transactions

in 2014(KPMG, 2015).

In many ways, China offers a unique source of ODI. Structural adjustments required by

China's WTO accession, additional market access through new trade agreements, large and

growing domestic demand, and the opportunity to engage in markets with less intense

competition and to make use of surplus production capacity (Gu, 2009), have spurred Chinese

firms to explore opportunities in international markets. Unlike the typical model of ODI

investment, Chinese financial flows are more likely to be invested in other developing countries

and in settings where there is higher political risk.

The agrifood sector plays a crucial and strategic role in China's foreign investment

portfolio. As China's population and household income continue to rise, international agrifood

sector holdings serve both to further business interests and improve domestic access to raw and

processed foods to meet the continually growing nutritional demands of Chinese consumers.

Transactions involving agrifood ODI have followed a similar pattern as overall ODI flows;

agrifood sector ODI has increased from three transactions in 2001 to over 300 transactions in

2013. While these account for only 7%, of China's ODI transactions, these international investments and acquisitions are of concern to many observers due to their frequent targeting of very large companies in often sensitive sub-sectors.

A number of previous studies have investigated the determinants of either total Chinese ODI (e.g. Buckley et al., 2007), or Chinese ODI directed towards the manufacturing sector. To date, however, no work has explicitly examined Chinese agrifood sector ODI. This issue is significant given the potential implications of these Chinese investments to the volume and pattern of trade of agrifood products. This study attempts to fill this gap in the literature by identifying and assessing the determinants of China's ODI in the agrifood sector.

Literature Review

An array of factors have been pointed to as motivating a firm's decision to direct their financial resources to a particular market. Dunning (1977) made argument that both location-specific endowments of countries, and ownership-specific endowments of FDI source firms, shape investment decisions. On this premise, at least three drivers of FDI have been suggested: foreign-market seeking FDI, efficiency (cost-reducing) FDI, and resource-seeking FDI which includes a subset of strategic asset-seeking FDI (Dunning 1977, 1993).

The foundations of FDI location theory literature were based on the consideration of capital flows which originated in developed countries. While some drivers of FDI from developing to other developing or less-developed countries are thought to be similar, understanding of the drivers of "upstream" FDI flows (financial flows to countries with a better economic status) is still evolving. Several authors (e.g. Makino et al., 2002) have found evidence that investment by newly industrialized or emerging economies is undertaken to exploit their firm's proprietary assets across borders (asset-exploitation), and to acquire strategic assets

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(asset-seeking). The unique ways in which corporate governance structures and its impact on entry mode and investment location choices (Filatotchev et al., 2007), and the extent to which and mechanisms used by emerging country governments to foster ODI (Luo et al., 2010; Wang et al., 2012) are among other distinguishing features of emerging market ODI.

In addition, capital market imperfections and other unique market circumstances of many developing countries can both limit and offer potential advantages for developing country firms, and as such can stimulate unique ODI behavior. As summarized by Buckly et al. (2007), capital market imperfections such as the potential for state-owned enterprises to have access to capital at below market rates, for inefficient banking systems that may make soft loans to potential investors, of conglomerate firms that offer their subsidiaries capital that effectively subsidize FDI, and for family owned firms which may have access to cheap capital from family members can improve access of developing country firms to capital and may generate ownership advantages for firms from these areas (Buckley, 2004).

Other literature has explicitly examined determinants of Chinese outward direct investment. An initial study by Buckley et al. (2007) explored the extent to which unique explanations of ODI explain the behavior of Chinese multinational enterprises. Many common gravity model covariates were found to be positively associated with Chinese ODI flows including host market size, cultural and geographic proximity. Chinese ODI was also found to be positively associated with the natural resource endowment of the ODI destination country and negatively associated with higher levels of political risk. The authors propose several potential explanations for this latter, unexpected, result which center on Chinese investors potentially having a perverse attitude toward risk due to institutional factors and capital market imperfections in that country.

Results of more recent studies have been found to be largely consistent with those of Buckley et al., (2007). In addition, a positive correlation was found between Chinese ODI flows and Chinese export destinations (Ramasamy et al., 2012; Zhang and Daly, 2012.), and destination countries with poor institutional environments (Kolstad and Wiig, 2012). Importantly as well, the behavior of Chinese firms engaged in ODI has been found to differ dependent upon the type of firm. Relative to private firms, state controlled firms send more ODI to countries with large sources of natural resources and relatively risky political environments; private firms are market seekers and opt to invest in settings with relatively large markets (Ramasamy et al., 2012). In addition, it has also been found that Chinese firms tend to invest in large markets which are more open to FDI (Kolstad and Wiig, 2012; Ramasamy et al., 2012; Zhang and Daly, 2012). There is, however, no evidence to support the frequent perception that Chinese ODI is targeted to countries with depreciated currency, low inflation rates (Zhang and Daly, 2012).

While they have received considerable attention through the popular press, Chinese investments in the agricultural sector have received relatively little academic consideration. One notable exception is a recent effort by Brautigam (2015) examined the investments of Chinese government and privately held firms in rural Africa. While Chinese investments in this area have captured alarmed attention from many observers, Brautigam's analysis finds that Chinese investments in both African farming operations and land acquisition, are far more modest than what is commonly thought. Other than this notable contribution, however, to the authors' knowledge, thus far, no studies have empirically and comprehensively examined the relationship between China's ODI and the agri-food sector.

Data

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While the Chinese government's official data reveals the volume of new outward direct investment across foreign markets it has many well-recognized limitations. For example, in this source a significant proportion (more than 60 percent) of all ODI is recorded as investment in Hong Kong, which is not final destination but rather a bank routing waypoint for the majority of these transactions. For this reason, we make use of data recently compiled by Murakawa et al. (2014). The data is from official Chinese source and it reports the number of foreign subsidiaries of Chinese companies. While this source is limited in providing information regarding the number of ODI transactions (note that an ODI transaction must have occurred for a subsidiary to come into existence) instead of their value, it is notably better in accurately reflecting final ODI destination countries.

While the data report the number of foreign subsidiaries across 135 foreign countries by finely disaggregated industries, they do not supply the number of subsidiaries on an annual basis, but for the entire sample period from 2001 to 2013. Hence, our main econometric approach will necessarily by cross-sectional in nature, investigating the determinants of the total number of ODI transactions for the entire sample period. In our analysis, we focus on the farm and the food sectors, but we also report results for the overall economy, for comparison. Table 1, Panel 1 reports summary statistics. In particular, the average number of new Chinese subsidiaries in a given destination in the farm sector country during the sample period from 2001 to 2013 was 5.69, whereas the average number of new Chinese subsidiaries in the processed foods sector was 3.78.

To supplement the insights from the data on the number of ODI transactions described above, we additionally obtain data on individual transactions from the SDC Platinum database. These data include information on individual transaction values, country of destination, and the public status of the acquirer and the target company. The more detailed nature of SDC Platinum

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data allows to investigate a few more additional aspects of China's ODI that cannot be analyzed with aggregate industry data. Unfortunately, the database reports individual transaction data in the Agri-food industry for only 59 Chinese ODI transactions (see Table 1, Panel 2), with an average transaction value of $206.73 million.

Econometric Approach

A basic conceptual framework of the multinational firm which casts FDI strategies as a function of donor and recipient country endowments and characteristics, trade flows, cross-border activity, and target industry and company characteristics is used to guide the development of our empirical model (see, for example, Markusen 1984; Blonigen 2005; Markusen & Venables 2007; Yeaple 2003a,b). Because our baseline model is used to analyze the number of outward direct investment deals originating from China, we use a negative binomial econometric specification that is typically used to analyze count data. Formally, if N_i is the number of ODI transactions originating from China to one of the 135 target countries included in our analysis, the negative binomial distribution is given by

$$ (1) \qquad P(N_i = n) = \frac{\Gamma(n+\tau)}{\Gamma(1+n)\Gamma(\tau)} \left(1+\frac{\lambda}{\tau}\right)^{-\tau} \left(1+\frac{\tau}{\lambda}\right)^{-n}, \qquad n = 0,1,2,.. $$

The parameter λ is the mean of the negative binomial distribution and τ is a shape parameter that quantifies the amount of overdispersion. The mean and the variance are $E(N_i) = \lambda$ and $Var(N_i) = \lambda(1+\lambda/\tau)$, respectively. Note that the negative binomial distribution approaches the Poisson as $\tau \to \infty$. For more details on the negative binomial distribution see Cameron and Trivedi (1998). One important advantage of the negative binomial model compared to the Poisson model, also often used for count data, is that the former relaxes the assumption that the mean equals the

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variance). The mean, λ, of the number of ODI transactions from China to the target country i is then specified as a function of a number of factors that have been shown to affect (location of) foreign direct investment:

$$(2) \qquad \lambda = \exp(\phi + \beta_1 g_i + \beta_2 a_i + \beta_3 d_i + \beta_4 WTO_i + \beta_5 RISK_i + \beta_6 \left(\frac{Trade}{GDP}\right)_i + \beta_7 \left(\frac{FDI}{GDP}\right)_i),$$

where ϕ is a constant, g is a vector of gravity model covariates relevant to FDI flows (the natural logarithm of the target country GDP, the natural logarithm of the geographical distance between China and the target country, and a dummy variable indicating common legal origin), a is a vector of characteristics of the agricultural sector in the target country (amount of agricultural land and the proportion of GDP derived from agriculture), and d reflects the target country's development status and location (developing country dummy, least developed country dummy, located in the Southern hemisphere). Membership of the target country in the WTO is reflected by the dummy variable WTO. As higher recipient country risk (of expropriation, corruption, political uncertainty etc.) is expected to negatively affect foreign investment, a measure of economic and political risk is also included in our econometric model above ($RISK$). Finally, following previous work on foreign direct investment (e.g. Buckley et al. 2007), total bilateral trade flows (exports plus imports) between China and the destination country, as well as the existing stock of Chinese FDI in the destination country as a fraction of the host country's GDP are also included as determinants. These variables control for trade linkages and agglomeration effects which tend to facilitate new foreign investments. We estimate the negative binomial model via Maximum Likelihood.

Our analysis reflects the period from 2001 to 2013. The dependent variable represents the total ODI transactions (new subsidiaries of Chinese firms) over the entire sample period. The right-hand side variables are averaged over the same period. Trade flow data are obtained from

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the United Nations Comtrade database. Explanatory variables which are commonly used in gravity models are obtained from standard sources (CEPII, UNCTAD). Measures of country level risk are obtained from IHS Connect.

Finally, we also analyze individual transaction-level data on Chinese acquisitions in the food and farm industry abroad available from the SDC Platinum database. Using these data, we focus on explaining the determinants of the transaction value and we estimate the following econometric specification (via Ordinary Least Squares):

$$(3) \quad \ln(Trans\_Value_{ji}) = \phi + \beta_1 g_i + \beta_2 a_i + \beta_3 d_i + \beta_4 WTO_i + \beta_5 RISK_i + \beta_6 \left(\frac{Trade}{GDP}\right)_i + \beta_7 \left(\frac{FDI}{GDP}\right)_i + \varepsilon_{ij},$$

where $\ln(Trans\_Value_i)$ is the natural logarithm of transaction value j associated with an acquisition in country i, and the right-hand side determinants in the regression equation (3) are the same as in the negative binomial count model in equations (1) and (2) above.

Results and Discussion

Our results in Table 2 confirm the hypothesis discussed above. Analyzing the overall (in all sectors of the economy) number of Chinese ODI transactions, we find that traditional determinants of FDI do a good job at explaining the cross country variation. Specifically, if the destination country has higher GDP, then there are more Chinese subsidiaries in that nation. The estimated coefficient on the destination country GDP is positive at 0.674 and highly statistically significant (with a standard error of 0.042). Not surprisingly, the number of foreign subsidiaries declines with geographical distance and the negative coefficient on the logarithm of distance (-0.859) is close to -1, as the gravity model of trade would predict. Destination countries that trade with Chine more intensely or where China already has a sizeable stock of FDI were also

the recipients of greater number of Chinese ODI deals during our sample period. While the estimated coefficient on country risk is negative, it is not statistically significant. On the other hand, and contrary to expectations, if the destination country has the same legal origins as China's or if the destination country is a WTO member, it has fewer Chinese subsidiaries. Both of these effects are statistically significant at the 5 percent level.

Next, we have included 3 variables that we believe are important in the determination of foreign investment in the farm and processed food sectors – total agricultural land (to capture comparative advantage driven by endowment), agricultural value added as a share of GDP (capturing both endowment and productivity effects) and destination country location in the Southern hemisphere (higher trade and FDI in the agricultural sector because the seasons are reversed). All 3 factors appear to positively affect the total number of new Chinese subsidiaries during the sample period. All 3 coefficients are positive in highly statistically significant. Finally, our specification also includes dummy variables indicating if the destination country is developing or least developed. The results show that least developed countries receive a significantly larger number of Chinese subsidiaries.

In Table 3, we present results from the baseline specification analyzing the number of Chinese subsidiaries abroad separately for the farm sector, the processed food sector, and the all other sectors combined. First, note that the results for all other sectors combined (in column 3 of Table 3) are very similar to the results for the overall number of ODI transactions presented in Table 2. This is not surprising because while growing, the number of transactions in the farm and food industry is still a small fraction of the total.

Turning attention to columns (1) and (2) of Table 3, note that the destination country GDP and distance from China are still significant determinants of the number of ODI transactions in the farm and food industries. Additionally, both agricultural land and the share of

agricultural production (in total output) have a positive and significant effect on the number of

Chinese ODI transactions in the farm and food sector. As expected, location in the Southern

hemisphere only matters for the farm sector and not for the processed food sector. Finally, least

developed status of the destination country has a significant positive effect on the number of

Chinese ODI transactions in the farm sector only.

In the last table we present (Table 4), we show the results from our analysis of individual

cross-border M&A (mergers and acquisitions) transaction values. While the sample is rather

limited in scope, one can still gather some useful insights. We present two specifications, an

unweighted one in column (1) and a specification using the transaction values as weights in

column (2). None of the estimated coefficients in column (1) are statistically significant,

although most have the expected sign. Many of the coefficients in the second column, on the

other hand, are precisely estimated. In particular, these results imply that destination countries

with larger GDP attract Chinese ODI transactions with larger values. Also, greater distance

tends to depress transaction values. Interestingly, so do countries that trade more intensely with

China. In this specification, both common legal origins and WTO membership have a large

positive and statistically significant effect on Chinese ODI transactions. Not surprisingly,

destination country's location in the Southern hemisphere has a positive impact on Chinese ODI

transaction values. Finally, our results imply that transaction values of ODI deals that involve

foreign targets that are public (publicly traded) tend to be larger than those of private targets.

Conclusion

Results of this analysis offers useful insights into the determinants of Chinese foreign investment

in the global Agrifood industry. Conventional determinants of FDI flows, including GDP,

distance, existing stock of FDI, a legal system of common origins, were found to be significant

as explanatory factors in the number of foreign subsidiaries of Chinese multinationals in the farm and food sector. Explanatory variables specific to the farm and food sector were also found to be matter; specifically, the amount of land, value added by the agricultural sector and nations located in the southern hemisphere were found to also be positively correlated with the number of foreign Chinese subsidiaries. Importantly, however, the explanatory variables found to be significant differed depending on the specific (sub)sector of focus. These findings will be of interest to members of the agribusiness community involved with China or Chinese ODI target countries or industries. In particular these findings have policy implementation implications for countries who wish to attract ODI to their farm or food sector. As these results provide insight into whether a particular setting is likely to be appealing to ODI from China, these findings will allow ODI recruitment strategies to be more appropriately targeted.

Future analysis will expand upon these results and will assess the extent to which investment agreements (or trade agreements with investment components), country development status, aggregate ODI stocks (ODI competition), the ownership of the ODI source firm (privately or publically held), and interest and tax rates in a destination market affects China's outward investment in the agricultural sector decisions.

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Figure 1. China's Outward Direct Investment by Region
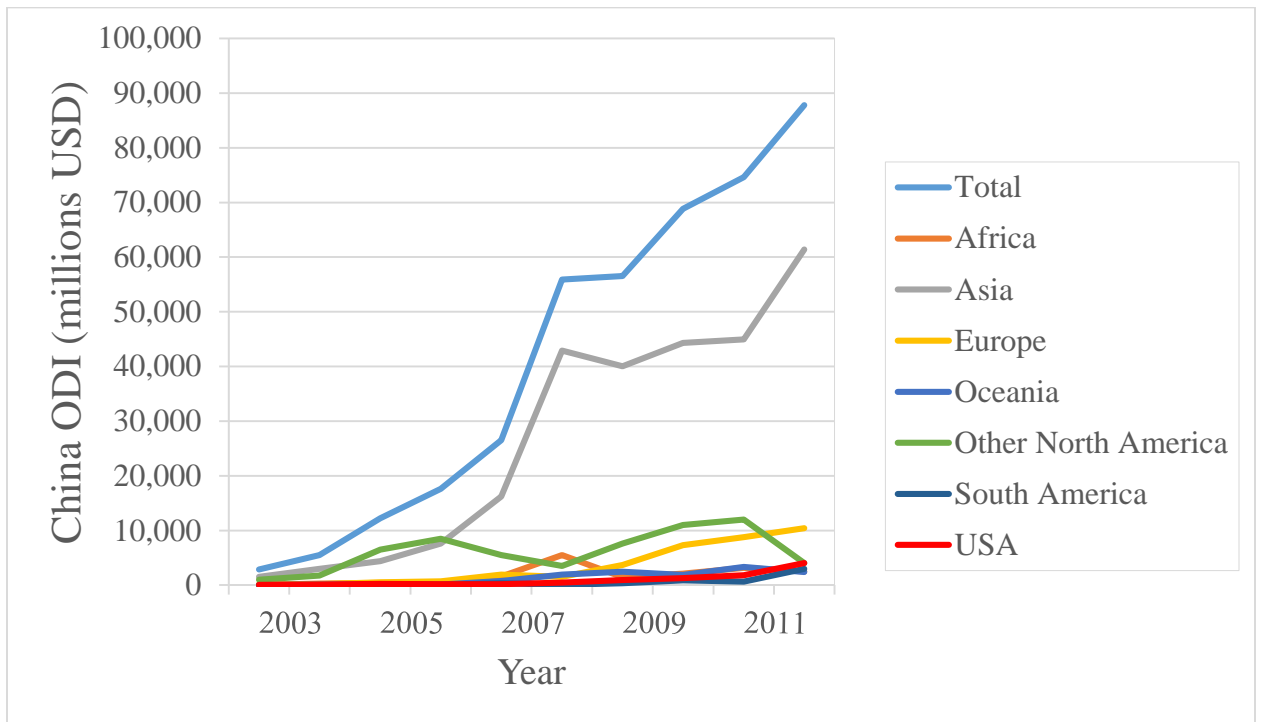
Table 1. Summary Statistics, Panel A

Variable	Mean	Standard Deviation	Min	Median	Max
No. of Subsidiaries in the Farm Sector (in the average destination country)	5.69	25.40	0.00	1.00	320.00
No. of Subsidiaries in the Processed Food Sector (in the average target destination country)	3.78	14.65	0.00	0.00	165.00
No of All (across all sectors) Foreign Subsidiaries (in the average destination country)	154.28	640.62	1.00	30.00	7,954.00
Destination country GDP (billion U.S. $)	233.37	997.57	0.06	13.96	11,500.00
Distance from China (thousand km)	9.00	4.00	1.02	8.41	19.11
Trade/GDP	0.20	0.57	0.01	0.06	6.22
Stock of Chinese FDI/Destination Country GDP	0.03	0.09	0.00	0.00	0.73
Destination Country Risk	2.19	0.96	0.33	2.23	5.20
Common Legal Origins	0.19	0.39	0.00	0.00	1.00
WTO Member	0.74	0.43	0.00	1.00	1.00
Agricultural Land (millions of sq. km.)	0.27	0.69	0.00	0.05	5.21
Agricultural Value Added (Percent of GDP)	13.60	12.85	0.00	9.50	54.81
Destination Country in Southern Hemisphere	0.23	0.42	0.00	0.00	1.00
Developed	0.29	0.45	0.00	0.00	1.00
Developing	0.49	0.51	0.00	0.00	1.00
Least Developed	0.22	0.41	0.00	0.00	1.00

Table 1. Summary Statistics, Panel B

Variable	Mean	Standard Deviation	Min	Median	Max
Transaction Value (million U.S. $)	206.73	681.59	0.05	14.82	4,752.38
GDP (billion U.S. $)	1,553.29	3,378.06	1.64	170.35	11,500.00
Distance from China (thousand km)	7.56	4.49	1.61	8.36	18.89
Trade/GDP	0.37	0.47	0.02	0.10	1.60
Stock of Chinese FDI/Destination Country GDP	0.19	0.31	0.00	0.00	0.73
Destination Country Risk	1.01	0.64	0.33	0.95	2.68
Common Legal Origins	0.03	0.18	0.00	0.00	1.00
WTO Member	0.92	0.27	0.00	1.00	1.00
Agricultural Land (millions of sq. km.)	0.87	1.60	0.00	0.12	4.30
Agricultural Value Added (Percent of GDP)	3.51	4.60	0.06	1.90	19.98
Destination Country in Southern Hemisphere	0.27	0.45	0.00	0.00	1.00
Developed	0.82	0.38	0.00	1.00	1.00
Developing	0.16	0.37	0.00	0.00	1.00
Least Developed	0.02	0.13	0.00	0.00	1.00
Public Acquirer	0.27	0.45	0.00	0.00	1.00
Public Target	0.33	0.47	0.00	0.00	1.00

Table 2. The Determinants of the Number of Foreign Subsidiaries for Chinese Multinationals, All Sectors

Sample Variables/Dep. Var	All Sectors No. of foreign subsidiaries Negative Binomial Model
	(1)
Log(GDP)	0.674***
	(0.042)
Log(Distance)	-0.859***
	(0.202)
Trade/GDP	0.157***
	(0.049)
Stock of FDI/GDP	3.207**
	(1.509)
Country Risk	-0.133
	(0.116)
Common Legal Origins	-0.523**
	(0.232)
WTO member	-0.446**
	(0.222)
Agricultural Land	0.261***
	(0.087)
Agricultural Value Added/GDP	0.027***
	(0.010)
Southern Hemisphere	0.681***
	(0.174)
Developing Country	0.495
	(0.329)
Least Developed Country	1.240***
	(0.469)
No. Obs.	135

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 3. The Determinants of the Number of Foreign Subsidiaries for Chinese Multinationals, Farm Sector, Food Sector, and All Other Sectors

Dependent Variables	Farm Sector No. of foreign subsidiaries Negative Binomial Model	Food Sector No. of foreign subsidiaries Negative Binomial Model	All BUT Farm and Food No. of foreign subsidiaries Negative Binomial Model
	(1)	(2)	(3)
Log(GDP)	0.578***	0.693***	0.677***
	(0.103)	(0.082)	(0.043)
Log(Distance)	-1.042***	-0.856***	-0.824***
	(0.245)	(0.185)	(0.204)
Trade/GDP	0.092	0.211***	0.159***
	(0.101)	(0.060)	(0.049)
Stock of FDI/GDP	2.296	0.627	3.286**
	(1.437)	(1.019)	(1.531)
Country Risk	-0.208	-0.313	-0.139
	(0.170)	(0.223)	(0.117)
Common Legal Origins	0.556	-0.206	-0.565**
	(0.425)	(0.347)	(0.227)
WTO member	-0.432	-0.424	-0.464**
	(0.437)	(0.433)	(0.220)
Agricultural Land	0.611*	0.350***	0.237***
	(0.322)	(0.103)	(0.083)
Agricultural Value Added/GDP	0.037**	0.078***	0.026**
	(0.016)	(0.021)	(0.010)
Southern Hemisphere	1.503***	-0.069	0.652***
	(0.357)	(0.381)	(0.179)
Developing Country	0.333	-0.465	0.509
	(0.442)	(0.438)	(0.332)
Least Developed Country	1.309*	0.235	1.241***
	(0.684)	(0.710)	(0.474)
No. Obs.	135	135	135

Robust standard errors in parentheses;
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 4. The Determinants of Transaction Values for Chinese Multinationals, Farm Sector and Food Sector

Dependent Variables	Transaction Value OLS, unweighted	Transaction value OLS, weighted by transaction values
	(1)	(2)
Log(GDP)	0.352	0.422**
	(0.428)	(0.187)
Log(Distance)	2.304	-5.286**
	(3.348)	(2.060)
Trade/GDP	0.644	-1.413**
	(1.518)	(0.664)
Stock of FDI/GDP	-1.763	5.300
	(10.864)	(5.823)
Country Risk	1.291	-0.169
	(2.574)	(0.588)
Common Legal Origins	-7.962	15.002**
	(13.090)	(6.374)
WTO member	-3.631	12.451***
	(9.675)	(4.263)
Agricultural Land	-0.073	0.075
	(0.416)	(0.107)
Agricultural Value Added/GDP	0.230	-0.498**
	(0.291)	(0.236)
Southern Hemisphere	-0.588	1.834**
	(1.251)	(0.845)
Developing Country	-2.705	2.777
	(4.750)	(1.901)
Public Acquirer	-0.473	-1.240
	(0.692)	(0.919)
Public Target	0.195	1.526*
	(0.757)	(0.828)
No. Obs.	59	59
R-squared	0.127	0.705

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1