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DETERMINANTS OF ODI FROM CHINA AND OTHER EMERGING ECONOMIES: EVIDENCE FROM NEW MIRO-LEVEL DATASET

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DETERMINANTS OF ODI FROM CHINA AND OTHER EMERGING ECONOMIES: EVIDENCE FROM NEW MIRO-LEVEL DATASET

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ABSTRACT

As a former major recipient of foreign direct investment (FDI), China is now turning into a big source. Studies have made great attempts to characterize China's outward FDI (ODI), and have explained the forces behind investment decisions. In our study, we first try to illustrate China's outward investment pattern with a background of BRIC countries in terms of sectorial and geographical distribution. Furthermore, by adopting a micro-level dataset, we are going to show a different picture of what has driven China to conduct ODI in host countries in comparison with Russia within the same framework. Our ultimate goal is to use alternative ways to reveal the determinants of China ODI, whether market-seeking, resource-seeking, or both, and its uniqueness among the BRIC countries.

Key words: China; outward FDI; BRIC countries; alternative micro-level dataset

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I. INTRODUCTION

Studies focusing on Foreign Direct Investment (FDI) from economically advanced countries toward emerging markets have long been under close observation. Numerous literatures have set sight on such issues all through the world. However, research on outward FDI (ODI hereafter) from developing countries are far from enough. Investment from such countries is attracting spotlight in recent years nonetheless. With rapid and vigorous economic growth catching the world's eyes, China is among the countries that economists are most interested. Some groups of experts pioneered in this trend, trying to characterize, decompose, and analyze Chinese ODI.

China re-opened its market in the late 1970s. Ever since then, the nation has started rejuvenation in all aspects of its society. Although cumbersome, early efforts were made to get the economy back from pieces after a decade of social turbulence. However, the pace of world integration is slow and the level of international participation is low. Starting from 1992, when former president Deng Xiaoping took a journey to Southern China and made public speeches declaring the 'open-up policy' to be reinforced by the Chinese government, China has accelerated its paces towards globalization by increased activities in the world economy. During this period of time, China has become one of the top ranking countries in attracting FDI from the world. 2001 is another memorable time point when China successfully joined WTO, from which the economic giant witnessed a surge in its own FDI out flux to date.

As recorded officially by the Ministry of Commerce (MOFCOM), Chinese total ODI flow jumped from $2.7 billion in 2002 to $68.81 billion in 2010, a 21.7% increase from the year before. By the end of 2010, China's ODI accounted for 5.2% of total world FDI flow, which was $1.32 trillion, making China the fifth largest origin. Meanwhile, its ODI stock expanded from $29.9 billion to $317.21billion, accounting for 1.6% of the world total.

China is not the only country that has been drawing so much attention in recent years. Brazil, Russia, India and China, or BRIC, are all hot spots intensively observed. Even though each one of the BRIC countries has its own development trajectory, the four countries share fast growth, shifted global economic power, and inevitably, rapid rise in investment abroad. According to UNCTAD statistics, Brazil experienced a volatile but generally upward trend, with FDI outflow starting from $2.3 billion in 2000 to $11.5 billion in 2010. Russia's original outward investment amounts to $3.2 billion in 2000 and steadily increased to $51.7 billion in 2010. During the same period, India started from $0.5 billion, reached peak at $19.4 billion in 2008, and ended most recently with $14.6 billion.

Unlike most of the other studies, we are not going to look at ODI originated from China solely, but instead, to incorporate ODI features of other BRIC countries. By doing so, we try to answer two main questions. First, what are the determinants of China's ODI? Is it

market-seeking or resource-seeking? Although many have dissected this topic, we don't think previous interpretations are complete. We ask whether elements suggested by pioneers are persistent and reliable under examination by a new micro-level dataset, and whether new clues can be uncovered. Second, what are the differences between China's decision making and the rest of BRIC members? Do they have similar behaviors or does each have its own uniqueness? Such questions cannot be answered simply by yes or no; rather, we hope to decipher those problems with analytical discussions.

This article is organized as follows. In the next section, we will have a general review on insightful studies about Chinese FDI. Section 3will illustrate the methods and models in use and justify the adjustment on the theory. In section 4, we will analyze the results in details. Section 5 concludes.

II. LITERATURE REVIEW

A thorough analysis into Chinese ODI was made by Buckley, *et al.* (2007). Through empirical work in which a total of 14 independent variables were taken into account, they concluded, among others, that:

1. Resource-oriented investment remains as a strong motivation behind Chinese ODI. Prior to 2001, asset acquisition is not a main cause; this needs to be re-examined in the case after 2001.

2. Cultural proximity is one of the good reasons that Chinese ODI is directed, which is not common compared to other FDI providers.
3. Chinese ODI is much less concerned about political and market risks in host countries than those from highly industrialized and financially competent economies.

Their findings are worth noting, since they conducted such studies under a framework of classic FDI theory. In fact, one of the goals of their paper was to test the fitness of FDI theory on Chinese cases, and they found FDI theory could partly interpret Chinese ODI behaviors. One of the impressive characteristics of this paper was their familiarity with the evolving economic policies since 1979 when China's leaders determined to open up and vigorously participate in global business. The integration of policy background into the study leveled up the research.

A similar study by looking at Chinese ODI under the interference of host county factors was carried out by Cheung and Qian (2009). They found that China directs its ODI in different manners with respect to developing and developed countries in resource-seeking and market-seeking motives, export to the subjective host country, holding of foreign exchange reserve, and agglomeration effects. They also suggested that further studies could include equity investment and portfolio management.

Cheng and Ma (2007) did somewhat different work in studying Chinese ODI. Statistics about the size and composition of Chinese ODI showed that investment capacity is

surging rapidly, and sectorial and geographical investment pattern is changing over time. Empirical analysis is to some extent overlapping with that in the first paper above, taking into consideration host country market size, physical distance with home country, cultural proximity, and geographical features. In addition, they tried to predict the growth and position of future ODI levels by adopting the growth pace of other economies, especially Japan and South Korea. This policy-oriented point in the paper needs time to check its precision, since the annual growth rate begins to show upper resistance, and domestic political condition is ambiguous.

Bower, Fernandez and Thiman (2009) examined M&A behaviors within emerging market countries as well as investments from emerging markets to more advanced economies. They showed that ODI from emerging market countries are rocketing from 1999 to 2006. Empirical works yield three major purposes for emerging market economies to conduct M&A endeavors: strategic access to national resources, advanced technology and knowledge, and enhancement in market power and distribution channel in host countries. Such points are quite intuitive, and might be helpful when studying the specific case of China.

III. MODELS AND METHODS

Two independent datasets forge the foundation of our work. The first part is a statistical comparison among BRIC countries in terms of industrial and regional patterns. The

dataset adopted is Investment Map collected by International Trade Center. FDI data are detailed at sectorial level, covering up to 200 countries. Each entry of FDI information contains both home and host countries along with corresponding companies, year, employee number, sales and line of business. The website provides an interactive query system that enables users to draw data from users' favored prospective. One critical limitation with this dataset is that sales information is not complete thus invalidating ODI sum-up, which substantially undermines its value in our studies. As an alternative approach to utilize this dataset, we conduct statistical analysis on case counts instead of total amount.

The second part is an empirical analysis on China and Russia' ODI, which is conducted within a framework applied by earlier studies (Buckley, *et al.*, 2007). Our goal is twofold. First, we do our job using a new dataset and try to see how the altering of the dataset can affect the determinants on China's ODI. In earlier endeavor, a systematic examination on the determinants of China's ODI is carried out based on official data from Statistical Bulletin of China's Outward Foreign Direct Investment published by the State Administration for Foreign Exchange (SAFE), one of the key agencies overlooking China's investment approval and decision under the supervision of Ministry of Commerce (MOFCOM). However, studies also show that official data are to some extent biased, due to the treatment of ODI host countries, in that ODI flow to tax havens are reported as if these countries are final destinations, which is not an accurate measure. To compensate for such biasedness, another micro-level dataset, China Global Investment

Tracker collected by Heritage Foundation, has been shown to be a better substitute (Liao and Tsui, 2012). Second, by using the same model, we are trying to compare and contrast investment patterns between China and Russia, in reference to the findings in the first part. Official ODI data of Russia are obtained from the Central Bank of the Russia Federation, covering 194 countries from 2007 to 2011.

We use two empirical models in our research. The basic model is in accordance with the theory described in detail by Buckley, *et al.* (2007). We generally accept the log-linear form shown as follow.

$$LFDI\ (FDI \text{ in Poisson regression}) = \alpha + \beta_1 LGDP + \beta_2 LORE + \beta_3 LPATENT + \beta_4\ LPRSrq + \beta_5\ CP + \beta_6 LEXRATE + \beta_7\ INF + \beta_8\ LEXP + \beta_9\ LIMP + \beta_{10}\ LDIS + \beta_{11}\ LINFDI + \varepsilon_i$$

As a supplementation to earlier work, another more generalized model includes not only one of the omitted terms, namely GDP per capita (*LGDPPC*), but also two new variables, European Union dummy variable (*EU*) and government corruption indicator (*LPRScc*). The reassignment of the GDP term aims to fully catch the market-seeking initiative and positive signs are anticipated. The EU dummy is an indicator of a host country being a member of European Union, within which trade barrier is relatively low. We expect to see positive impact since home countries might want to get access to a bigger market via a small one as a channel. Such a manner is desirable for horizontal investments whose goal is to manufacture or to serve local and neighboring markets. *LPRScc*, a PRS

indicator of corruption control, is to complement regulatory imperfection. Positive coefficient is expected. The generalized model is written as follow. Table 2 lists all the variables taken into consideration in both models.

$$LFDI \text{ (}FDI\text{ in Poisson regression)} = \alpha + \beta_1 LGDP + \beta_2 LGDPPC + \beta_3 LORE + \beta_4 LPATENT + \beta_5 LPRSrq + \beta_6 LPRScc + \beta_7 CP + \beta_8 LEXRATE + \beta_9 INF + \beta_{10} LEXP + \beta_{11} LIMP + \beta_{12} LDIS + \beta_{13} LINFDI + \beta_{14} EU + \varepsilon_i$$

There are several other points to be noted, as we are not utilizing the exact same methods in the previous work. Modifications include:

1. We used averages from data of the same time span as the dependent variable (*LFDI* and *FDI*) for most of the variables instead of numbers in a specific year. Some countries have experienced vast volatility in these indicators. By averaging the numeric, we can get a more solid ground for regression.
2. We eliminate one independent variable, *TD92*, in the case of China. In the earlier model, official records can be traced back to as early as 1979 when China starts to open up to the world. During the past years, 1992 was a milestone in China's history of policy-making in respect of globalization for the reason stated earlier in this article. The variable is set to capture the impact caused by such an event, which is beyond the scope of our work, which focuses on China' FDI from 2005 and on. Needless to say, the variable is not necessary in the case of Russia either.

3. Average inflation rate (*INF*), are not in log form, since several host countries have witnessed negative inflation rate. Plus, the log form of the variable doesn't improve the explanatory abilities in the whole model, and the un-logging should result in a more straightforward interpretation.
4. Total patent measure is set to 1 if no patent is claimed in the host countries instead of 0. Such a change would benefit the study in the log-linear regression.
5. In Russia case, Georgia is considered CIS and historical data are combined, although it quit CIS in 2008.

The statistical approaches presented in this study are the pooled ordinary least squares (OLS) and Poisson pseudo-maximum likelihood regression (Poisson regression hereafter). While the random effects (RE) generalized least squares method seemed to give out more preferable results, the assumption under random effects, however, doesn't fit the situation in this study since ODI is not at all random. Due to the discrepancy of data source, we don't expect our analysis to be robust as in the work by Buckley, *et al*. (2007).

IV. RESULTS AND DISCUSSION

Industrial and regional distribution

The results based on Investment Map are shown in Figure 1 - 5. China seems to distribute its ODI mostly in wholesale/retail trade and manufacturing, accounting for 30% and 22% of total ODI cases, respectively, followed by business activities and construction. Such

pattern is not uncommon among BRIC countries. Wholesale/retail trade, manufacturing and business activities all make up for a big portion in FDI outflow for each of the other three countries. Brazil, however, is shown to give out the most part of its ODI to financial sector. The reason is hard to determine. The top four industries where each BRIC countries allocate its ODI are listed in Table 1 with their respective portion to the total.

The regional distribution of every BRIC country reveals interesting results. China was previously believed to give cultural proximity high credit when making investment decisions. This finding is in agreement with our study, showing Southeast Asia receives the most ODI from China. Latin America accepts the second largest portion, probably due to shared development level and strategies. Surprisingly, FDI from the other three BRIC countries are more highly concentrated. Russia devotes the majority of its ODI to European countries with which it has close cultural bond, especially those in Eastern Europe. A similar pattern is also observed in the case of Brazil, who devotes almost all its ODI into neighboring countries in Latin America, a region where India focuses its ODI as well. Put together, Russia and Brazil both have a higher level of cultural preference when conducting foreign investment than China, while India doesn't have explicit cultural reasons but behaves the same as shown in Figure 5.

Empirical analysis by basic model

The first part of our study has provided valuable hints on the investment characteristics of the BRIC countries; however, their implications are limited to dataset shortcomings.

Since the statistics are carried out on case counts, ODI into certain industries and regions might well be under- or over-estimated. To further study China's ODI determinants, we extend our work to a more thorough level. In the second part, by using the Heritage Foundation dataset, we observed new results in depth analysis.

To begin with, we ran regression on countries that are the targets of outward FDI by China and Russia only. 78 countries are recorded in China's statement and 115 have been records in Russia's. Due to the lack of data for the independent variables, this approach yielded only 60 and 55 observations in regression for China and Russia, respectively. We then included all the countries other than hosts. In order to circumvent the problem in which zero FDI could not take the log form, we also applied Poisson regression as suggested by Silva and Tenreyro (2006), and yielded 114 observations for China and 59 for Russia. The same technique is also applied back to data containing only host counties. Russia's ODI data have zero and even negative numeric. We set those to 1 in OLS regression and 0 in Poisson regression. It is obvious that this isn't a big improvement in the case of Russia, due to the small group of countries Russia is having bilateral trade with. We finally dropped the two trade terms, export (*LEXP*) and import (*LIMP*), and re-examine the factors, after which 67 observations in host counties were studied under both OLS and Poisson methods and 112 in all countries under Poisson methods solely. All the coefficients obtained from Poisson regression are significant under 1% significance level.

In earlier studies by Buckley, *et al*. (2007), GDP per capita (*LGDPPC*) and GDP growth rate (*GGDP*) did not show significance in the regression and thus were excluded. In the China case, the foremost two main variables, *LGDP* representing the absolute market size and *LORE* representing metal ore productions, both retain positive and close coefficient in all methods, saying market-seeking motivates Chinese investors, at a scale slightly larger than resource-seeking. Intriguing results are observable in the Russia case. At first glance, Russia's ODI doesn't seem to be attracted by either market or resources. After eliminating the trade terms, both regression models give higher numbers. However, under Poisson regression, market size turns out to have negative effect on ODI, except for the model in which only host counties are included without trade terms. Coefficient for resource term (*LORE*) is much more consistent, indicating Russia's ODI is also resource oriented.

The strategic asset-seeking specification is nonetheless weak. The theory predicts that host country patent registration should have positive impact on FDI, but for China, OLS gives a negative but insignificant coefficient and Poisson model infers small positive numbers. Similar scenarios are seen for Russia. When host-country-only dataset is used, OLS regression with trade terms and Poisson regression without trade terms both show small coefficients that are negative signed. On the other hand, positive but small numbers are retained from the rest of the regression models. We would argue that, if anything, strategic asset-seeking is not a major cause of FDI outflow from the two home countries in question. Maybe patent is not a good proxy for this specification.

Contrary to previously predicted theory, Chinese investors show risk-seeking. The coefficient of *LPRSrq* is negative in all models for China, implying a 1% decrease in regulatory quality measurement, or in other words, 1% deterioration in host country regulation will cause a 0.82% to 1.22% increase in ODI. One of the probable reasons is the correlation between resource-richness and political instability. In particular, China invests a great amount into Sub-Sahara Africa and Mid-east Asia. Countries in those regions are exposed to higher political risks. China's well-known hunger towards natural resources, a critical factor supporting its continuing fast economic growth, may have elevated risk-tolerance in respect of host counties' domestic political environment. Another reason that inverse relevancy of ODI and political riskiness arose may attribute to the bilateral relationships between China and nations that share ideological, institutional or developmental traits, such as those in Latin America. This rationale is in line with our finding in the first part, which implied that nearly half of China's ODI is distributed to South American counties. A third reason that has not been paid much attention to is its intimate link with under-developed countries. Particularly, China has a traceable long history of helping promote local economic growth and infrastructure in Africa where Chinese government is still having great presence as long-term commitment (Mlachila and Takebe, 2011). One thing worth noting is that this doesn't necessarily mean China has an inverted taste of investing in countries with less risk. The argument here simply states that the bond between resources and riskiness, among others, dominates the decision in conducting FDI.

Such deviation from earlier work can be explained by the sources of the dataset. In the official data, tax havens, usually of high political quality and regulation transparency, are treated as destinations of FDI outflow. As such, political determinants will therefore have a positive impact on ODI, showing a high preference toward politically sound countries. By adopting the new dataset, this effect is reversed, since most funds further flow into countries with lower political soundness through those tax havens instead of settling down.

The influence of political factors on Russia is positive, suggested by all the models. Moreover, except the one retained by PLOS regression on host countries with no trade terms, other coefficients are quite high, ranging from 2.5 to more than 4. This says Russian investors care a lot about whether the targeting host country is a politically safe place. One reason that comes to mind is that so-called ‘oligarchs’ are playing a vigorous role in Russia’s economy, especially in the private sector. In recent years, they have shown a strong favor towards investment in developed industrialized countries and fondness in acquiring safe assets, while public sector enterprises are also in favor of more regulated markets.

Cultural Proximity is a strong initiative for both China and Russia. In all models, cultural proximity (*CP*) accounts for 82% to 91% more ODI in countries having a large local Chinese population, and this effect is statistically significant. The same effect is even

more magnified in Russia case. Under OLS regression model, being a CIS country could receive at least $2.4 million more ODI from Russia, while in Poisson regression, this figure jumps to around $4 million. Those results are in agreement with our earlier findings from part one in terms of regional distribution.

A totally different trait between China and Russia shows up in the exchange rate (*LEXRATE*). Given coefficients all lower than 0.1 by all regression models, exchange rate seems to be negligible to China's outward FDI, although the digits from OLS is insignificant. For Russia, however, exchange rate has a statistically significant and negative impact on ODI, which is even stronger under Poisson regression. Since the data are in indirect quote terms, which specify the amount of host country local currency to one US dollar, a higher exchange rate means relatively lower domestic prices of the host country. As a control variable, *LEXRATE* results support the argument in which China is investing more in developing countries whereas Russia seeks investment opportunities in developed countries.

Another deviation from earlier studies appeared in inflation rate. Contradictory to the previous proposal, but in line with the predicted theory, host country inflation rate is now negatively influencing the amount of China ODI, although such influence is of small scale, even though the coefficient is statistically significant. Every 1% increase in inflation rate would discourage a little lower than 0.08% of FDI from flowing in. This says that China ODI is still concerned about local economic condition, and Chinese

companies don't deviate from general firm preference in a sense of high yield, albeit insensitive. On the other hand, in the case of countries undergoing high inflation or even hyper-inflation, which is not uncommon among under-developed nations, the negative response would prevent a larger piece of ODI from flowing in. The difference from earlier studies could also be a result of changed dataset. Tax haven countries, treated as FDI destinations in official data, usually have stable and mild inflation; while the true host countries tend to be less integrated to the world economy, with inflation more volatile. The relation between ODI and inflation rate is hence inverted. Russia's response to host country inflation rate again shows mystery. Coefficients given by OLS regression are positive but not significant, whereas those by Poisson regression are negative without exception.

International trade doesn't turn out to be strong determinants to China ODI. Both the export and import terms fail to imply high impact, none of which showed statistical significance, and all country Poisson model even provides negative coefficients. This result may be caused by the fact that the use of the micro-level dataset may reduce the robustness of the analysis. Another reason that might explain such insignificance is the strategy of 'Angola mode', in which African resource-rich countries enter a barter agreement in exchange for infrastructure by Chinese enterprises. No explicit money transfer has occurred in these 'resource for infrastructure' contracts. If these transactions are otherwise treated as investment, FDI would have been higher in participating host countries which, at the same time, are exporters of natural resources (Mlachila Takebe,

2011). The endogenous limitation in the lack of trade partners makes it even more difficult to determine how export and import affect Russian investment. OLS regression shows that both export and import play positive roles to encourage ODI at approximately the same scale. Although Poisson regression also affirms the positive effect, a 1% increase in export could induce an approximately 1% increment in ODI, whereas import's induction is much more limited.

Distance is predicted to negatively motivate total FDI. In our study, a 1% increase in distance contributes to a 0.62% increase in investment from China according to OLS and about 0.42% according to Poisson model. These seemingly contradictory results could be explained by the phenomena observed in part one. Recall that China allocates a big chunk of its ODI to Latin America, which is on the other side of the globe. This concentration may well cause the positive coefficients. For Russian Federation, adjacent north to China, positive coefficients are suggested by models with trade terms but statistically significant negativity is generated by those without. If we focus on a dataset covering more observations, which is of higher reliability, inverse relations between FDI and geographical location should be confirmed.

The openness to FDI from abroad (*LINFDI*) is shown to be positively affecting home country ODI as expected by theory. Even though not significant in OLS regression, 1% more total FDI inflow would allow approximately 0.2% more FDI from China. Russia seems to be more willing to invest in countries that are open to FDI, since all models

except one implies an increase in total FDI inflow will trigger Russia to invest at least twice the amount China will.

Evolved analysis by generalized model

We add three variables to constitute a more generalized model in order to supplement the modified one since we believe these variables are potential determinants intuitively. One of the previously dropped variables, GDP *per capita* (*LGDPPC*), indicating relative market size, is added back. Government corruption is also believed to be a key element in terms of political condition. The *EU* dummy is to check whether the home countries are trying to get into the European market through European Union members, which in turn makes those nations more attractive to China and Russia. Our result again shows significance in almost all coefficients under Poisson regression, thus no asterisks are explicitly assigned if not otherwise marked. OLS and Poisson regression methods are used in the same way as in Russia case under basic model for both home countries.

The results in market-seeking and resource-seeking motivations are consistent with that under basic model. Notably, relative market size, represented by GDP *per capita*, turns out to be a weaker determinant compared to absolute market size in the case of China. One of the reasons is that Chinese multinational enterprises are mostly manufacturers producing goods of inelastic demand, for instance, daily-life necessities, while China's expertise in construction may also contribute to its favor toward countries of higher total GDP. These interpretations are in line with the findings in the first part, which stated that

China pays greater attention to industries including wholesale/retail business, manufacturing and construction. Russia's results don't improve under the new model.

As in the basic model, strategic asset is not a strong attraction to China, not to mention the contradictory signs among the group of coefficients. Regressions on host-country-only dataset, whether using OLS or Poisson methods, yield negative, but fairly small numbers. When all the countries are taken into consideration, the sign is reversed but remains small. Russia has moderate interest in strategic asset, although the coefficients are not stable.

The diversity in which China is politically risk-seeking while Russia is risk-averse is generally confirmed under the new model by both regulation and corruption terms. The newly included government corruption indicator shows that when this measurement is reduced by 1%, ODI from China would rise by approximately 0.2% suggested by data with only host countries. Russia's fondness of political safety is also weakened, but still remains stronger than unit elasticity. Results are in line with those from the basic model in terms of cultural proximity, exchange rate emerge and geographical distance as well.

China's concern against inflation remains. Surprisingly in the general model, Russia's ODI is positively related to inflation rate, except in the case of all country data with no trade terms, which deviates from the results in the basic model. On the other hand, the coefficients on export, import and total FDI inflow are similar to those from the basic

model for China. For Russia, the effect of export on ODI is close, but import coefficients showed much lessened impact on ODI, and when all country data are included, the coefficient turns negative. Similarly, coefficients for *LINFDI* are half-off and Poisson regressions without trade terms give negative numbers. We would argue that import from the host country may not be a powerful motivation for investment from Russia, and the attitude toward FDI is not strong compared to those suggested by the basic model. Those changes in results might be caused by endogeneity problems among FDI, trade, inflation and overall FDI.

Last but not least, China is shown to be avoiding the European Union, displayed by coefficients of about -0.8 to -1.0 from regressions on mere host country and -0.4 from all-country data. The hypothesis that China is getting into the European market through horizontal investment strategy, in which investment is aimed at providing products and service locally, therefore fails to find support. Since Russia has tight historical connections with the Europe, it is not surprising to see *EU* coefficients are mostly positive. This also further reflects the fact that Russia is doing much more business with the European countries shown in part 1 of our study.

V. CONCLUSIONS

China has had great achievements in the past three decades, from a country with low level of productivity to a critical economy in world affairs. Undergoing continuing rapid

economic growth oriented by international trade, China has accumulated vast Dollar-denominated reserves. To diversify ways of earning money and seek better growth opportunities, Chinese enterprises have been involved in increasing amount of foreign investment. The same practice is also adopted by other BRIC countries. In our article, we not only compare features in China's ODI with those of other BRICs, but also try to determine factors controlling China's investment by utilizing new micro-level datasets.

We first showed that in selecting economic sectors, all four nations demonstrate similar preference by pouring the majority of their FDI into industries such as wholesale/retail trade, manufacturing and business activities. After switching the scope to geographical allocation of ODI, we found China is the most diversified by investing mostly in Asia, Latin America, and Europe. Investment is highly concentrated by other three BRIC countries. Russia directs almost all its ODI to Europe, while India and Brazil both emphasize on Latin America.

Since official ODI data of China has flaws, we tried to re-examine the determinants of China's ODI and contrast that with Russia's under the framework developed by Burkley, *et al*. (2007) as well as a more generalized vessel developed from that. We confirmed the relatively equal importance of market-seeking and resource-seeking motivations when China conducts investment, which is not clear in Russia's case. Both countries are inclined to invest in countries with close cultural proximity, but don't seem to be attracted by strategic assets. Interestingly, China is willing to take on more risk in terms

of host country political conditions whereas Russia is more conservative. Such conservativeness of Russia is also reflected in regarding host's exchange rate in comparison with China. Macroeconomic environment is also a concern of China as expected, although highly insensitive. China reacts reversely on higher inflation. As to bilateral trade, no evidence is found to support the theory which says ODI is strongly affected by export as well as import for China. With limited data, however, Russia seems to be intrigued by export. The distance doesn't seem to push Chinese ODI away; rather, it is shown to have positive influence, which is in accordance with the pattern of Chinese ODI distribution. Russia was first implied to have a better interest in countries more open to FDI from abroad, but our generalized model does not support such a finding. The obscure effect of import, inflation and inward FDI may be attributed to the variable endogeneity. Finally, no strong evidence is discovered to support the hypothesis in which China is adopting horizontal investment strategy in Europe. Russia involves a lot in this sense due to its long-term relations with Europe countries.

With respect to further issue, we hope future studies can be extended to empirical analysis on the other two countries in order to provide a bigger picture. Some improvement on the model is also anticipated. Proxies of some variables are subject to reconsideration. For example, patent might not be a good indication of strategic-asset, and oil production could be added to complement resource-seeking specification. The micro-level data we used is not without limitations either. Heritage Foundation only record transactions above $100 million and 'Angola mode' agreement between China and

African resource exporters also cause underestimation in China FDI. Since 2008, the whole world, especially Euro zone, has been suffering from the financial crisis. In the years to come, we expect to see studies of how this turmoil impacts investment worldwide.

APPENDICES

Figure 1A: Industrial Distribution of China's ODI

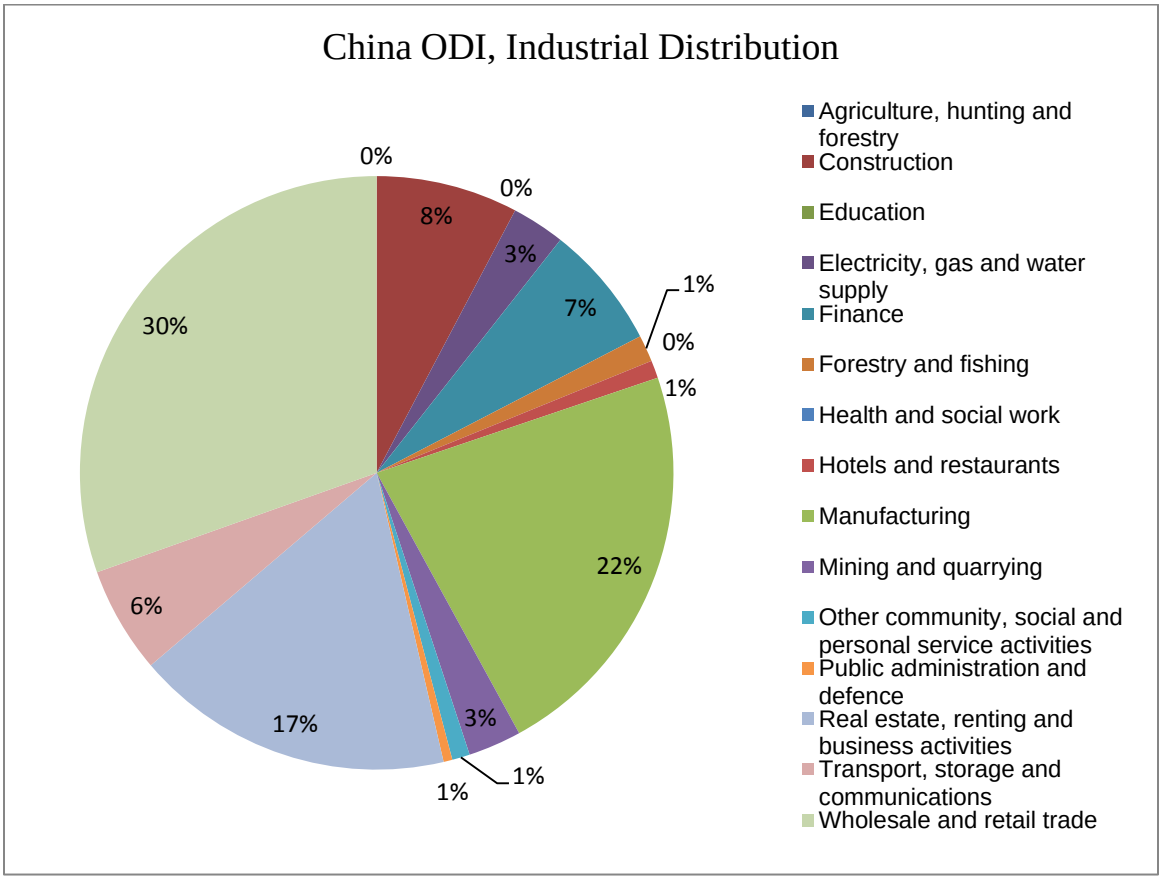

Figure 1B: Regional Distribution of China's ODI

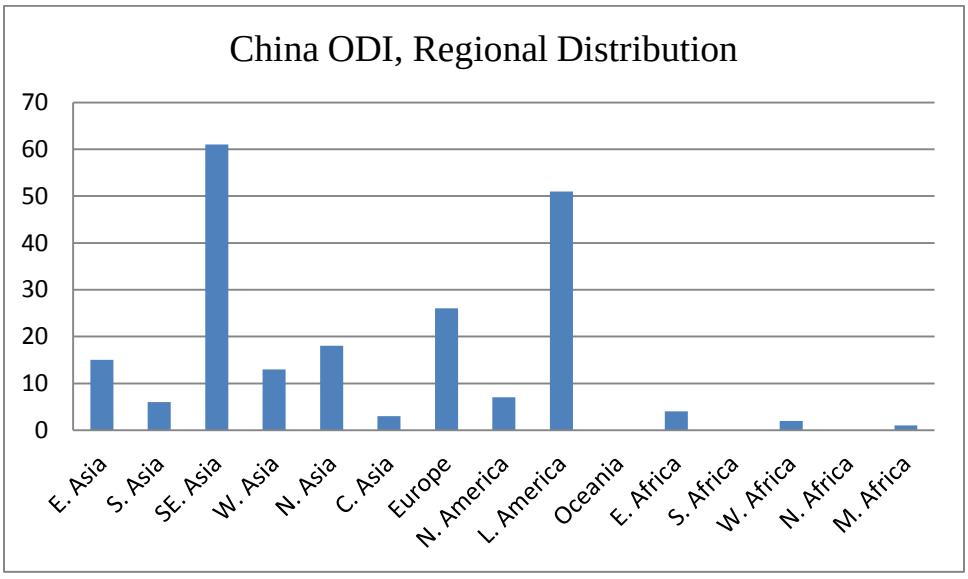

Figure 2A: Industrial Distribution of Russia's ODI

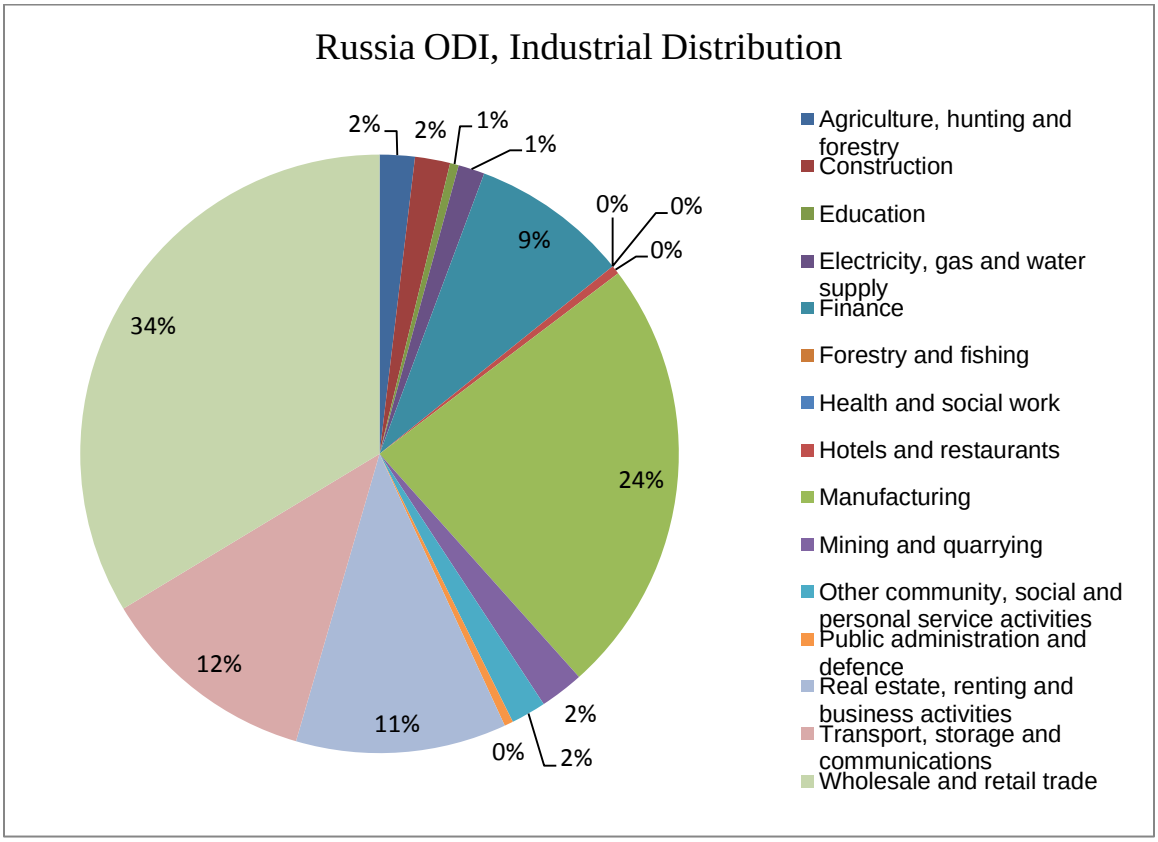

Figure 2B: Regional Distribution of Russia's ODI

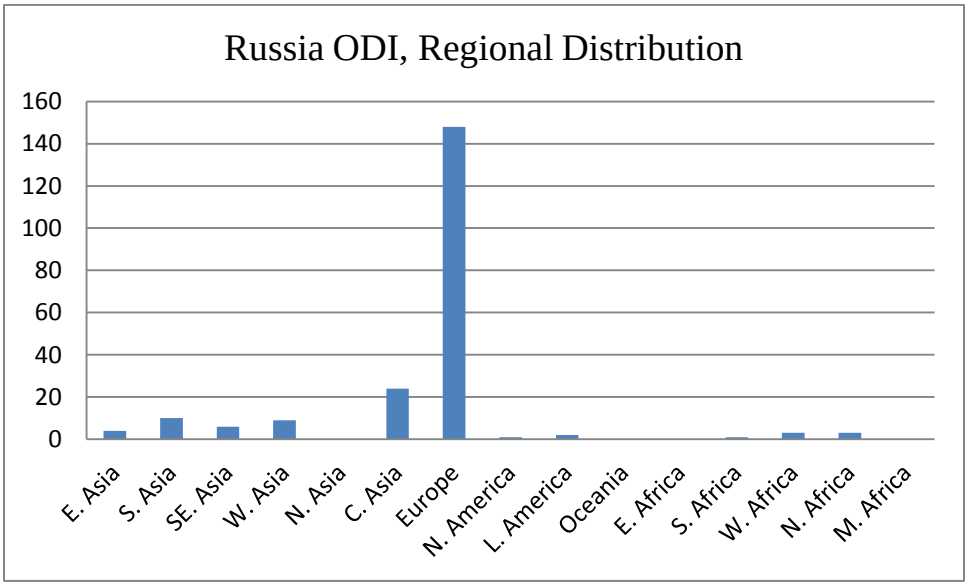

Figure 3A: Industrial Distribution of India's ODI

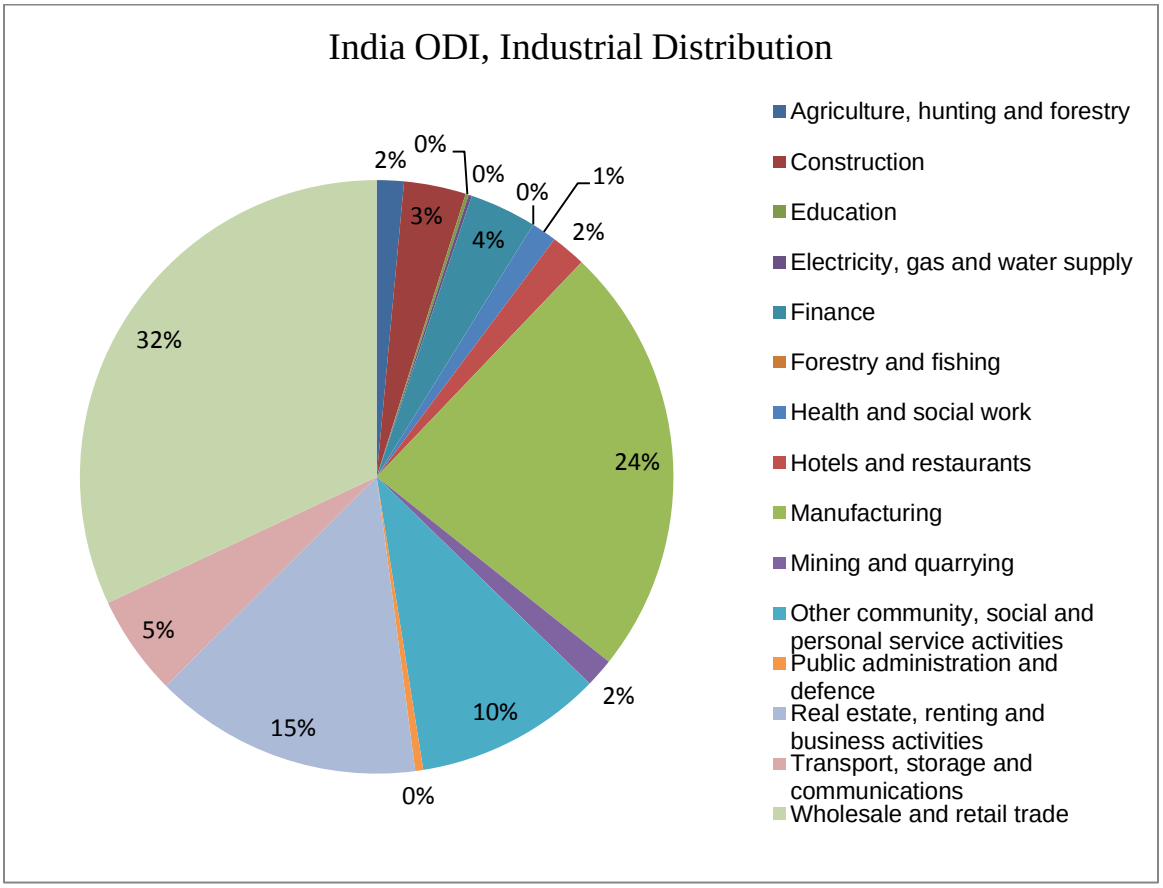

Figure 3B: Regional Distribution of India's ODI

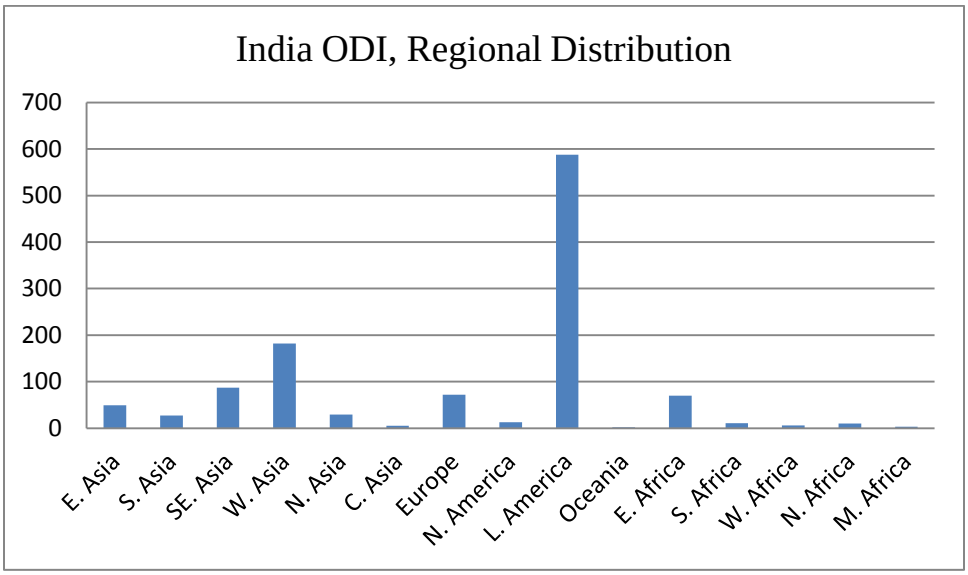

Figure 4A: Industrial Distribution of Brazil's ODI

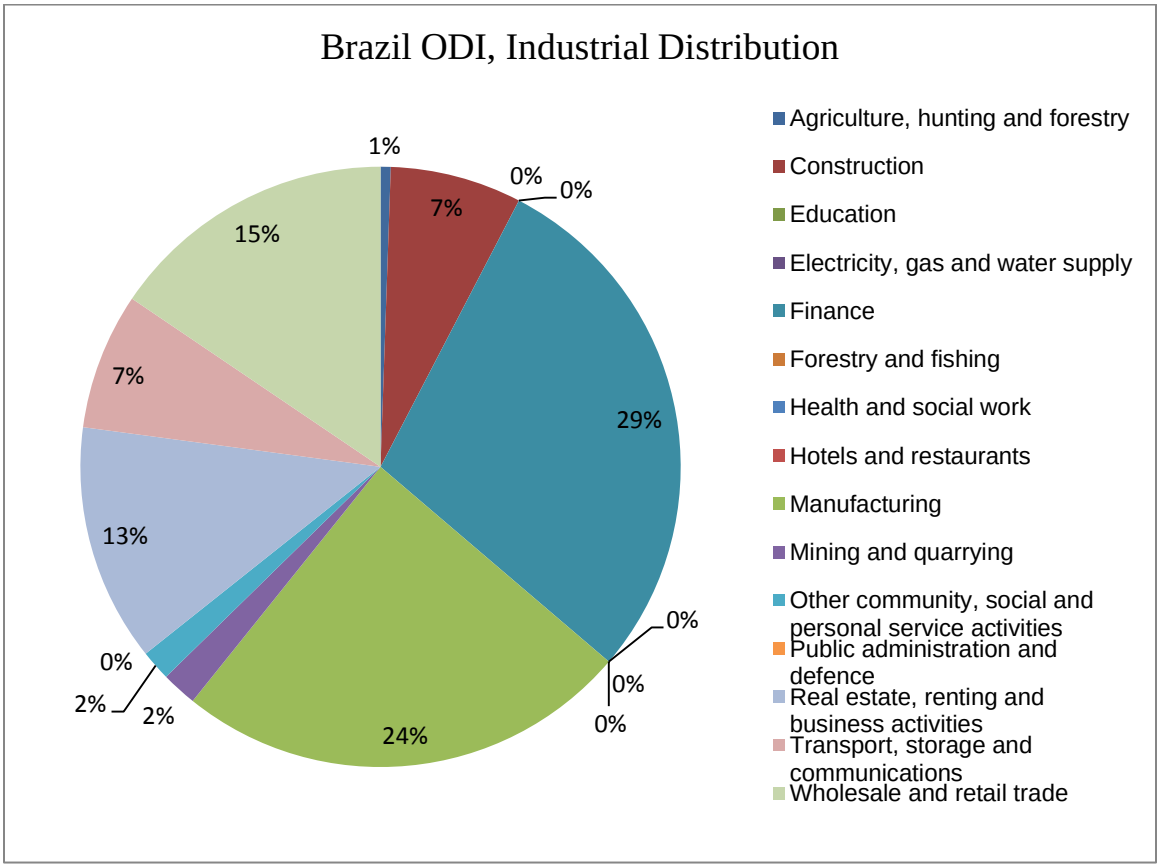

Figure 4B: Regional Distribution of Brazil's ODI

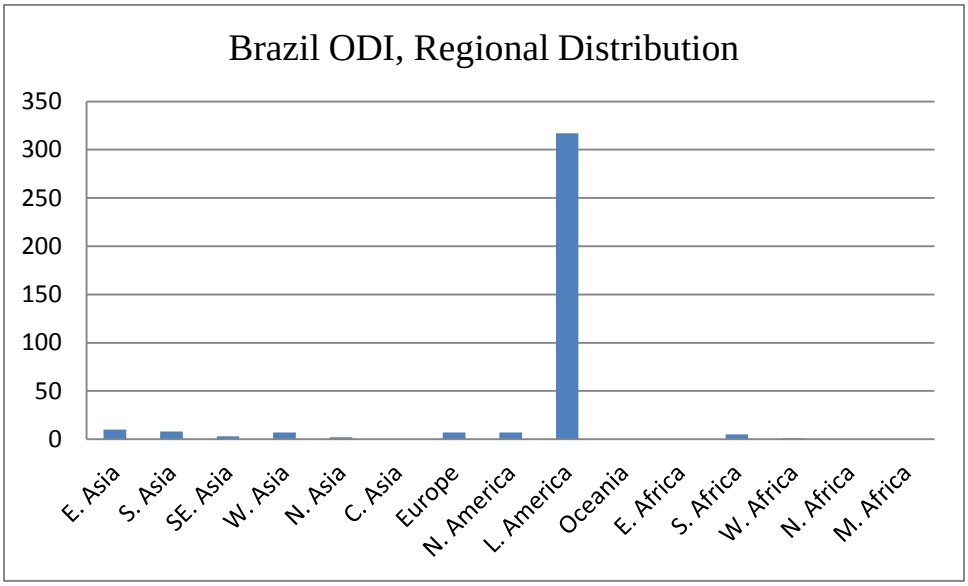

Figure 5: BRIC ODI regional distribution

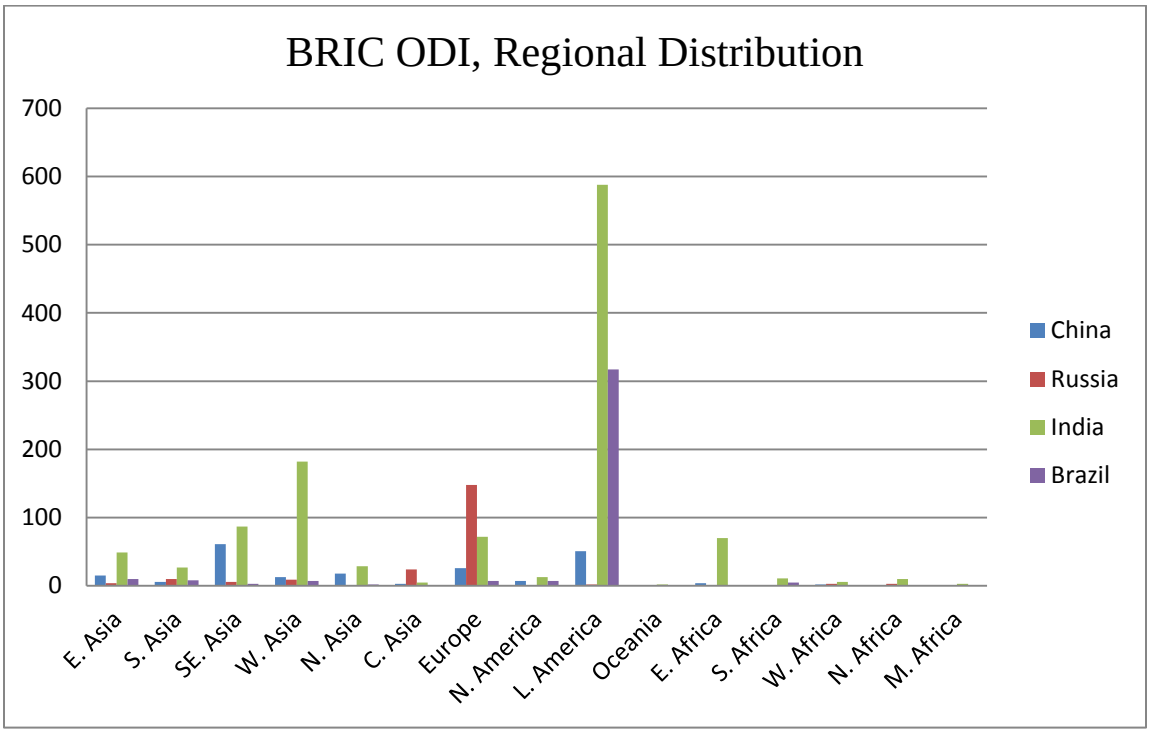

Table 1: Top 4 industries as ODI targets by BRIC countries

China		Russia		India		Brazil	
Wholesale and retail trade	30%	Wholesale and retail trade	34%	Wholesale and retail trade	32%	Finance	29%
Manufacturing	22%	Manufacturing	24%	Manufacturing	24%	Manufacturing	24%
Real estate, renting and business acrivities	17%	Transport, storage and communications	12%	Real estate, renting and business acrivities	15%	Wholesale and retail trade	15%
Construction	8%	Real estate, renting and business acrivities	11%	Other community, social and personal service activities	10%	Real estate, renting and business acrivities	13%

Table 2: The determinants of ODI

Hypotheses and number	Proxy	Expected sign	Theoretical justification	Main or control	variable Data source
FDI (dependent variable)	Annual outflow of Chinese FDI by country				Heritage Foundation/The Central Bank of the Russia Federation
Host market characteristics (I): absolute market size	LGDP: Host country GDP	+	Market seeking	Main	World Bank Development Indicator (Average)
Host market characteristics (II): relative market size	LGDPPC: Host country GDP per capita	+	Market seeking	Alternative main (I)	World Bank Development Indicator (Average)
Natural resource endowment	LORE: the ratio of ore and metal exports to merchandise exports of host country	+	Resource seeking	Main	World Bank Development Indicator (Average)
Asset-seeking FDI	LPATENT: Total (resident plus non-resident) annual patent granted in host country	+	Strategic asset seeking	Main	World Intellectual Property Organisation (2005-2010 Total)
Political risk (I)	LPRSrq: Host country's regulatory quality rating (higher values indicate greater stability)	+	Transaction costs	Main	World Bank Political Risk Services International Country Risk Guide (PRS), Regulatory Quality Indicator (Average)
Political risk (II)	LPRSrq: Host country's corruption control (higher values indicate greater stability)	+	Transaction costs	Main	World Bank Political Risk Services International Country Risk Guide (PRS), Corruption Control Indicator (Average)
Cultural proximity to China or Russia	CP: =1 when percentage of ethnic Chinese in total population is >1%; =1 when host country is a member of CIS	+	Region-specific transaction costs	Main	Ohio University Shao Center Distibution of the Ethnic Chinese Population around The World (2005)

Table 2(continued)

Exchange rate	LEXRATE: Host country official annual average exchange rate against RMB (fixed to dollar)	+	Domestic currency price of foreign assets	Control	World Bank Development Indicator (Average)
Host country inflation rate	LINF: Host country annual inflation Rate	_	Macroeconomic conditions	Control	World Bank Development Indicator (Average)
Exports	LEXP: China's exports to the host country	+	Market seeking	Control	China Statistical Yearbook (Average) / Foreign trade of Russia, National import and export statistics. (2004-2009 average)
Imports	LIMP: China's imports from the host country	+	Trade intensity	Control	China Statistical Yearbook (Average) / Foreign trade of Russia, National import and export statistics. (2004-2009 average)
Geographic distance from China	LDIS: Geographic distance between host and home country (capital or largest city)	_	Spatial costs	Control	Calculated using http://www.geobytes.com and Google Earth
Openness to FDI	LINFDI: Ratio of inward FDI stock to host GDP	+	Investment policy	Control	World Bank Development Indicator (Average)
European Union Member	*EU*: =1 if host country is a member state	+	Trade Barrier	Control	EU official website

Table 3: Results for China ODI determinants from basic model

	China			Russia					
	Host Counties Only		All Countries	Host Counties Only				All Countries	
	OLS	Poisson		OLS		Poisson			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
LGDP	0.3854	0.4061	0.5477	0.0509	0.5383	-0.5157	0.2255	-0.4123	-0.0241
	(0.3130)	(0.0042)	(0.0040)	(0.3652)	(0.2328)**	(0.0036)***	(0.0028)***	(0.0034)***	(0.0023)***
LORE	0.3142	0.3992	0.4269	0.0153	0.3937	0.6562	0.8192	0.5893	0.5891
	(0.1628)*	(0.0022)	(0.0023	(0.3403)	(0.3017)	(0.0048)***	(0.0040)***	(0.0049)***	(0.0033)***
LPATENT	-0.5838	0.0074	0.0331	-0.0441	0.0816	0.1062	-0.1581	0.1257	0.1065
	(0.0809)	(0.0010)	(0.0009)	(0.1496)	(0.1099)	(0.0025)***	(0.0015)***	(0.0026)***	(0.0013)***
LPRSrq	-0.9199	-0.8231	-1.2154	4.1168	0.5959	2.4922	3.3415	3.4220	3.7563
	(0.6803)	(0.0090)	(0.0087)	(2.1469)	(1.7934)	(0.0324)***	(0.0327)***	(0.0377)***	(0.0332)***
CP	0.8721	0.8275	0.9189	2.9272	2.4345	2.3280	4.1773	3.9951	3.9807
	(0.4982)*	(0.0047)	(0.0048)	(1.4828)*	(1.4112)*	(0.0228)***	(0.0218)***	(0.0237)***	(0.0196)***
LEXRATE	0.0762	0.0277	0.0659	-0.4366	-0.3550	-0.3944	-0.8127	-0.7532	-0.6590
	(0.0745)	(0.0010)	(0.0009)	(0.1582)***	(0.1201)***	(0.0034)***	(0.0033)***	(0.0027)***	(0.0026)***
INF	-0.0008	-0.0007	-0.0008	0.2079	0.0730	-0.2166	-0.1373	-0.1191	-0.1763
	(0.0003)**	(0.00001)	(0.00001)	(0.1601)	(0.1223)	(0.0024)***	(0.0020)***	(0.0021)***	(0.0017)***
EXP	0.1447	0.0959	-0.0510	0.2997		1.0018		1.0054	
	(0.2880)	(0.0042)	(0.0039)	(0.3323		(0.0033)***		(0.0033)***	
IMP	0.0806	0.0342	0.1857	0.3898		0.2410		0.0236	
	(0.1337)	(0.0020)	(0.0022)	(0.4593)		(0.0051)***		(0.0050)***	
DIS	0.6192	0.4108	0.4276	0.2646	-1.13391	1.2428	-0.6485	0.9014	-0.6296
	(0.4000)	(0.0050)	(0.0049)	(0.7090)	(0.3657)***	(0.0064)***	(0.0039)***	(0.0063)***	(0.0035)***
INFDI	0.2998	0.1820	0.2302	0.4745	0.5156	0.7250	0.0648	0.6943	0.2022
	(0.2407)	(0.0034)	(0.0033)	(0.3137)	(0.3034)*	(0.0039)***	(0.0018)***	(0.0032)***	(0.0018)***
R^2	0.2586	0.6433	0.7058	0.3297	0.3500	0.7955	0.4767	0.7709	0.5086
Observations	60	60	114	55	67	55	67	59	112

Notes: Standard errors are in parentheses.

* significant at 10%; ** significant at 5%; *** significant at 1% for POLS.

Adj. R^2 is recorded for POLS and Pseudo-R^2 is recorded for Poisson pseudo-maximum likelihood.

Table 4: Results for China ODI determinants from general model

	Host Counties Only				All Countries	
	OLS		Poisson			
	(1)	(2)	(3)	(4)	(5)	(6)
LGDP	0.5692	0.6669	0.4605	0.5353	0.5652	0.6498
	(0.3483)	(0.1828)***	(0.0044)***	(0.0022)***	(0.0041)***	(0.0020)***
LGDPPC	0.1769	0.1733	0.2480	0.2445	0.1457	0.1571
	(0.2263)	(0.2150)	(0.0031)***	(0.0031)***	(0.0031)***	(0.0030)***
LORE	0.3021	0.3088	0.3974	0.4023	0.4205	0.5061
	(0.1628)*	(0.1582)*	(0.0023)***	(0.0021)***	(0.0024)***	(0.0023)***
LPATENT	-0.0772	-0.0729	-0.0287	-0.0237	0.0253	0.0358
	(0.0835)	(0.0811)	(0.0010)***	(0.0010)***	(0.0009)***	(0.0009)***
LPRSrq	-0.7439	-0.8085	-0.7059	-0.7428	-1.2407	-1.4471
	(0.7734)	(0.7387)	(0.0112)***	(0.0108)***	(0.0109)***	(0.0104)***
LPRScc	-0.3245	-0.3033	-0.2446	-0.2381	-0.0520	0.0150
	(0.6553)	(0.6355)	(0.0090)***	(0.0090)***	(0.0093)***	(0.0090)*
CP	0.5912	0.6574	0.5707	0.6080	0.8100	0.8725
	(0.5210)	(0.4814)	(0.0054)***	(0.0050)***	(0.0055)***	(0.0054)***
LEXRATE	0.0840	0.0860	0.0363	0.0408	0.0762	0.0868
	(0.0887)	(0.0846)	(0.0012)***	(0.0012)***	(0.0011)***	(0.0011)***
INF	-0.0008	-0.0008	-0.0007	-0.0007	-0.0008	-0.0010
	(0.0004)*	(0.0004)*	(0.0000)***	(0.0000)***	(0.0000)***	(0.0000)***
LEXP	0.0581		0.0712		-0.0779	
	(0.3092)		(0.0044)***		(0.0039)***	
LIMP	0.0414		0.0133		0.1753	
	(0.1354)		(0.0020)***		(0.0023)***	
LDIS	0.4908	0.4154	0.3077	0.2582	0.3779	0.2881
	(0.4342)	(0.3564)	(0.0054)***	(0.0047)***	(0.0050)***	(0.0045)***
LINFDI	0.4590	0.4702	0.2909	0.3043	0.2620	0.2299
	(0.2558)*	(0.2473)*	(0.0035)***	(0.0035)***	(0.0032)***	(0.0031)***
EU	-1.0270	-1.0966	-0.8070	-0.8313	-0.4010	-0.4201
	(0.6209)	(0.5760)*	(0.0082)***	(0.0081)***	(0.0082)***	(0.0080)***
R^2	0.2637	0.2927	0.6770	0.6761	0.7110	0.7033
Observations	60	60	60	60	115	116

Notes: Standard errors are in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1% for POLS.
Adj. R^2 is recorded for POLS and Pseudo-R^2 is recorded for Poisson pseudo-maximum likelihood.

Table 5: Results for Russia ODI determinants from general model

	Host Counties Only				All Countries	
	OLS		Poisson			
	(1)	(2)	(3)	(4)	(5)	(6)
LGDP	-0.1841	0.2038	-0.7020	0.1032	-0.5875	-0.1052
	(0.3618)	(0.2289)	(0.0050)***	(0.0030)***	(0.0050)***	(0.0028)***
LGDPPC	0.3904	1.0742	0.7385	0.4062	1.1070	0.4950
	(0.5029)	(0.3630)***	(0.0112)***	(0.0068)***	(0.0113)***	(0.0065)***
LORE	0.1370	0.4732	0.9018	0.7892	0.7754	0.7329
	(0.3290)	(0.2745)*	(0.0054)***	(0.0041)***	(0.0056)***	(0.0035)***
LPATENT	0.0517	0.1369	0.2229	-0.1425	0.1984	0.0212
	(0.1554)	(0.1012)	(0.0034)***	(0.0016)***	(0.0034)***	(0.0016)***
LPRSrq	1.4763	-1.0877	0.0302	1.6763	1.4724	1.4076
	(2.4120)	(1.8798)	(0.0451)	(0.0349)***	(0.0493)***	(0.0331)***
LPRScc	2.5407	0.9182	2.2718	1.0108	1.2641	1.2285
	(1.3625)*	(1.1133)	(0.0189)***	(0.0143)***	(0.0172)***	(0.0118)***
CP	3.7060	2.5918	2.4864	3.9859	3.1605	4.5272
	(1.6210)**	(1.3519)*	(0.0236)***	(0.0208)***	(0.0283)***	(0.0196)***
LEXRATE	-0.3936	-0.1668	-0.2665	-0.6244	-0.4924	-0.5138
	(0.1672)**	(0.1259)	(0.0037)***	(0.0035)***	(0.0031)***	(0.0025)***
INF	0.2720	0.1427	0.0715	0.0444	0.1494	-0.0151
	(0.1578)*	(0.1163)	(0.0033)***	(0.0025)***	(0.0035)***	(0.0018)***
LEXP	0.6111		1.0806		1.0743	
	(0.3220)		(0.0031)***		(0.0034)***	
LIMP	0.0963		0.0969		-0.1903	
	(0.4570)		(0.0055)***		(0.0063)***	
LDIS	0.4880	-0.8386	1.4173	-0.3167	1.0277	-0.0512
	(0.6961)	(0.4347)*	(0.0073)***	(0.0052)***	(0.0069)***	(0.0047)***
LINFDI	0.2880	0.4151	0.4957	-0.0700	0.3525	-0.0690
	(0.2979)	(0.2741)	(0.0041)***	(0.0023)***	(0.0036)***	(0.0022)***
EU	-0.0138	0.0695	0.3021	0.7029	0.2432	1.3274
	(1.0041)	(0.8355)	(0.0090)***	(0.0091)***	(0.0082)***	(0.0085)***
R^2	0.3778	0.4584	0.8362	0.4958	0.8057	0.5667
Observations	56	68	56	68	59	114

Notes: Standard errors are in parentheses.
* significant at 10%; ** significant at 5%; *** significant at 1% for POLS.
Adj. R^2 is recorded for POLS and Pseudo-R^2 is recorded for Poisson pseudo-maximum likelihood.

REFERENCES

Böwer, U., Fernandez, D. and Thimann, C. (2009) 'Outward FDI from Emerging Markets: Evidence from Firm-Level M&A Data', Working paper, European Central Bank.

Buckley, P. J., Clegg, L. J., Cross, A. R., Liu, X., Voss, H. and Zheng, P. (2007) 'The determinants of Chinese outward foreign direct investment', *Journal of International Business Studies* **38**: 499–518.

Cheng, L. K. and Ma, Z. (2009) 'China's Outward FDI: Past and Future', NBER working paper, Hong Kong University of Science and Technology.

Cheung, Y.-W. and Qian, X. (2009) 'Empirics of China's outward direct investment', *Pacific Economic Review* **14**: 3.

Liao, W. and Tsui, K. K. (2012) 'China's Outward Direct Investment: Evidence from a New Micro Dataset', HKIMR Working Paper No.17/2012.

Mlachila, M. and Takebe, M. (2011) 'FDI from BRICs to LICs: Emerging Growth Driver?', IMF working paper, International Monetary Fund.

MOFCOM (2010) *Statistical Bulletin of China's Outward Foreign Direct Investment Ministry of Commerce* (MOFCOM): Beijing.

Silva, J. M. C. S. and Tenreyro, S. (2006) 'The Log of Gravity', *Review of Economics and Statistics* **88**(4): 641-658.