

# Testing the Asset-seeking Hypothesis :through the Investments of Chinese and Indian Firms in Europe

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## Abstract

We use the investments of Chinese and Indian MNCs in Europe to test the hypothesis that the main motivation of the Southern MNCs for investing in the Northern countries is asset- or technology-seeking. After showing that the previous work has not adequately tested this hypothesis due to its use of country-level FDI flow data, we conduct our tests with count data models tests. The results reveal that this motivation for Chinese MNCs is strong, whereas Indian MNCs, due to their excessive concentration in the UK and in software sector, have a weaker asset-seeking motivation than Chinese MNCs.

**JEL Classifications:** F21, F23, O52, O57

**Key Words:** Location Strategy, China, India, The Southern MNC, Asset-seeking FDI, Europe

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## I. Introduction

The foreign direct investments (FDI) from less developed countries, also called the “Third World FDI” or FDI from emerging markets, have attracted the attention of researchers (UNCTAD, 2006; Goldstein, 2007; Sauvart *et al.*, 2010). This paper concentrates on the outward FDI of Chinese and Indian multinational companies (MNC) in Europe. We begin with some descriptive statistics on Chinese and Indian outward FDI.

**Table 1. China’s outward FDI**

(million of USD)

Year	2003	2004	2005	2006	2007	2008	2009	2010	Accumulated
Europe	145	157.2	395.5	597.7	1540.4	875.8	3352.7	6760.2	13824.5
Growth rate		8.4%	151.6%	51.1%	157.7%	-43.1%	282.8%	101.6%	
North America	57.8	126.5	320.8	258.1	1125.7	364.2	1521.9	2621.4	6396.4
Growth rate		118.9%	153.6%	-19.5%	336.1%	-67.6%	317.9%	72.3%	
World	2844.7	5498	12261.2	17634	26506.1	55907.2	56529	68811.3	245991.
Growth rate		93.3%	123.0%	43.8%	50.3%	110.9%	1.1%	21.7%	
The share of Europe	5.1%	2.9%	3.2%	3.4%	5.8%	1.6%	5.9%	9.8%	5.6%

(Source) Ministry of Commerce of China, 2009 Statistical bulletin of China’s outward foreign direct investment; and 2010 Statistical bulletin of China’s outward foreign direct investment.

China’s outward FDI is concentrated in Asia. Table 1 shows that although the accumulated share of Europe in China’s total FDI is less than 6%, the trend is growing. China’s average growth rates of outward FDI in Europe and in North America were visibly higher than its average global FDI growth.

**Table 2. India’s overseas acquisitions**

(million USD)

Year	2000	2001	2002	2003	2004	2005	2006	2007	Accumulated
Western Europe	437.3	11	26.5	427.6	175.9	1237	3131	17573	23019.3
Growth rate		-97.5%	140.9%	1513.6%	-58.9%	603.2%	153.1%	461.3%	
North America	437.2	109.8	52.25	124.58	539.3	896.6	2670.6	12714	17544.3
Growth rate		-74.9%	-52.4%	138.4%	332.9%	66.3%	197.9%	376.1%	
World	896	188	2536	649	2787	3564	7658	32858	51136
Growth rate		-79.0%	1248.9%	-74.4%	329.4%	27.9%	114.9%	329.1%	
The share of Europe	48.8%	5.9%	1.0%	65.9%	6.3%	34.7%	40.9%	53.5%	45.0%

(Source) Pradhan (2007).

Table 2 shows that unlike China in most years, India’s FDI is concentrated in Western Eu-

rope and North America.<sup>1</sup> The share of Western Europe in the total accumulated FDI is 45%. A comparison between Tables 1 and 2 indicates that the total FDI in Europe by Indian MNCs is higher than those by Chinese MNCs in absolute value.

This paper starts by showing that in the previous work, even asset-seeking is regarded as decisive to explain the FDI of Southern MNCs in the northern countries although this hypothesis has not been adequately tested. In most studies, the dependent variable is the national FDI flow and the explanatory variables on asset-seeking are at the country level. Country-level technology, however, is highly correlated with such indicators of market size as GDP and per capita GDP. Another problem on the tests of asset-seeking with the country-level variables is that the measurements risk being inaccurate when the FDI operation aims at a sector-level technology target while there is a divergence between the host country's national technology level and its technology level of this sector. The tests ought to be conducted at the sector level where the technology-seeking motivation of the MNC could be unambiguously identified.

The originality of this study resides in our attempt to assess the technology-seeking motivation in relation to sector-level data. We test two hypotheses:

- Hypothesis 1. Southern MNCs choose to locate in Northern countries with advanced technology at the sector level.
- Hypothesis 2. Southern MNCs have weaker/stronger asset-seeking motivation to invest in those sectors in which they have/do not have a strong competitive advantage.

The second test can be regarded as a robust test of the first. To highlight our method, we exploit a sample of 910 Chinese and 796 Indian investment projects in Europe and use count data models to test the technology-seeking motivation of these investments. 54 disaggregated subsectors are identified in the data and they are then grouped in 14 grand sectors. The output shares of 32 European host countries in Europe in 54 subsectors are employed to measure their competitive or technological advantage at the sector level. For the sake of comparison, we also use some conventional factors that are generally employed to explain the FDI location of the Northern MNCs. In order to test Hypothesis 2, we must identify, among the 54 sectors, those in which Chinese and Indian MNCs have a strong competitive advantage. By comparing the two regressions with and without the sectors where they have a strong competitive advantage, Hypothesis 2 will be confirmed if the parameter of the variable reflecting asset-seeking in the former is lower than that in the latter. Our tests are also constructed to reveal if Chinese and Indian MNCs are different in technology-seeking, and if there is an evolution of this motivation over time. We will return to develop these points in detail since they are crucial for our approach.

This paper is organized as follows: Section I summarizes the literature and introduces the issue to address. Section II presents data and some descriptive analysis of our sample. Section III presents the econometric methodology and our strategy to define sectors in order to be apt to test asset-seeking hypothesis with our sample. Finally, we introduce and analyze the results

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<sup>1</sup> 2002 and 2004 are exceptional, however. According to Pradhan (2007), in 2002, USD 1,770 million was invested in Eastern and Central Europe, and in 2004, USD 1,420 million was invested in Asia.

before concluding.

## II. The Literature and Issues to Address

Most studies of FDI are part of the industrial location literature focusing on their determinants (McFadden, 2001; McCann & Sheppard, 2003). These determinants can be classified as neoclassical, institutional, and behavioral (Hayter, 1997). In neoclassical theories, perfectly informed individuals choose rational and optimal locations, thus such factors as agglomeration economies (market size or production concentration, of which population, GDP, or number of workers are often used as proxies), geographical distance (Hattari & Rajan 2011), and transport infrastructures (Martín-Arroyuelos & Usategui 2000). Technology and human capital that increase profit or reduce costs are included. Institutional factors take in the rigidity of the labor system, the efficiency of public administration, taxes, environmental regulations, and incentive programs for a new business. Behavioral factors qualify entrepreneurs as deciders of the FDI and their personal circumstances. Arauzo-Carod *et al.* (2010) provide a complete list on econometric works that have estimated these determinants with different sample sizes from different countries with two principal sets of methods: discrete choice models and count data models. Given that outward FDI is conducted by multinationals of which a great majority belongs to a developed economy, these studies focus uniquely on the Northern MNC in the first stage.

With the rapid increase of outward FDI from the South, and in particular from emerging markets, one natural question is: Among these determinants drawn on the basis of the FDI of Northern MNC, which fit the “Third World FDI”? What factors differentiate the FDI of Northern from that of Southern MNCs?

The general question “why do firms invest abroad?” has four subquestions: 1) Why do Northern firms invest in Northern countries? 2) Why do Northern firms invest in Southern countries? 3) Why do Southern firms invest in Southern countries? 4) Why do Southern firms invest in Northern countries? Theoretically, the answer to the first question could be found in a new industrial organization theory on intraindustrial specialization or in explanations on market-seeking motivation. The response to the third question could be similar to the first question. The second question could be answered by the increase in production costs in the home economy. In their core-periphery models, Fujita, Krugman, and Venables (2001) use labor cost as a unique variable that drives Northern firms to the South. Just like this answer, the Southern firms going to the even less developed Southern regions are mainly for cost-saving.

The answer to the last question “why do Southern firms go to the North” must be different from the answers to the first and the second questions that explore Northern firms’ motivations of FDI. It is also the theoretical and empirical issue of this paper: explaining and testing the main determinants of Chinese and Indian firms’ investments in Europe.

The most intuitive theory of why Southern firms go to the North is their quest for higher technology. It is based on Porter's 1980 study of competitive advantage and on Porter's 1990 work on the competitive advantage of nations. He emphasized the strategy of "globalizing to tap selectively into sources of advantage in other nations in order to improve the home diamond" (Porter, 1990, p. 90). Porter's idea has inspired extensive academic discussions on the peculiarities of such investments.

Dunning describes these kinds of investments as asset-seeking (Dunning & Narula, 1996). Since more advanced economies have more to offer in terms of technologies, capabilities, and managerial skills, industrializing countries from Asia (Korea and Taiwan, followed by China and India) have based their internationalization strategies on the search for competitive assets not yet possessed or fully leveraged (Dunning *et al.*, 1997). The growing role of strategic asset-seeking, rather than that of asset-exploitation, is a main determinant for the internationalization of these firms (Makino *et al.*, 2002; Li, 2007; Luo & Tung, 2007). In contrast to asset-exploiting MNC strategies, firms engaged in asset-augmenting strategies may not possess competitive advantages, especially the firm-specific ones, which allow them to work efficiently. Such firms may therefore venture into international markets and exploit their limited competitive advantages in order to acquire "strategic" created assets such as technology, brands, distribution networks, R&D facilities, and managerial competencies. Asset augmenting FDI has therefore become more prevalent and is undertaken by firms that have the necessary minimum complement of competitive advantages for acquiring assets and conducting operations in foreign locations (Dunning, 2004). Emerging investments from this recent trend have led some authors to search for alternative theories or paradigms in order to capture all the specificities of these countries' FDI (Matthews, 2006; Child & Rodrigues, 2005).

Interesting for explaining the Southern firms going North, another factor that can also be included into asset-seeking is shown by Jovanović (2003). According to him, the local proximity (clusters) of firms that produce similar, competing, and/or related products together with supporting institutions can influence the firms' decision of location. Economies of scale, activity-specific backward and forward linkages (indivisible production), accumulated knowledge and skills, innovation, existence of sophisticated customers, and a fall in transportation costs play relevant roles in the "protection" of clusters and absolute locational advantages of certain locations. These well-performed clusters are mostly located within industrialized countries and for the Southern firms, locating near these clusters is an important asset-seeking strategy to improve "global" competitiveness.

This idea of asset-seeking or asset-augmenting in which the Southern MNC invests in Northern countries for higher technology, has not, however, been adequately tested.

In most empirical work on location choice for the FDI of the Southern MNC, a general framework applicable to all MNCs, Northern and Southern, has been applied. In a frequently cited empirical study on Chinese outward FDI, Buckley *et al.* (2007) have tested, besides technology-seeking, such classic hypotheses as size of the host country market, endowments

of natural resources, endowments of ownership advantages, political risk, inflation rates, links with exports, geographic distance, and degree of openness. They conclude that the classic determinants explain much of this behavior. Technology-seeking is tested as insignificant. Child and Rodriguez (2005), however, have argued that these determinants do not explain all motivations of Chinese and Indian multinationals, and case studies of Chinese firms indicate that they are seeking technological and brand assets to create a competitive position in international markets.

A serious weakness of previous work on FDI location choice of the Southern MNC is the absence of sector-level studies. In most recent work on Chinese, Indian, or comparative Chinese and Indian overseas FDI, the dependent variable is their outward flows of FDI across years and host countries without sector-level distinctions (Buckley *et al.*, 2007; Duanmu & Guney, 2009; Kolstad & Wiig, 2009; Pradhan, 2007, 2009). Technology-seeking indicators chosen as explanatory variables are also at the country level. This is the reason for the failure of empirical studies to address the role of technology-seeking by the Southern MNC. When evaluating the effect of technology at the country level, it is equivalent to treating the country's entire economy as a single sector, and in this way the country-level technology is the "average" technology level of all sectors. As market size indicators, such as GDP and GDP per capita, are strongly influenced by average technology level, it will therefore be difficult to differentiate technology-seeking effects with market size (or agglomeration) effects.

Another problem on testing asset-seeking with country-level indicators is its inaccuracy. Most FDI operations are taken by MNCs that aim at sectorial targets. For example, if a Chinese MNC invests in France for wine, it seeks French wine technology. Testing at the country level coincides with testing at sector level only when France is high-tech both at the wine sector and at the average country level. Otherwise the test at country level diverges with the "true" motivation that can be faithfully measured only at the sector level. A country can be technologically strong in a specific sector but weak in average technology level, and vice versa. The larger the divergence between the sector-level and the country-level technology is, the larger the inaccuracy will be.

To clarify our arguments further, take Buckley *et al.* (2007) as example. In their work, the dependent variable is the total amount of FDI by host country (in total forty-nine) by year (1984–2001). They use three variables to measure the host market size: GDP, GDP per capita, and growth in GDP. They measure asset-seeking by the total annual patent registrations in host countries. With pooled ordinary least squares and the random effects generalized least squares methods, they find asset-seeking variables insignificant, which suggests that Chinese firms have not been motivated to acquire strategic intellectual capital assets over the period under study. Absolute host market size has a positive influence on Chinese FDI outflows, while the two alternative variables reflecting market size are insignificant.

Our concern is that patent number is highly correlated with GDP and GDP per capita. To check this, we find that for 194 countries in 2000, the correlation between patent number and GDP is 0.7466 and between patent number and GDP per capita 0.2484. Taking them in loga-

rithm (like in Buckley *et al.* 2007) they are 0.7902 and 0.4661.

De Beule (2010) uses the number of acquisitions as a dependent variable to compare Chinese and Indian overseas investments with a sample of 303 Chinese acquisitions in 37 host countries and 427 Indian acquisitions in 54 host countries. This is different from other work that use country-level FDI values as dependent variable. He employs, however, the number of patents/GDP, the R&D expenditure/GDP, and tertiary school enrollment to measure strategic assets. As a result, technological motivations are also measured at the country level.

Our innovation, in relation to De Beule (2010) and all other work, serves to analyze their choices among 32 European countries by taking into account sector-level information of these acquisitions. Through finding a way to measure each host country’s subsectorial competitive forces, our econometric estimations will more convincingly identify the technology-seeking motivation of these investments.

### III. Data and Description

The data in this study on Indian and Chinese investments in Europe were collected by Hay *et al.* (2008). Their information comes from the French Agency of International Investments, Invest Germany, Invest in Sweden Agency, Thomson Financial, the European embassies of the People’s Republic of China and of India, and specialized journals.

In total, 910 and 796 observations by firm, sector, year, and host European countries (listed in Annex 2) are gathered for China and for India, respectively. The periods cover 1981 to 2010 for China and 1965 to 2009 for India, but only 29 cases for China and 61 cases for India are from before 2000. Except for certain omissions, they include all China’s and India’s most important investment projects in Europe. As the great majority of those Chinese and Indian MNCs capable to invest in North America and in Europe are large firms, the results derived from this study are fairly representative of the location choices of their large firms.

Table 3 presents the destinations of their investments in Europe. We observe an unusual concentration of both China and India in Europe’s three largest countries, and this concentration is even higher for India. The major difference between them is India’s special attachment to the UK.

**Table 3. The Destinations of Chinese and Indian Investments in Europe**

(in number)

	UK	Germany	France	Other European countries
China	20.50%	18.18%	19.34%	41.98%
India	37.56%	17.96%	10.43%	34.05%

(Source) Calculated with our sample.

In Table 4, while India's first sectorial investment is software, China's first sectorial choice is electronics. Transportation services being in second place reflects China's willingness to create a transport network for its trade expansion. The importance of investments in textile, especially in the commerce of textiles, is not a surprise as China has become the world's largest producer and supplier of textile goods for Europe.

**Table 4. Sectorial Distribution of Chinese and Indian Investments in Europe** (in number)

	Electrical and electronic	Transport service	Textile	Building, entertainment and service	Telecom.	Transport equipment	Finance	Others
China	22.44%	14.74%	11.88%	9.24%	8.69%	8.25%	5.72%	19.04%
	Software	Pharmacy	Electrical and electronic	Transport equipment	Finance	Textile	Steel	Others
India	34.97%	13.96%	10.19%	8.05%	5.16%	4.4%	4.28%	18.99%

(Source) Calculated with our sample.

Table 5 presents the modality of their investments in Europe. China and India are very similar: creations and acquisitions represent nearly 95% of their investments.<sup>2</sup>

**Table 5. Modality of Chinese and Indian Investments in Europe**

	Creations	Acquisitions	JV	Extensions
China	44.07%	49.34%	2.97%	3.63%
India	43.59%	50.63%	1.76%	4.02%

(Source) Calculated with our sample.

## IV. Estimation Methodology

Two groups of models are applicable to location choice analysis: discrete choice and count data. The discrete choice models refer to the Conditional Logit models developed by McFadden (1974), now known as "Multinomial Logit." Count data models, like the first, are consistent with a profit maximization framework in which firms choose the optimal location subject to standard constraints. They calculate how changes in location characteristics affect the conditional expectation of the number of industrial or commercial projects created in a certain country over a given period of time (cf. Becker & Henderson, 2000). The conditional density or probability mass function led to different models: a Poisson model with Poisson distribution or

<sup>2</sup> « Extensions » include those new operations following the realized creations, acquisition, and JV.



a Negative Binomial Model with Gamma distribution. For an extensive analysis of the pros and cons of both models, see Arauzo-Carod *et al.* (2010).

In this study, we choose count data models because we consider them to fit well the task we undertake. While discrete choice models may account for both firm/plant and spatial factors, we do not deal with firm factors, and the likelihood function in discrete choice models is cumbersome when the number of alternatives (32 European countries in our study) is large. Nonetheless, discrete choice models are not meant completely inappropriate to our analysis.

When using count data model, a serious concern is how to deal with over-dispersion and “excess zeros.” In our sample, both are present.<sup>3</sup> Either unobserved heterogeneity or a process that has separate mechanisms for generating zero and nonzero counts can produce both overdispersion and excess zeros in the raw data, and a simple negative binomial model, a zero-inflated Poisson model, and a zero-inflated negative binomial model (ZINB) are all candidates for count data with these characteristics. Wald and likelihood-ratio (LR) tests are able to evaluate the relative fits of zero-inflated Poisson model and zero-inflated negative binomial model. A Vuong test allows one to choose between a negative binomial model (NB) and a zero-inflated negative binomial model. We regress with all these models. For all regressions, when Vuong tests are not significant, implying zero-inflated negative binomial regression is not preferred to negative binomial regression, we will present the estimation results of a negative binomial model. Otherwise, the estimation results with zero-inflated negative binomial regression model will be shown. By running negative binomial regressions furthermore, the likelihood-ratio tests are all significant, implying that negative binomial regression is preferred to standard Poisson regression. Consequently the estimation results with standard Poisson regression model will not be kept.<sup>4</sup>

The dependent variable is the number of investment projects by sector and host country. As the sample size is limited, we must use pooling data. In other words, we must totalize the FDI projects by sector and host country over the full period. We argue that this choice is justified as 97% of Chinese projects and 92% of Indian projects occurred within 2000~2010, and as during this period neither on the investor-country side nor on the host-country side were there significant events that caused structural changes, the “power balance” between the 32 countries has significantly changed. Otherwise, these changes might significantly affect the choices of Chinese and Indian MNCs.

The remaining task is to define the number of sectors. The data contains the names of the Chinese and Indian firms that invested and the sectorial features of the operations. On the one side, as we fix as objective the verification of the asset-seeking effect at the sector level, the

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<sup>3</sup> In this study, the percentage of zero in the regressant depends on how to define the number of sectors. As we finally choose 14 sectors and 54 subsectors, the percentage of zero in the 14-sector samples for China and India are respectively 59.6 and 65.8% and 82.0 and 88.3% in the 54-subsector samples. A lot of previous work has dealt with the samples of high percentage of zero. For example, Greene (1994) applied various count data models with a sample in which the percentage exceeded 80%.

<sup>4</sup> Two dummy variables: small countries (populations of less than 2 million) and non-Western European countries (Eastern European countries plus Turkey and Cyprus) are employed to inflate (equation that determines whether the count is zero) zero-inflated negative binomial regression.

more disaggregated the classification is, the more accurate the asset-seeking effect will be. On the other side, as the size of our sample is rather limited, the more disaggregated the classification is, the more serious the problem of “excess zeros” will be. Keeping in mind this trade-off, we first identify 54 subsectors according to the original data. They are subsequently classified into 14 grand sectors: agriculture; transport equipment; chemical; electrical and electronic; finance; information industry; raw materials; steel; textile and fashion; pharmacy; telecommunication and service; transportation service; oil and energies; and building, entertainment, and services (the lists of 14 sectors and 54 subsectors are in Annex 1).

When estimating the various effects at subsector level, the dependent variable is the number of investment projects across 54 subsectors and 32 host countries. For complementary robust tests, we also verify the results at the 14-sector level. The number of observations for our regressions will be  $54 \times 32 = 1728$  and  $14 \times 32 = 448$ , respectively.

To test if there is the evolution of Chinese and Indian firms’ motivations in their choices over the period, we also divide the entire period into two subperiods before 2006 and between 2006 and 2010. Since this period is judged as without structural change, the reason for choosing year 2006 is just for balancing the sizes of two subsamples.

We choose seven explanatory variables. To begin with, in accordance with the dependent variable that is treated as time-invariant, all explanatory variables will be transformed as time-invariant. In seven explanatory variables that will be introduced, except distance, six are time-variant. Therefore, we average the time-variant values of them. For example, per GDP, and population are their average values by European country during 2000~2010.

The first and the most important explanatory variable for testing the hypothesis that the Southern firms go to the North for asset-seeking is the share of each European country in total European output by subsector or sector (*SHARE*). This is both an available and a pertinent indicator to measure each country’s competitive advantage by sector. According to neoclassical reasoning, a country’s cost and technological competitiveness determine its output to expand for some sectors or to contract for others with international trade. A traditional Heckscher-Ohlin-Ricardo trade model predicts interindustry specialization. New Trade Theory (Krugman, 1981) explains intraindustry specialization by following increasing returns. By taking into account both inter- and intraindustry trade effects, output shares reflect European countries’ comparative advantage in equilibrium.

Eurostat statistics’ database provides information on most sectorial output distributions among European countries. The statistics on the production of manufactured goods (*PROM*) according to “new activity classification (*NACE Rev 2*)” allow us to calculate the shares of these countries in 54 subsectors.<sup>5</sup> When the estimations are conducted at the 14-sector level, we will calculate the average shares of these countries according to the categorizations of these 54 subsectors. For example, if a sector is composed of four subsectors, the share of the sector is

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<sup>5</sup> <http://epp.eurostat.ec.europa.eu/portal/page/portal/eurostat/>.

the average share of four subsectors.

The second and the third explanatory variables are per capita GDP (*PER\_GDP*) in USD and population (*POPULATION*) by host country over the period. They are for testing agglomeration and market size hypotheses. These indicators are also available in Eurostat.

The fourth explanatory variable is wage level by sector (*WAGE*), and it tests the assumption that these firms go where labor costs are lower. This assumption is crucial in explaining Northern firms' movement into the South. We test its relative importance to the Southern MNC going North. This information is obtained from Laborsta (Labor Statistics Database of International Labor Organization), specifically the two files Europe monthly wage Laborsta 5A and 5B.

The fifth explanatory variable is distance (*DISTANCE*). We use the shortest distance of each country to Europe's five largest countries namely Germany, the UK, France, Spain, and Italy in order to measure each country's access to large European markets. The distance of these five large countries to themselves is not zero. These data come from CEPII.<sup>6</sup>

The sixth explanatory variable is the flexibility of the formal labor market (*FLEXIBILITY*), a factor reflecting one important aspect of institutional environment that may influence investment decisions. This information comes from CEPII's institutional data base.

The final explanatory variable is host country's tax as percentage of GDP (*TAX*). This variable is traditionally used to test if the tax burden has a negative impact on the investments of MNC. It would also be interesting to see if it influences Chinese and Indian MNC locations in Europe. The main data come from Eurostat (2010), and they have been completed by the 2010 Index of Economic Freedom from The Heritage Foundation.

Recall that we make the following hypotheses: (1) Southern MNCs locate in Northern countries with advanced technology at the sector level. This hypothesis will be confirmed if the impact of the first explanatory variable is significantly positive. (2) Southern MNCs have weaker/stronger asset-seeking motivation to invest in sectors in which they have/do not have a strong competitive advantage in terms of production costs. Through checking the Chinese and Indian foreign trade balances to test the second hypothesis, we define the sectors in which China and India have a strong competitive advantage as those in which they have substantial trade surplus. Two main sectors are information industry and steel (which include four subsectors, cf. Annex 1). The ten subsectors are tea, bicycles, textiles, telecommunication equipment, television, consumer electronics, computer and components, electric appliances, furniture and wood products, and construction equipment. To constitute the sample with the sectors and subsectors in which China and India do not have a strong competitive advantage, we remove information industry and steel and in the remaining 12 sectors and we remove the ten subsectors according to their sectorial affiliation. Thus the 40 subsectors and 12 sectors by host country and year are kept.

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<sup>6</sup> <http://www.cepii.fr/francgraph/bdd/distances.pdf>.

We will first regress with 54 subsector (and 14 sector) data, and then regress with 40 subsector (and 12 sector), afterwards comparing their differences. If with the sample of 40 subsectors (and 12 sectors) the impacts of *SHARE* appear stronger than with the sample of 54 subsectors (and 14 sectors), Hypothesis 2 is confirmed and we conclude that the Southern MNCs have a stronger asset-seeking motivation to invest in those sectors in which they do not have a competitive advantage. These results reinforce the tests that confirm Hypothesis 1.

We also compare the differences between the India and China samples. In order to assess changes over time, we compare the differences from before 2006 and from 2006 to 2010. Note that when dividing into two subperiods, the explanatory variables take the mean values of the subperiods.

The explanatory variables used here are all in logarithm form such that their coefficients can be interpreted in terms of elasticity. The percentage ratios such as *SHARE*, *TAX*, and *RIGIDITY* are firstly multiplied by 100; that is, 65% is now 65, so that in logarithm they are non-negative.

Without missing data, the number of full observations is 1,728 for the 54 subsectors (1,280 for the 40 subsectors) and 448 for the 14 sectors (384 for the 12 sectors). The output shares of Switzerland and Turkey lack a few subsectors and this explains why observations are less than full samples in Table 7 for China and Table 8 for India.

**Table 6. Descriptive Statistics of Variables**

Variable	14-sector sample					54-sector sample				
	Obs.	Mean	Std. Dev.	Min	Max	Obs.	Mean	Std. Dev.	Min	Max
<i>Nb of choice_chn</i>	448	2.03	5.67	0	52	1728	0.53	2.06	0	38
<i>Nb of choice_ind</i>	448	1.77	7.09	0	115	1728	0.46	2.97	0	75
<i>SHARE</i>	432	0.86	0.94	0	3.78	1654	0.78	0.98	0	4.24
<i>PER_GDP</i>	448	9.57	1.01	6.83	11.11	1728	9.57	1.00	6.83	11.11
<i>POPULATION</i>	448	15.95	1.30	13.01	18.23	1728	15.95	1.30	13.01	18.23
<i>TAX</i>	448	3.57	0.17	3.12	3.89	1728	3.57	0.17	3.12	3.89
<i>WAGE</i>	448	7.08	0.91	5.26	8.74	1728	7.08	0.93	5.26	8.74
<i>DISTANCE</i>	448	5.54	2.45	0	7.58	1728	5.54	2.45	0	7.58
<i>RIGITITY</i>	448	1.16	0.12	0.76	1.39	1728	1.16	0.12	0.76	1.39

## V. Results and Analysis

We start with the effects of *SHARE*. First, in Regression 1 in Tables 7 and 8, operated with the entire Chinese and Indian samples at the subsector level, *SHARE* is significantly positive in both the Chinese and Indian cases, indicating the impact of asset-seeking and confirming

Hypothesis 1 on asset-seeking. Comparing their coefficients of *SHARE*, however, the asset-seeking effect of Chinese MNCs is clearly stronger than that of Indian MNCs.

In comparing the coefficients of *SHARE* for China in Regressions 1 and 2, the latter has a higher impact, confirming Hypothesis 2 that the Southern MNCs have a stronger asset-seeking motivation to invest in those sectors in which they lack a competitive advantage. The result in the Indian case does not prove Hypothesis 2 since the coefficient of Regression 2 is even slightly lower than that of Regression 1. We explain this result by arguing that Indian MNCs in Europe may not be a good example for testing Hypothesis 2 for several reasons. First, among 796 observations, 402 (50.5%) belong to sectors in which, according to our definition, Indian firms have a strong competitive advantage (including 35% software producers). This is, however, not the case for Chinese MNCs in Europe as only 324 of 910 (35.6%) are in the category of strong competitive advantage. In a sample with a smaller proportion of cases in which there is no competitive advantage, the tests of technology-seeking motivation will get less satisfactory results. Second, Indian MNCs have an unusually high concentration in the UK (37.56%). In this case, all parameters of chosen variables risk being biased because of the concentration in the UK. Given the historical links between India and the UK, the movement of Indian MNCs to the UK have arguably been motivated more by market-seeking and cost-cutting and less by asset-seeking. The UK, however, has more advanced technology in the sectors in which India has competitive advantage in relation to most European countries. Therefore, the concentration in the UK may lead to an overvaluation of the impact of asset-seeking in the sectors in which India has a competitive advantage.

Third, Regressions 3 and 4 (with grand sectors) are robust tests of the results obtained in Regressions 1 and 2. We observe that in China's case, the coefficients of *SHARE* in Regressions 3 and 4 coincide well with Regressions 1 and 2. In India's case, however, they are visibly in divergence. In Regressions 3 and 4, they are lower and insignificant, while in Regressions 1 and 2, they are significant. The explanation would be that measuring asset-seeking effect at the subsector level is more accurate and of greater magnitude than it is at the grand sector level. In China's case, given the existence of strong asset-seeking motivation, the results of measurement converge at different aggregation levels. In India's case, as the level of asset-seeking motivation is "in average" weaker, this motivation can be visible only at a much disaggregated level.

Fourth, comparing the coefficients of *SHARE* in both China's and India's cases in Regressions 5 and 6, the asset-seeking motivation tends to be weaker in 2006~2010 than in the period before 2006. In the second period, even though *SHARE* is always significant, the market-seeking motivation becomes stronger in China's case as both *PER\_GDP* and *POPULATION* have their coefficients increased. In terms of *FLEXIBILITY*, the impact of the flexibility of labor market changes from insignificant to significant. In India's case, except *PER\_GDP*, both *POPULATION* and *FLEXIBILITY* follow a similar trend. It seems to indicate that when the motivation of technology-seeking is weakened, the other motivations noted in the studies of lo-

cation behavior of the Northern MNCs also apply to Southern MNCs. After a first-period asset-seeking, a stronger asset-exploitation motivation is manifested for the sectors in which they have a strong competitive advantage.

We also note that agglomeration and market size effects reflected by the coefficients of *POPULATION* are all significantly positive. With the removal of sectors in which China and India have competitive advantage (with the samples of 40 subsectors or 12 sectors), the agglomeration and market size effects are, however, weaker in China's case. This is also a logical result, since with the primordial motivation being technology-seeking, the agglomeration- and market size-seeking may be weaker. Another variable reflecting agglomeration and market size effects is *PER\_GDP*. While it is significant in the samples of 54 subsectors and 14 sectors in China's case, it is systematically insignificant in India's case. It is noteworthy that when the effect of asset-seeking is measured at a more disaggregated level, the asset-seeking effect may be different with *PER\_GDP* effect since per capita GDP merely correlates national-level average technology. This result confirms our argument on the necessity of evaluating the asset-seeking effect at the sector instead of the national level. *FLEXIBILITY* is significant in most tests in India's case and between 2006 and 2010 in China's case.

Other explanatory variables are not significant. It seems to prove that some conventional factors that explain the outward FDI of the Northern MNCs may not explain the actions of the Southern MNCs in the North. *WAGE* is not significant or significant but with an unexpected positive sign. Inductively, if Chinese and Indian MNCs go to Europe, searching locations with lower labor costs must be at most a secondary motivation. The same reasoning applies to *TAX*: measuring the tax burden in host countries that is insignificant in China's case and weakly significant in few regressions but with an unexpected sign in India's case. The proximity of European countries to large European countries reflected by *DISTANCE* is not significant, probably because Europe is already geographically quite concentrated.

**Table 7. Regression Results: China**

	(1) 54 subsectors	(2) 40 subsectors	(3) 14 sectors	(4) 12 sectors	(5) 54 subsectors before 2006	(6) 54 subsectors 2006-2010
Dependent Variable	Nb of choice_chn	Nb of choice_chn	Nb of choice_chn	Nb of choice_chn	Nb of choice_chn	Nb of choice_chn
<i>SHARE</i>	0.48*** (0.11)	0.68*** (0.15)	0.49** (0.19)	0.72*** (0.20)	0.55*** (0.11)	0.30** (0.11)
<i>PER_GDP</i>	0.46* (0.19)	0.21 (0.28)	0.52* (0.26)	0.36 (0.28)	0.44† (0.25)	0.95** (0.34)
<i>POPULATION</i>	0.90*** (0.14)	0.71*** (0.17)	0.83*** (0.16)	0.72*** (0.17)	0.82*** (0.16)	1.03*** (0.18)
<i>WAGE</i>	0.22 (0.17)	0.46* (0.23)	-0.00 (0.23)	0.21 (0.25)	0.05 (0.24)	-0.09 (0.27)
<i>DISTANCE</i>	0.08* (0.05)	0.06 (0.06)	0.04 (0.06)	0.06 (0.07)	0.085 (0.06)	0.072 (0.06)
<i>FLEXIBILITY</i>	0.64 (0.60)	0.48 (0.67)	0.17 (0.67)	0.11 (0.77)	-0.00 (0.56)	1.65* (0.78)

<i>TAX</i>	0.49 (0.59)	0.32 (0.73)	0.54 (0.63)	0.25 (0.70)	0.59 (0.74)	-0.17 (0.68)
<i>Constant</i>	-25.48*** (3.87)	-20.93*** (4.99)	-21.50*** (4.20)	-19.26*** (4.54)	-22.87*** (4.64)	-29.56*** (4.89)
Observations /lnalpha	1654 0.92** (0.11)	1234 1.05** (0.13)	432 0.18 (0.132)	372 0.12 (0.17)	1654 1.14** (0.14)	1654 0.95** (0.14)
Wald chi2(7)	436.52		353.13	279.75	188.58	261.31
Prob>chi2	(0.000)		(0.000)	(0.000)	(0.000)	(0.000)
LR chi2		217.28				
Prob>chi2		(0.000)				
Log pseudo-likelihood	-1076.33	-713.57	-562.38	-415.74	-517.54	-747.48
Estimation model	NB	ZINB	NB	NB	NB	NB

(Note) Robust standard errors in parentheses, \*\*\* p<0.001, \*\* p<0.01, \*p<0.05, † p<0.1.

**Table 8. Regression Results: India**

	(1) 54 subsectors	(2) 40 subsectors	(3) 14 sectors	(4) 12 sectors	(5) 54 subsectors before 2006	(6) 54 subsectors 2006-2010
Dependent variable	Nb of choice_ind	Nb of choice_ind	Nb of choice_ind	Nb of choice_ind	Nb of choice_ind	Nb of choice_ind
<i>SHARE</i>	0.39* (0.16)	0.36* (0.15)	0.17 (0.19)	0.21 (0.18)	0.45* (0.21)	0.30* (0.14)
<i>PER_GDP</i>	0.13 (0.27)	0.32 (0.29)	0.32 (0.32)	0.36 (0.31)	0.16 (0.35)	0.65 (0.44)
<i>POPULATION</i>	0.76*** (0.17)	0.81*** (0.22)	0.81*** (0.17)	0.80*** (0.20)	0.65** (0.23)	0.88*** (0.19)
<i>WAGE</i>	0.37 (0.24)	0.25 (0.29)	0.12 (0.28)	0.15 (0.32)	0.24 (0.32)	-0.08 (0.34)
<i>DISTANCE</i>	0.021 (0.07)	0.04 (0.08)	-0.05 (0.07)	-0.02 (0.07)	0.01 (0.10)	0.03 (0.07)
<i>FLEXIBILITY</i>	1.72* (0.70)	2.23* (0.87)	1.57* (0.78)	1.91** (0.84)	1.15 (0.74)	2.34** (0.88)
<i>TAX</i>	1.24 (0.78)	1.31 (0.82)	1.38* (0.82)	1.31* (0.79)	1.53 (1.07)	-0.01 (0.85)
<i>Constant</i>	-24.82*** (4.47)	-27.82*** (5.60)	-23.99*** (4.68)	-25.39*** (5.37)	-23.69** (6.81)	-25.23*** (5.16)
Observations /lnalpha	1654 1.88** (0.12)	1234 1.89** (0.16)	432 0.58** (0.16)	372 0.49** (0.21)	1654 2.24** (0.16)	1654 1.75** (0.14)
Wald chi2(7)	229.16	156.89	188.58	189.07		212.30
Prob>chi2	(0.000)	(0.000)	(0.000)	(0.000)		(0.000)
LR chi2					91.19	
Prob>chi2					(0.000)	
Log pseudo-likelihood	-867.42	-524.60	-517.54	-345.93	-487.55	-686.32
Estimation model	NB	NB	NB	NB	ZINB	NB

(Note) Robust standard errors in parentheses, \*\*\* p<0.001, \*\* p<0.01, \*p<0.05, † p<0.1.

## VI. Conclusion

The FDI of Southern MNCs in Northern countries has become a striking trend. Although the hypothesis of asset-seeking motivation has previously been theoretically presented, it has not been adequately tested. We use a sample of Chinese and Indian investment projects in Europe and count data models to test the asset-seeking motivation of these investments.

It is found that both Chinese and Indian MNCs manifest significant asset-seeking motivation. In addition, asset-seeking motivation becomes weaker in favor of market-seeking among projects in the second period (2006–2010), implying a stronger asset-exploitation motivation for the sectors in which they have gained a strong competitive advantage. Moreover, Indian MNCs' technology-seeking motivation is weaker than that of Chinese MNCs. Unlike Chinese MNCs, they do not have a stronger asset-seeking motivation in the sectors in which they lack a competitive advantage. We would therefore contend that the Indian sample comprises an excessively large number of cases in which MNCs search traditional markets since they have already gained a competitive advantage (especially in the software sector), and since there is an excessive concentration of FDI operations in the UK. Finally, while some conventional variables (such as agglomeration, market size, and market flexibility) applicable to Northern MNCs are also true of Southern MNCs, others (such as the interest in lower wages, lower taxes, and geographical proximity) are either partially or not at all appropriate to explain Southern MNCs' motivation for locating in the North.

It is not a surprise that Chinese firms have a strong motivation for asset-seeking. One of the explanations of such a behavior is that most large firms are former (or actual) state-owned enterprises, and the Chinese government has a very strong influence on firms' decision to invest with its "Go Global" strategy. Many authors question the very possibility of Chinese firms to become multinational without its government's support (Child and Rodrigues, 2005; Luo and Tung, 2007). This is a big challenge for European countries, which invites the European Commission to play a more active role in the elaboration and accomplishment of efficient and coherent industrial policy within the EU in the face of the competition coming from China and other emerging industrial countries.

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## References

- Arauzo-Carod, J.M., Liviano-Solis, D., & Manjón-Antolín, M. 2010. Empirical studies in industrial location: an assessment of their methods and results. *Journal of Regional Science*, 50: 685–711.
- Becker, R., & Henderson, V. 2000. Effects of air quality regulations on polluting industries. *Journal of Political*



*Economy*, 108: 379-421.

Buckley, P., Clegg, J., Cross, A., Liu, X., Voss, H., & Zheng, P. 2007. The determinants of Chinese outward foreign direct investment. *Journal of International Business Studies*, 38: 499-518.

Child, J., & Rodriguez, S.B. 2005. The internationalization of Chinese firms: A case for theoretical extension? *Management and Organization Review*, 1(3): 381-410.

De Beule, F. 2010. Locational determinants of internationalization: Chinese and Indian acquisitions. Copenhagen Conference on Emerging Multinationals: Outward Investment from Emerging and Developing Economies, 25-26 November 2010, Copenhagen Business School.

Duanmu, J.L., & Guney, Y. 2009. A panel data analysis of locational determinants of Chinese and Indian outward foreign direct investment. *Journal of Asia Business Studies*, 3(2): 1-15.

Dunning, J.H. 2004. An evolving paradigm of the economic determinants of international business activity. *Advances in International Management*, 15: 3-27.

Dunning, J.H., & Narula, R. 1996. The investment development path revisited – some emerging issues. In J.H. Dunning, & R. Narula (ED.), *Foreign direct investment and governments: catalysts for economic change*: 1-41. London: Routledge.

Dunning, J.H., Van Hoesel R., & Narula, R. 1997. Third world multinationals revisited: new developments and theoretical implications. In J. H. Dunning (ED.), *Globalization, trade and foreign direct investment*: 255-286. Oxford: Pergamon Press.

Eurostat, 2010. *Taxation trends in the European Union, data for the EU member states, Iceland and Norway*. Brussels: European Commission.

Fujita, M., Krugman, P., & Venables, A.J. 2001. *The spatial economy*. Cambridge, MA: The MIT Press.

Goldstein, A. 2007. *Multinational companies from emerging economies: composition, conceptualization and direction in the global economy*. New York: Palgrave.

Greene, W., Accounting for Excess Zeros and Sample Selection in Poisson and Negative Binomial Regression Models (March 1994). NYU Working Paper No. EC-94-10. Available at SSRN: <http://ssrn.com/abstract=1293115>.

Hattari, R. & Rajan, R. 2011. How different are FDI and FPI flows? Distance and capital market integration. *Journal of Economic Integration*, 26 (3) : 499-525

Hay, F., Milelli, C., & Shi, Y. 2008. *Présence et stratégies des firmes Chinoises et Indiennes en Europe une perspective dynamique et comparative*. Paris : Ministère de l'Economie, des Finances et de l'Emploi Direction Générale des Entreprises.

Hayter, R. 1997. *The dynamics of industrial location, the factory, the firm and the production system*. London: Wiley.

Jovanović, M. N. 2003. Local vs. global location of firms and industries. *Journal of Economic Integration*, 18 (1): 60-104.

Kolstad, I., & Wiig, A. 2009. What determines Chinese outward FDI? Working paper WP 2009: 3, Chr. Michelsen Institute.

Krugman, P.R. 1981. Intraindustry specialization and the gains from trade. *The Journal of Political Economy*, 89(5): 959-973.

- Li, P. P. 2007. Toward an integrated theory of multinational evolution: The evidence of Chinese multinational enterprises as latecomers. *Journal of International Management*, 13, 296-318.
- Luo, Y. and Tung, R.L. 2007. International expansion of emerging market enterprises: a springboard perspective. *Journal of International Business Studies*, 38(4), 481-498.
- Makino, S., Lau, C., & Yeh, R. 2002. Asset-exploitation versus asset-seeking: Implications for location choice of foreign direct investment from newly industrialized economies. *Journal of International Business Studies*, 33 (3): 403-421.
- Martin-Arroyuelos, A. & Usategui, J. 2000. Firm location when countries differ in infrastructures or incomes. *Journal of Economic Integration*, 15 (2): 294-313.
- Matthews, J. 2006. Dragon Multinationals: new players in 21<sup>st</sup> century globalization. *Asia Pacific Journal of Management*, 23: 5-27.
- McCann, P. & Sheppard, S. 2003. The rise, fall and rise again of industrial location theory. *Regional Studies*, 37: 649-663.
- McFadden, D. 2001. Economic choices. *American Economic Review*, 91: 351-378.
- McFadden, D. 1974. Conditional logit analysis of qualitative choice behavior. In P. Zarembka (ED.), *Frontiers in econometrics*. London: Academic Press.
- Ministry of Commerce of China, 2009, *Statistical bulletin of China's outward foreign direct investment*. Beijing: Ministry of Commerce of China.
- Porter, M.E. 1990. *The competitive advantage of nations*, Harvard Business Review, March-April, 1990, 73-91.
- Porter, M.E. 1980. *Competitive strategy*. New York: Free Press.
- Pradhan, J.P. 2009. Emerging multinationals from India and China: origin, impetus and growth. MPRA Paper, No. 18210, University of Munich Library.
- Pradhan, J.P. 2007. Trends and patterns of overseas acquisitions by Indian multinationals. Institute for Studies in Industrial Development Paper, No. 12404, Munich Personal RePEc Archive.
- Sauvant, K.P., Maschek W.A., & McAllister, G. (EDs.) 2010. *Foreign direct investment from emerging markets: The challenges ahead*. New York: Palgrave Macmillan.
- UNCTAD, 2006. *World investment report 2006 -FDI from developing and transition economies*. New York: UNCTAD.

## Appendices

### Appendix 1: The Lists of 14 Sectors and 54 Subsectors and their Numbers of Cases

Sector	Number	Subsector	Number	Subsector	Number
1. agriculture	51	1. agricultural products	43	4. tea	2
		2. wine	3	5. tobacco	1
		3. flower	2		
2. transport equipment	139	6. car	123	8. ship	2
		7. airplane	2	9. bicycle (and motor bicycle)	12
3. chemical	56	10. agricultural chemical	40	12. chemical fiber	1
		11. plastic	3	13. laboratory chemical and biochemical	12
4. electrical and electronic	285	14. electric appliances	29	19. environmental equipment	47
		15. computer and components	106	20. optical precision equipment	11
		16. television	8	21. medical equipment	8
		17. consumer electronic	20	22. construction equipment	15
		18. machine tools	41		
5. finance	93	23. finance	93		
6. information industry	317	24. software	229	26. information related components	6
		25. information service	82		
7. raw materials	55	27. rubber	8	30. glass and ceramics	11
		28. aluminum	16	31. furniture and wood products	7
		29. paper and package	13		
8. steel	58	32. steel	58		
9. textile and fashion	144	33. textile	103	36. jewels	1
		34. perfume	16	37. other fashion	7
		35. watch	16	38. pencil and office supplies	1
10. pharmacy	124	39. pharmacy	124		
11. telecommunication and service	97	40. telecommunication equipment	49	41. telecommunication service	48
12. transportation service	151	42. transport service	151		
13. oil and energies	37	43. oil and gas	26	46. bio-energy	3
		44. nuclear	1	47. energy transportation	2
		45. coal	5		
14. building, entertainment, and service	98	48. construction	23		
		49. real estate	8	52. TV, movie, music, and multimedia	23
		50. restaurant and hotel	20	53. advertising	3
		51. toy and game	18	54. ecommerce	3

(Note) The classification of the sector and subsectors are functions of the chosen sectors which the FDI have realized in our data.

**Appendix 2: The List of 32 European Countries**

Austria	Spain	Netherlands
Belgium	Finland	Norway
Bosnia	France	Poland
Bulgaria	Greece	Portugal
Switzerland	Hungary	Romania
Croatia	Ireland	Serbia
Cyprus	Italy	Slovenia
Czech Republic	Kosovo	Sweden
Germany	Latvia	Turkey
Denmark	Lithuania	United Kingdom
Estonia	Luxembourg	