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Chinese and Indian Multinationals: A Firm-Level Analysis of their Investments in Europe

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JEL codes: F21; F23

Keywords: China, India, FDI, firm-level data, MNEs

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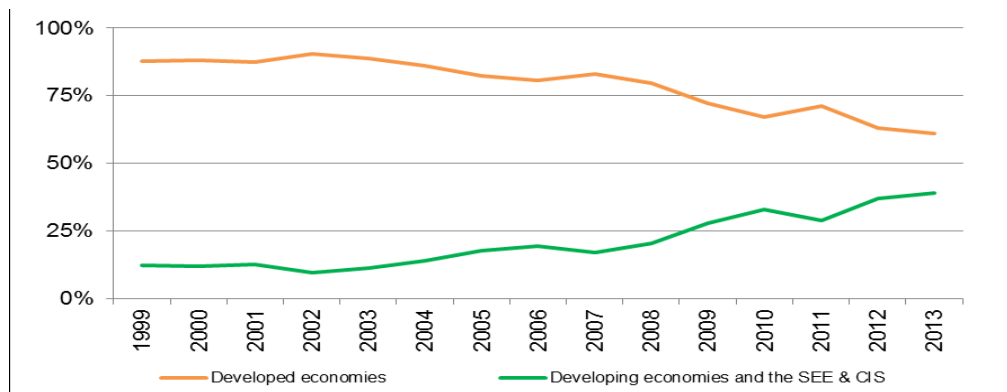
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1. Introduction

Over the last years, foreign direct investments (FDI) undertaken by developing country multinational enterprises (MNEs) have been continuously increasing, and in 2013 reached a record level of US\$460 billion, representing 39% of global direct investment outflows (UNCTAD, 2014).

Fig.1. The share of FDI outflows: developed vs. developing economies



Source: UNCTAD (2014)

Among MNEs from developing countries, Chinese and Indian companies are considered particularly aggressive in their outward FDI. In the eleven years between 2001 and 2012, FDI flows from China and India increased dramatically - from US\$6.9 billion to US\$84.2 billion for China, and from US\$1.4 billion to US\$8.6 billion for India. Within the same time span, outward FDI stock rose from US\$34.6 billion to US\$ 509 billion in the case of China, and from US\$2.5 billion to US\$ 118.2 billion in the case of India (UNCTAD, 2014). If we consider overall investments made by the BRICS (Brazil, Russian, India, China, South Africa), we find that in 2012, 42% of their outward FDI stock was in developed economies, with Europe accounting for 35% of the total (UNCTAD, 2013).¹

China and India, together with Russia, account for the lion's share of investments in Europe and the increasing presence of these countries is generating considerable interest, concern, and controversy. The rapid expansion of these countries is viewed with a mix of optimism and fear: on the one hand inputs of fresh capital are welcomed by the host countries, especially in the current period of low growth, while on the other hand, there are fears that these foreign investments might be an attempt to gain control over strategic assets and infrastructures, and could lead to the loss of key technological capabilities. These mixed sentiments are often based on anecdotal empirical evidence and personal interpretations of a few well known cases of leading multinationals such as Lenovo,

¹ The shares of China and India in the stock of BRICS outward FDI are respectively 36% and 10% (UNCTAD, 2014).

Haier, and Huawei from China, and Tata and Mittal from India. So far, relatively little is known about the characteristics of the Chinese and Indian firms engaging in FDI, or how these features are related to these firms' internationalization strategies.

The academic literature provides evidence of a growing interest in Emerging Market MNEs (EMNEs); for instance, the recent review by Kearney (2012) of works on emerging markets published in economics, finance, international business, and management journals concludes that EMNEs' international business strategies is one of the most promising areas for future research.²

A lively debate on the adequacy of existing MNE theories to study the behavior of EMNEs has recently emerged. Some scholars consider EMNEs to be a new type of MNEs, requiring a new theory (Mathews, 2002); others think still valid the standard MNE theories (Narula, 2006). The former group considers that EMNEs count on different advantages with respect to Advanced Country MNEs (AMNEs), which rely mainly on ownership of key assets such as technologies, brands, and other intellectual property. Ramamurti (2012) shows that the reality is somewhere in between these two positions, and that there are aspects of EMNEs that are similar to AMNEs and others which are not. On the basis of a large number of case studies, Ramamurti and Singh (2009) conclude that EMNEs are a heterogeneous group exhibiting a variety of internationalization strategies, which the authors categorize according to five different types based on *country-specific* (natural resources, cheap factors of production, and cultural factors) and *firm-specific* (product/process technologies, brands, marketing and commercial skills) advantages, and their target markets (other developing or emerging countries or advanced economies).

In this paper, we add to the literature on EMNEs by focusing on Chinese and Indian multinationals investing in Europe. We exploit a firm level dataset to build an empirical picture of who these firms are, their characteristics, and how these features are associated with their international business strategies. The novelty of our empirical exercise derives from two main features: the availability of a new database and the use of an innovative, in this field, statistical instrument.

The database is EMENDATA (Emerging Multinationals' Events and Networks DATAbase), and contains information on both greenfield investments and mergers and acquisitions (M&A) in the period 2003-2011. The data are derived from different sources and associate information at the level of the deal with information on the company undertaking the investment. In EMENDATA, each cross-border deal is associated with information available in BvD's *Orbis* on the investing company; this allows an investigation of the foreign expansion strategies of Chinese and Indian multinationals at firm level (Amighini et al., 2014). The empirical literature on Chinese and Indian

² See Wright et al. (2005) and Xu and Meyer (2013) for theoretical reviews of EMNEs' business strategies.

FDI so far has been mainly based on aggregate official FDI data (among others see Buckley et al., 2007; Kolstad & Wiig, 2012) or data on greenfield FDI (Amighini & Franco, 2013; Amighini et al., 2013a,b; De Beule & van de Bulcke, 2012) or M&As (Bhabra & Huang, 2013). The only studies at the level of the investing firm are case studies on individual companies, which mostly focus on the same well-known multinationals and provide useful anecdotal evidence but do not allow generalization (Fan et al., 2012; Zhang & Filippov, 2009; Zhang et al., 2011).

In the empirical analysis we adopt classification trees, a data mining nonparametric technique commonly used in botany and in medical decision-making to select from among a large number of variables those that are the most important for determining the outcome variable to be explained. In the case of Chinese and Indian investors in Europe, we investigate in a simple and a priori manner which of their several characteristics (i.e. size, factor intensity, innovation propensity, leverage capacity, profitability) is most likely to be associated with their internationalization strategies in relation to mode of entry, destination, motivation, and replication of investments. In other words, classification trees allow us to segment the population of investing firms into meaningful subsets, including companies, characterized by similar characteristics, and more likely to choose similar internationalization strategies.

For mode of entry, we find that greenfield investment is more likely to be chosen by large-sized EMNEs. We find also that a low propensity for innovation is associated with a small probability of opting for M&A strategy. A high propensity for innovation is related to asset-seeking FDI, while a high level of profitability is needed to invest in the core EU countries. Finally, very large size characterizes companies investing in more than one country.

The paper is organized as follows. Section 2 introduces the database and describes Chinese and Indian investments in Europe. Section 3 discusses the methodology and the variables which are selected on the basis of the existing literature. Section 4 presents the empirical findings. Section 5 concludes.

2. Chinese and Indian FDI: some descriptive evidence

2.1. The EMENDATA database

The Emerging Multinationals' Events and Networks DATABASE (EMENDATA) includes greenfield investments, M&As, and other minority investments by emerging multinationals between 2003 and 2011. We match three data sources: *fDiMarkets* (Financial Times Group) for greenfield

investments, and *Zephyr* (Bureau van Dijk's - BvD) and *SDC Platinum* (Thomson Reuter) for M&A and other minority investments (corresponding to an ownership share of less than 50%).³

The three sources are built in different ways. *fDiMarkets* is an event- or deal-based database, reporting each investment resulting in a wholly-owned subsidiary established at a certain date by an investing firm; Bureau van Dijk's *Zephyr* and Thomson Reuters' *SDC Platinum* are firm-level databases, reporting the ownership relationships between any parent firm and its affiliates. Given the very different nature of these data sources, the main effort undertaken in EMENDATA is their harmonization, which involves intensive manual work.

In the current paper, we focus on deals undertaken by Chinese and Indian investors in the EU27 countries; this represents a total of 1,790 deals, 841 undertaken by 495 Chinese companies, and 949 by 432 Indian investors.⁴ The available information on individual deals includes: location of the investment, mode of entry (greenfield, M&A, or minority), industry specialization of the investing company and the subsidiary, the activity (e.g. R&D, production, sales) undertaken in the case of greenfield investments.⁵ In addition, for each investing company we have information on size, ownership structure, and consolidated and unconsolidated balance indicators.

2.2. Chinese and Indian deals in the EU-27

Table 1 shows that in the period 2003-2011 Indian firms made 949 investments in the EU27, and Chinese companies 841 investments. For both Indian and Chinese firms, greenfield investment is by far the favorite mode of entry and accounts for 80% of Chinese deals and 55% of Indian deals. In relation to trends (Figure 2), greenfield investments are increasing all along the period, and especially those undertaken by Chinese firms. M&As show a less clear trend: Indian M&As increased up to 2008 when they have reached the level of greenfield investments in absolute value. They then dropped sharply, Chinese M&As have increased continuously but at a slower pace.

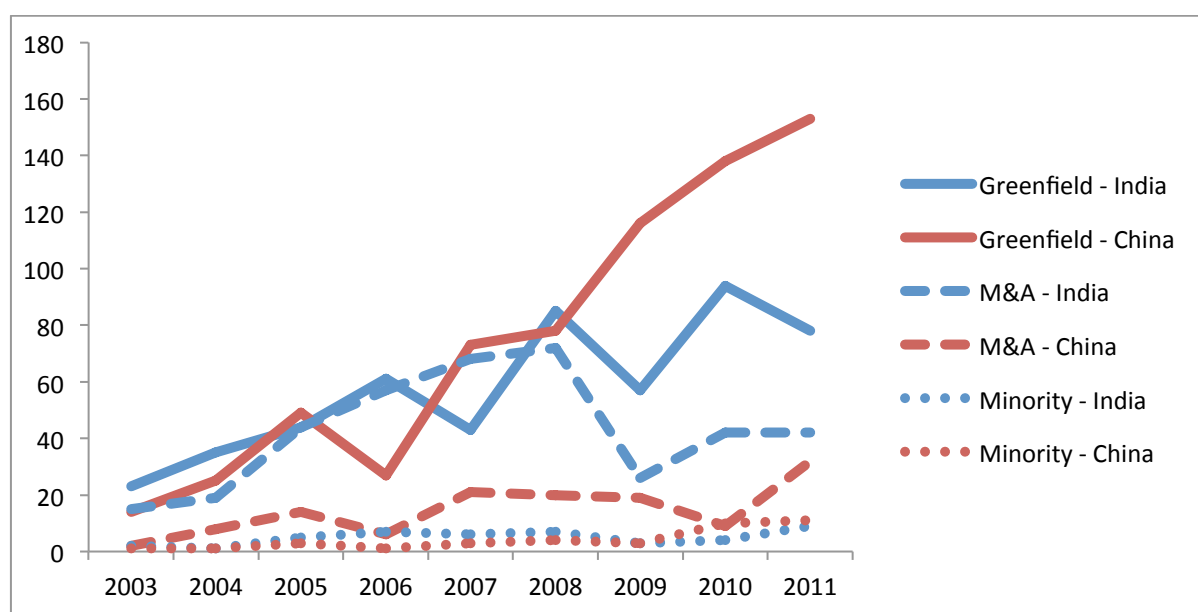
³ Bureau van Dijk's *Zephyr* and Thomson Reuters' *SDC Platinum* are recognized as comprehensive sources of data on M&As and most existing empirical analyses are based on one or the other of them. Merging these two sources provides us with more complete information. 41% of the deals in EMENDATA are both in *Zephyr* and *SDC Platinum*, 28% are only reported in *Zephyr* and 31% are only in *SDC Platinum*. Therefore, EMENDATA has better coverage of M&As than either single data source.

⁴ Information at deal level allows identification of the location of both the direct acquirer and the ultimate owner and whether transit via a fiscal haven is involved, thus assessing the relative importance of fiscal havens as location choices. We have checked whether deals directed to EU-27 originating from fiscal havens could ultimately be attributed to a Chinese or an Indian group and could be considered Chinese or Indian investments. This allowed us to add further deals increasing the coverage of EMENDATA.

⁵ When investigating the internationalization strategies of multinationals the number of deals is a more appropriate unit of analysis than the value of the investment because the choice to invest in a specific country and the motivation of the investment might be largely independent of the amount of capital invested. Moreover, investment size varies widely across sectors, with resource-intensive sectors receiving larger average investments than consumer goods sectors or services. For this reason several empirical studies take number of deals (not investment size) as the unit of analysis (Amighini et al., 2014).

With regard to investment destinations, Chinese and Indian investments in the EU27 countries represent respectively 30% and 10% of their global investments, with most (89% and 90% respectively of Chinese and Indian deals) going to the EU-15.⁶ The top destination countries for China and India differ: Indian firms mostly target the United Kingdom, while Chinese firms mainly invest in Germany. In both cases, the top destination country is the recipient of more than one-third of the total deals (Table 1).

Fig.2. Chinese and Indian FDI to Europe (2003-2011)



Source: EMENDATA

Tab.1 - Investments by destination country (# of deals and %)

	China			India		
	Greenfield	M&A	Total*	Greenfield	M&A	Total*
Germany	268 (40)	32 (24)	304 (36)	96 (18)	63 (17)	163 (17)
UK	108 (16)	28 (21)	144 (17)	225 (43)	146 (38)	391 (41)
France	50 (7)	20 (15)	74 (9)	30 (6)	30 (8)	65 (7)
Netherlands	32 (5)	17 (14)	53 (6)	30 (6)	21 (5)	51 (5)
Italy	33 (5)	11 (8)	47 (6)	14 (3)	29 (7)	47 (5)
EU-15	592 (88)	126 (96)	718 (89)	461 (89)	353 (92)	814 (90)
EU-12	81 (2)	5 (4)	86 (11)	59 (11)	32 (8)	91 (10)
EU27	673 (100)	131 (100)	804(100)	520 (100)	385 (100)	905(100)
World	2092	623	2715	2559	290	2849

In parentheses % of the total

*Total values include minority acquisitions

Source EMENDATA

⁶ EU15 includes Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, and United Kingdom. EU12 includes Bulgaria, Cyprus, Czech Republic, Estonia, Hungary Lithuania, Latvia, Malta Poland, Romania, Slovenia, and Slovakia.

Chinese and Indian FDI in Europe are very concentrated in terms not only of destination countries but also of target sectors. In both cases, around half of the deals are concentrated in four sectors, which are different for the two investing countries. Chinese firms invest mainly in manufacturing: electronics, industrial machinery, communication, and automotive; Indian MNEs invest in the service and pharmaceuticals sectors.

Notable in the number of investments undertaken by individual companies is that a large majority of Chinese (80%) and Indian (65%) MNEs were involved in one deal during the period investigated, evidence of still sporadic investments in Europe. Most Chinese firms' investment (68%) was via greenfield, while Indian MNEs were involved in a mix of greenfield (33%) and M&A (32%). Finally, Indian firms show a greater propensity to invest in more than one country than their Chinese counterparts.

Tab.2 - Investments by sector (# of deals and %)

CHINA	Greenfield	M&A	Total*
Electronics	114	9	128 (25)
Industrial Machinery & Engines	79	30	114 (14)
Communications	97	0	97 (12)
Automotive	49	13	62 (7)
All other sectors	334	79	440 (52)
Total	673	131	841 (100)
INDIA			
Software & IT services	134	58	197 (22)
Business Services	79	36	118 (12)
Biotech & Pharmaceuticals	41	48	95 (10)
Financial Services	73	5	79 (8)
All other sectors	193	238	460 (48)
Total	520	385	949 (100)

In parentheses % of the total

* Total values include minority acquisitions

Source EMENDATA

Tab.3 –Indian and Chinese MNEs: number of investments

	China	India
1 greenfield	336 (68)	144 (33)
1 M&A	58 (12)	139 (32)
> than 1 greenfield	60 (12)	40 (9)
> than 1 M&A	11 (2)	37 (9)
Greenfield and M&A	30 (6)	72 (17)
Investments in more than 1 country	68 (14)	108 (25)
Total	495 (100)	432 (100)

In parentheses % of the total

Source EMENDATA

If we consider the top investors in the EU-27, we observe first that more Indian groups are involved in at least ten deals than Chinese MNEs. Also, investment strategies based on multiple

modes of entry, i.e. greenfield and M&As, tend to be concentrated in the capital and knowledge intensive manufacturing sectors, such as automotive (SAIC, Tata Group, Mahindra Group), chemicals (China National Chemical), and energy (Reliance, Suzlon Energy). Service industry (e.g. finance, communications, software) and electronics industry investors tend to rely on greenfield entry (see the cases of Huawei, ZTE, ICBC, State Bank of India, ICICI Bank).

3. The empirical analysis

3.1. The classification trees

Breiman et al.'s (1984) seminal paper introduced the notion of classification trees in statistics. Classification trees are part of the family of decision trees⁷ and are based on a recursive procedure which allows partitioning a set of n statistical units (i.e. investing firms) into groups that are homogeneous with respect to a discrete or categorical output variable (i.e. modes of entry - greenfield or M&As, or motivations) (see the Appendix for a detailed description of the statistical procedure). The premise of the investigation is fairly simple – given factors $x_1, x_2, x_3, \dots, x_n$ (in our case firm characteristics: size, factor intensity, innovation propensity, leverage capacity, and profitability) we want to predict an outcome Y (in our case for instance greenfield or M&A, or location in the core or the periphery of the EU).

Tab.4 - Top Chinese and Indian investors in the EU27 (# of deals)

	Country	Greenfield	M&A	Total
Tata Group	India	62	9	71
Huawei Technologies	China	52	0	52
ZTE	China	24	0	24
Mahindra Group	India	11	11	22
China National Chemical	China	13	9	22
Wipro	India	15	5	20
Reliance	India	10	6	16
Industrial and Commercial Bank of China (ICBC)	China	15	0	15
State Bank of India (SBI)	India	13	0	13
Suzlon Energy	India	8	4	12
ICICI Bank	India	11	0	11
Infosys Technologies	India	11	0	11
Punjab National Bank (PNB)	India	11	0	11
Shanghai Automotive Industry Corporation (SAIC)	China	8	3	11
Ranbaxy Laboratories	India	5	5	10
Suntech Power Holdings	China	9	1	10

Source: EMENDATA

⁷ There are two types of decision trees: classification trees which are used if the output variable can take a finite set of values (as in our case), and regression trees used when the output variable is continuous.

Classification trees allow us to identify which of the various characteristics of multinationals plays a statistically significant role in the decisions related to key aspects of the internationalization strategy. Note that each characteristic on its own may not be a strong predictor of a given outcome, but together they may be important. In addition to identifying which variables matter to predict a given output, this technique also provides precise variable thresholds below/above which a certain international business strategy is more likely.

Compared to a simple linear regression model, classification trees have several advantages. First, they provide fast and easily understandable predictions about which variables are important to classify the sample units with respect to a certain outcome, without introducing distribution assumptions and treating the data generation process as unknown. Second, they are extremely useful if the variables affecting the output interact in complicated and nonlinear ways. In such cases, defining a simple global model for the entire sample can be hard, and non-parametric smoothers such as classification trees, are helpful because they try to fit the model within smaller parts of the sample.⁸

3.2. *Internationalization strategies*

We apply classification trees to categorize Chinese and Indian multinationals investing in the EU27 and making a 1-0 decision with regard to alternative modes of entry, location, motivation, and decision to invest in more than one country.

(i) *Mode of entry: Greenfield vs. Mergers & Acquisitions.*

Although traditionally most outward FDI by EMNEs (especially Chinese MNEs) was in the form of greenfield investments, EMNEs have recently been exploiting M&As in order to expand abroad (Ramamurti, 2012). M&As guarantee rapid entry into a foreign country, relatively easy control over specific and strategic assets such as reputation, brands and distribution networks, knowledge and technologies of the acquired firm, and access to local markets (Makino et al., 2002; Meyer et al. 2009a and b). Acquisitions can support EMNEs' catch up strategies through the development of new skills and competences, and organizational and technological learning (Vermeulen & Barkema, 2001).

(ii) *Location: EU-core (EU-15 countries) vs. EU-periphery (EU-12 countries that joined the EU after 2004)*

⁸ E.g., see Durlauf & Johnson (1995), Minier (1998) and Sheridan (2014), who use regression trees to investigate macroeconomic issues implying non-linear effects.

The literature on MNEs explains the location decision based on investment motive(s) and the characteristics of the host economy (Dunning & Lundan, 2008): market seeking investments are attracted by large and growing markets; strategic resource seeking investments search for locations well endowed with specialized knowledge assets; efficiency seeking investments favor low labor cost destinations. In the case of Chinese and Indian MNEs, there are several empirical studies that investigate the effect of some host country characteristics for explaining their location choices (Pradhan, 2011; De Beule & Duanmu, 2012; Kolstad & Wiig, 2012). In particular, focusing on the EU-27, Brien et al. (2010) show that the quality of the labor market is an important aspect of the decision to invest in a particular region.

(iii) *Motivation: Technology driven FDI (TFDI) vs. other FDI*

One of the motivations for EMNE investment in advanced countries is the existence of technological assets which give access to advanced knowledge and capabilities to improve the MNE's technological and innovative capabilities (Makino et al., 2002; Luo & Tung, 2007; Deng, 2009; Chen et al., 2012). In the case of Indian MNEs, Pradhan (2008) shows how their motivations have evolved from market-seeking in the pre-liberalization phase (when investments were mostly directed to other developing countries), to resource-seeking and asset-seeking in more recent times (with investments shifting to developed countries).

In this paper, TFDI are identified in two different ways according to the information available in EMENDATA:

- for greenfield investments *fDiMarkets* provides information on the activity related to the investment. We define as TFDI the investments undertaking: "Research and Development", "Design, Development & Testing", and "Education & Training" activities;
- for acquisitions, we define as TFDI the investments where the target company has intangible assets values larger than zero. In BvD's Orbis, intangible (fixed) assets include expenditure on training, and research and development expenses. Therefore, in the case of an acquisition we can take a positive level of intangible assets as a proxy for TFDI.

(iv) *Number of deals/countries: one deal vs. more than one deal in more than one country*

In a recent paper, Kalasin et al. (2014) suggest that the capacity to focus on the core business and cope with managerial and financial resources constraints is associated with EMNEs' ability to invest in several advanced markets, because of the high costs involved in undertaking investments in different countries.

3.3. *Firm level characteristics*

In the empirical analysis we investigate which of several characteristics of investing companies are most likely to explain the modalities of the international business strategies discussed above. One of the difficulties related to the selection of appropriate variables to measure different structural characteristics of the EMNEs is the very high number of missing values. Our selected firm variables are aimed at encompassing several structural aspects, at the same time minimizing sample reduction. The variables considered (see Appendix for details on their construction), taken in the same year of the deal, are as follows:

- a) Total revenues as a measure of size (**Y**) (Contractor et al., 2007);
- b) Ratio of total capital assets to number of employees as a measure of capital intensity (**KL**);
- c) Share of intangible assets to total assets as a proxy for propensity to innovate (**INN**) (Montresor et al., 2014);⁹
- d) Ratio of shareholders' assets to total assets, i.e. the solvency ratio (**SOLV**), intended as a measure of negative leverage (Desai et al., 2008);
- e) Percentage of profits earned by the firm in relation to its total assets (**ROA**), as a measure of profitability (Contractor et al., 2007; Kalasin et al., 2014).

Table 5 provides summary statistics for the variables employed in the empirical analysis,¹⁰ and shows some differences between Chinese and Indian investors. In terms of total revenues, Indian MNEs have a larger median value than Chinese MNEs, while the mean value is larger for Chinese companies due to the inclusion in the sample of some very large-sized companies (i.e. the 90th percentile value for Chinese companies is much larger than for Indian companies). With regard to innovation propensity, Indian MNEs have a larger mean value due to some outliers on the right side of the value distribution. Also, Indian companies have higher profitability, and higher solvency ratios and ROA values with respect to Chinese investors for both the mean and median. Finally, Chinese MNEs, on average, are more capitalized than Indian companies, which show larger median values for the capital/labor ratio.

4. Associating firm characteristics and international business strategies

The output of the econometric tests is a tree, which identifies groups of Chinese and Indian MNEs that are homogeneous in terms of their investment strategies in Europe.¹¹ In each tree we investigate

⁹ Focusing on Innobarometer 2013, a survey about attitudes and activities related to innovation policy in the EU countries, Montresor et al. (2014) find that a high level of intangible assets is associated with companies giving high priority to the development of new products/processes. The ratio of number of patents to total revenues was also used as a measure of innovation propensity in our econometric tests but the results were not statistically significant.

¹⁰ Appendix Table A1 presents the correlation matrix of the variables.

¹¹ The econometric tests were undertaken on a sample of 423 companies (253 from China and 170 from India), for which financial information is available in Orbis database, and involving a total of 706 deals. In each test, we drop

an alternative choice of investment strategy: e.g. in Figure 3 the choice is between greenfield (1) or M&A (0) strategy. Each tree provides interesting information. First, it reveals the firm characteristics associated significantly to each alternative choice (e.g. in Figure 3 INN, KL, Y, and ROA).¹²

Second, each node provides a quantitative threshold (e.g. the first node in Figure 3 a share of intangible assets to total assets lower than 1.2%) and the probability that companies meeting this condition choose a greenfield (93%) or a M&A (7%) investment. The tree also reports the size of each sub-group of companies generated (in our case 77 companies).

It should be noted also that the firm characteristics relevant to each alternative choice should be considered together to predict a given outcome. In what follows we explain the four estimated trees in detail.

Tab. 5. Structural characteristics of the investing firms

Variable	Mean	Median	S.D.	P10	P90
Y					
Full sample	2.40e+09	2.38e+08	6.45e+09	1.54e+07	7.39e+09
China	2.84e+09	2.34e+08	7.18e+09	1.45e+07	9.03e+09
India	1.59e+09	2.40e+08	4.81e+09	2.29e+07	2.46e+09
KL					
Full sample	2496621	102515.4	1.44e+07	24128.09	1611819
China	2834151	102315.3	1.59e+07	28061.14	1425481
India	1018472	135279.2	3099550	10719.7	2053751
INN					
Full sample	0.038	0.012	0.067	0.0	0.113
China	0.033	0.017	0.044	0.0	0.087
India	0.046	0.002	0.090	0.0	0.190
SOLV					
Full sample	37.610	37.142	25.621	5.994	73.243
China	36.962	36.982	25.713	6.4	68.611
India	38.778	38.394	25.588	5.668	75.858
ROA					
Full sample	6.576	5.077	8.593	-0.168	17.429
China	5.856	4.279	8.264	-1.541	16.438
India	7.739	6.903	9.035	0.479	18.679

Source: EMENDATA

Mode of entry: Greenfield vs. M&A

The choice is between greenfield (1) and M&A (0) (Figure 3). The largest homogeneous group of companies (216) with 87.5% probability of choosing a greenfield investment is characterized by a) $INN > 0.012$; b) $K/L > 47234$ and c) $Y >$ than US\$ 1 billion. The second largest homogeneous group

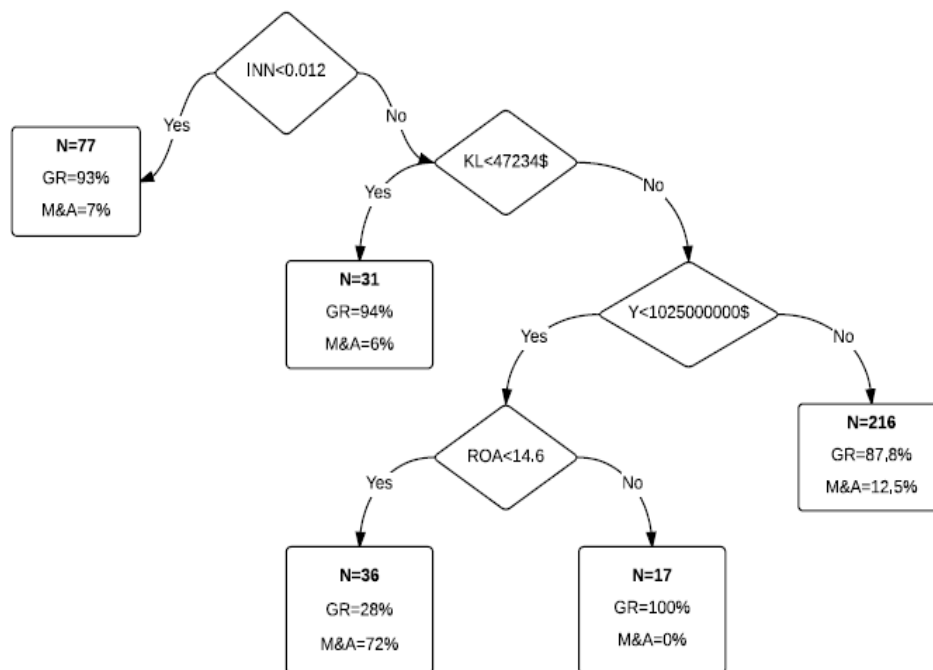
companies with more than one investment following different strategies. For instance, in the test for mode of entry we exclude companies that were involved in both greenfield and M&A.

¹² Firm level characteristics were selected following the recursive procedure described in the Appendix.

includes 77 companies, characterized by $INN < 0.012$, with 93% probability of undertaking a greenfield investment.

For entry via M&A (72% of probability), the largest group includes 36 companies characterized by a) $INN > 0.012$, b) $K/L > 47234$, c) $Y < \text{US\$ } 1$ and $ROA < 14.6$.

Figure 3: Mode of entry: Greenfield vs. M&A



Destination: EU-core vs. EU-periphery

Figure 4 depicts the alternative decision between a EU15 region destination (1) and investment in the EU12 (0). For location choice, the relevant firm characteristic is profitability. We find that a very large group of 303 companies with ROA larger than 5.81 chose to locate in the EU core.

Motivation: TFDI vs. other FDI

In the case of motivation we consider the alternative between TFDI (1) and all the other FDI (0). INN is the main characteristic influencing the decision of the investors to undertake TFDI. In a group of 315 firms, there is a 20% probability of TFDI from companies with $INN > 0.015$ (Figure 5). The choice is between undertaking more than one investment in more than one country (1) and making a single investment (0). The largest probability of undertaking investments in more than one country (58%) is linked to MNEs with revenues of more than US\$2.7 billion. This result is confirmed by another large group of companies (162) with revenues of less than US\$2.7 billion and with 87% probability of undertaking a single investment (Figure 6).

Figure 4: Location: EU-core vs. EU-periphery

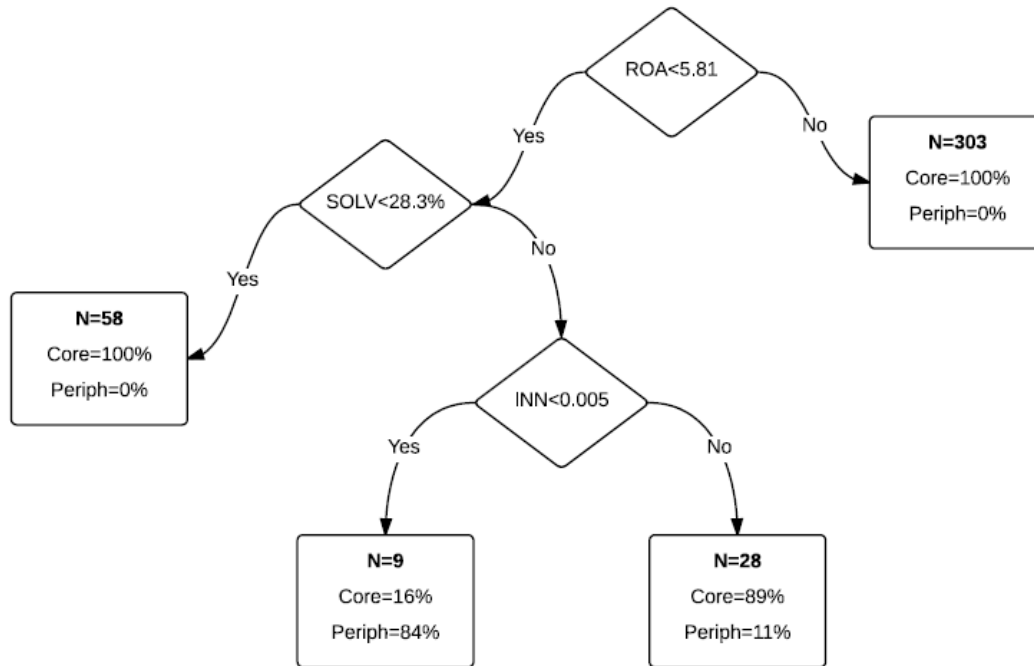


Figure 5: Motivation: TFDI vs. other FDI

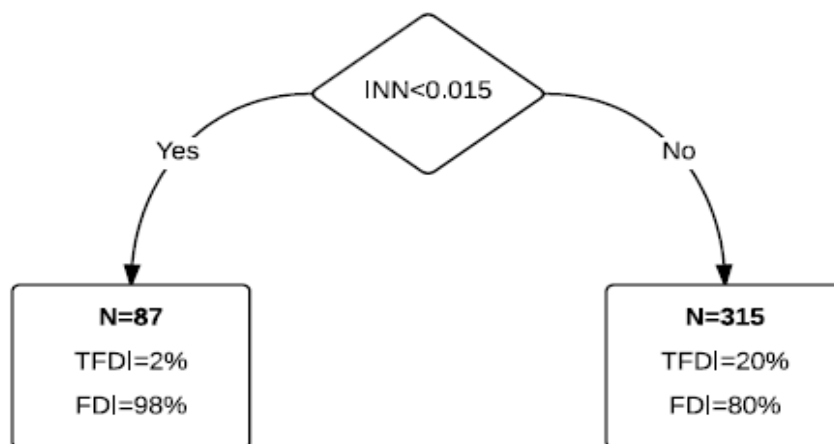
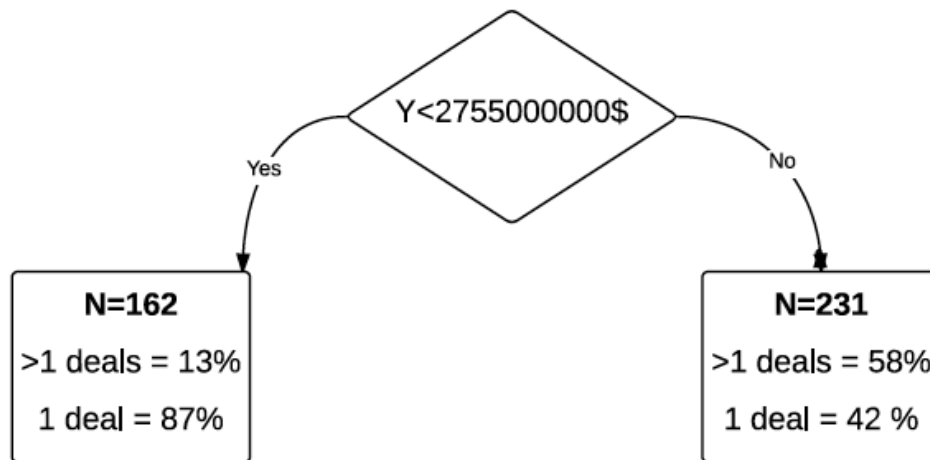


Figure 6: Number of deals: One deal vs. more than one deal in more than one country



4.1. Discussion of the findings

Classification trees allow the main characteristics of Chinese and Indian MNEs investing in Europe to be identified and associated with some specific elements of their international business strategies. With regard to mode of entry, large size facilitates investment in foreign markets through greenfield, which is a strategy involving high fixed entry costs (Eicher & Kang, 2005). A greater propensity for innovation is associated with investments via M&A compared to the group of MNEs with a high probability of choosing greenfield, which show a lower innovation propensity. This result is confirmed by Zhou et al. (2014) who found that Chinese companies, especially in technology-intensive industries, acquire other companies in order to access technologically advanced assets not available at home. Finally, the group of companies with the highest probability of undertaking M&A investments is characterized by small size and high innovation propensity, and also low profitability.¹³ This last might be a consequence of the acquisition strategy where high entry sunk costs might be lowering profits.

Taking a comparative perspective and going back to the descriptive evidence presented in Section 2, we find a clear difference between Chinese and Indian investors for mode of entry (Table 1): greenfield investments are the preferred strategy for Chinese MNEs (80%), while both modes of entry are favored equally by Indian firms. If we take account of firm characteristics, this difference could be explained by the average larger and higher capital intensiveness of Chinese MNEs with respect to Indian investors (Table 5), as confirmed by the classification tree depicted in figure 3

¹³ They are also characterized by large capital intensity. However, this applies to the other groups of companies with a high probability of choosing greenfield investment, so we found no clear direction in the relationship between capital/labour ratio and mode of entry.

which shows a large group of companies with a high probability of choosing greenfield entry which are both capital-intensive and large-sized.

High profitability characterizes a very large group of companies investing in the EU-core. This may be due to the need for the high performance required to compete in large and competitive markets such as those of the EU-15 (Amiti, 1998, 1999). The characteristics of the group of companies with the highest probability to invest into the EU-periphery include low ROA values, high solvency ratio values, and very low innovation propensity. On the one hand greater financial stability can be helpful for investors interested in more volatile and riskier markets such as those in the EU12 (Desai et al., 2008). On the other hand, since the EU12 is less skills-abundant (Brulhart, 1998) and less knowledge-oriented (Kottaridi, 2007) than the core, these countries are likely to attract investments from companies with a lower innovation propensity.

Larger values of innovation propensity are associated with the group of investors with the largest probability of involvement in TFDI. This is in line with Lu et al. (2011), who find that asset-seeking investments are more likely to be undertaken by MNEs relying on technology-based competitive advantages.

Size matters for investing in more than one country. In fact, large size can be crucial for investors operating in multiple markets, given the very high fixed entry costs they have to deal with. Bernard et al. (2007) show that firms exporting to multiple destinations are much larger than those exporting to a single destination. Indeed, we can expect that the variables affecting the choice to export to multiple markets will be similar to those affecting the strategy of investing into multiple countries.¹⁴

5. Concluding remarks

This paper provides new empirical evidence on Chinese and Indian investors in the EU27 countries. The study was motivated by the increasing amount of Chinese and Indian outward FDI in Europe in recent years, and the need for a more comprehensive understanding of their behavior based on firm level data.

We shed new light on Chinese and Indian international business strategies in the EU27 by looking at the decisions that investors are required to make: the alternative between different modes of entry, location choice, motivations, and determination to replicate their investments in several countries. Classification trees allowed us to associate these aspects to key firm-level characteristics such as size, capital intensity, innovation propensity, leverage capacity, profitability, and efficiency. The empirical analysis was based on EMENDATA, a new database that includes all FDI (i.e. greenfield and M&A) made by Chinese and Indian MNEs between 2003 and 2011.

¹⁴ E.g., Helpman et al. (2004) study export and FDI within a common firm-level theoretical framework.

Our empirical analysis shows that investing firm size influences the choice of entry mode and the decision to undertake several investments in different countries. The propensity to innovate is a determinant of mode of entry, and location decision and is a motivation for investment. Profitability and financial stability play a significant role in the decision to invest in a core or periphery country of Europe.

These results provide a first picture of how Chinese and Indian multinationals are investing in Europe, and goes beyond case studies of specific companies. It also highlights directions for future research and provides indications of some key firm level determinants that influence the mode of entry, the location decision, and the investment motivation. We plan to exploit EMENDATA to explore these indications further in future empirical work.

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Appendix

Classification trees: technical details

In classification trees, the units in the sample are divided into groups through a division rule that maximizes the homogeneity (“purity”) of a discrete or a categorical output variable within each group. The first stage of the statistical analysis is partitioning which involves sub-dividing the space into smaller regions. Partitioning goes on until the sum of the squared errors for each tree is larger than a certain threshold (recursive partitioning):

$$S = \sum_{c \in \text{leaves}(T)} \sum_{i \in c} (y_i - m_c)^2,$$

where y_i is the value of the output variable for unit i , while $m_c = \frac{1}{n_c} \sum_{i \in c} y_i$ is the prediction of the output variable for all the units belonging to leaf c .

The second stage is estimating. The model in each leaf is a constant estimation of the output variable, which is given simply by the sample mean of the response variable in that leaf. Thus, if as in our cases, the output variable is a binary dummy (0-1), then the fitted values represent the proportion of 1-output units within each group (i.e. leaf) and can be read as fitted probabilities.

The ideal final tree configuration is both parsimonious and accurate. The first property implies that the tree has a limited number of leaves, and therefore its interpretation should be easy. The second property is that the tree is of a sufficient size to have leaves that are as “pure” as possible, within each of which the variance across the sample units’ outputs is minimized (the smaller the leaf size, the smaller the expected variance).

In practice, optimal pruning can minimize the loss function which takes account of both the complexity and total impurity of the tree: the larger the size of the tree, the lower the total impurity and the greater the complexity (which is penalized) (see Venables and Ripley, 2002, and Giudici and Figini, 2009 for further details on this econometric approach).

Empirically, the size of the tree is found by a cross-validation procedure. The data are split into a training set and a testing set. A classification tree is built first on the training data, with no penalization for complexity, which results in the largest possible tree. Then, for each pair of leaves with a common parent node, the error (“impurity”) is evaluated on the testing data. If removal of the two leaves causes the error to collapse, then the parent node becomes a leaf, otherwise the two leaves remain. In more detail, a 10-fold cross-validation is implemented: the training set is divided into 10 parts of (approximately) the same size. Thus, nine parts are used to grow the tree and one part is a testing sample. This exercise is repeated ten times to allow each part to assume the role of testing sample in one of the ten periods. Finally, the results are averaged.

Tab. A1- Correlation matrix

	Y	KL	INN	SOLV	ROA
Y	1.0				
KL	0.115	1.0			
INN	-0.088	-0.126	1.0		
SOLV	-0.299	-0.213	0.261	1.0	
ROA	-0.079	-0.142	0.081	0.594	1.0