Strategic asset-seeking acquisitions by emerging market multinationals:

The role of the industry context

Stefano Elia*
Assistant Professor
DIG-Politecnico di Milano (Italy)
stefano.elia@polimi.it

Grazia D. Santangelo[1]
Professor
Department of Political and Social Science
University of Catania (Italy)
grsanta@unict.it

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[1] Corresponding author

1. Introduction

Firms from emerging markets often pursue aggressive strategies aimed at transforming them in global players at the technology frontier (Luo & Tung, 2007; Mathews, 2006; Ramamurti, 2009a, b; Sauvant, 2008). Strategic asset-seeking primarily motivates these strategies in advanced economies in the form of acquisitions of local firms (Guillén and Garcia-Canal 2009, Luo and Tung 2007, Mathews 2006). A number of studies have indeed documented that multinational companies in emerging economies (EMNCs) extensively use acquisitions in advanced economies to address their home country comparative disadvantage and further up the technological ladder (Deng 2007, Child and Rodrigues 2005; Deng 2009, Guillén and Garcıa-Canal 2009, Rui & Yip, 2008, Makino et al. 2002, Luo and Tung 2007, Li 2007). This behavior is consistent with the strategic asset-seeking perspective on FDI which regards a weak technological home country-specific comparative advantage as a major determinant of this FDI type (Fosfuri and Motta 1999, Almeida, 1996; Chang, 1995; Dunning, 1993, 1995; Frost, 2001; Shan and Song, 1997; Teece, 1992). Firms engage in strategic asset-seeking FDI when they intend to seek technology based resources and skills in a host country that are superior or not available in their home countries. The strategic asset seeking perspective has developed mostly in relation to North-North FDI. More recently, a number of studies have looked at South-North strategic asset-seeking FDI. These studies converge on the idea that underdeveloped markets for technology and other intangible assets force EMNCs to look aggressively beyond their national borders and acknowledge the relevance of firm's absorptive capacity in this process (Deng 2007, Makino et al. 2002, Kumar 2008, Chen and Chen 1998, van Hoesel 1999, Belderbos 2003). However, this stream of research has failed to discriminate across different technology-intensive EMNCs.

Drawing on existing research on EMNCs that acknowledges the relevance of the industry context in EMNCs internationalization strategies (Ramamurti 2009), we seek to fill this gap. In particular, resorting to innovation studies and recent international business (IB) literature recognizing the relevance of the home country in the international growth of emerging market firms (Patel and Pavitt 1999, Cantwell and Janne 1999, Narula and Nguyen, 2011, Tan and Meyer 2011), we draw on the idea that the firms' capacity to understand *and* acquire strategic assets abroad (absorptive capacity in Cohen and Levinthal's (1990) terms) is a function of, among others, the home country knowledge

base. Thus, we ask what role the home country knowledge base plays in the likelihood that EMNCs operating in different technology-intensive industries engage in strategic asset-seeking FDI in advanced economies. We focus on strategic asset-seeking acquisitions and define them as deals aiming at augmenting the emerging market acquirer's intangible assets by targeting firms with greater intangible assets in up-markets. The extensive use of cross-border acquisitions by EMNCs (UNCTAD 2006) motivates this choice. In line with existing research (Ramamurti 2009, Hitt et al. 2000, 2005; Uhlenbruck, Meyer, & Hitt, 2003), we assume that EMNCs still suffer from a country-specific comparative technological disadvantage although emerging economies are catching-up with the more advanced ones (Athreye and Cantwell 2007).

We argue that the critical level of home country knowledge base required to engage successfully in strategic asset-seeking varies across different technology-intensive industries. On average a weak home country knowledge base drives strategic asset-seeking acquisitions by EMNCs, which mostly operate in non-high-tech sectors and, as a result, rely on a more codified and standardize knowledge. Instead, for high-tech EMNCs the requirements in terms of home country knowledge base to engage successfully in strategic asset-seeking acquisitions are more demanding. Traditionally, the type of strategic assets which high-tech firms rely on and look for when going abroad is complex (Cantwell and Santangelo 1999, 2000). As a result, high-tech EMNCs possess the required absorptive capacity to engage in strategic asset–seeking acquisitions in advance countries for relatively higher levels of home country knowledge base than non-high-tech firms do. Thus, we suggest that high-tech emerging market firms are likelier to gain new intangible assets in advanced economies than non-high-tech ones, the greater the home country knowledge base.

We test our arguments on a sample of 104 mergers and acquisition (M&As) drawn from the population of deals undertaken in Europe, North America and Japan by firms headquartered in Brazil, Russia, India and China (BRIC)[2] between 1985 and 2008. By relying on a dataset recoding information at the firm and home country level, our analysis shows that on average the likelihood that EMNCs engage in strategic asset-seeking acquisitions is higher for low levels of home country

[2] The motive for focusing on the BRIC country group relies on the fact that these countries account for approximately 40% of total outward FDI from emerging countries (OECD, 2009).

knowledge base. However, high-tech emerging market firms are likelier to successfully pursue strategic asset-seeking FDI than non-high-tech ones when relying on a strong home country knowledge base.

The study offers three contributions. First, we advance the strategic asset-seeking perspective. Our conceptual argument suggests and our empirical analysis confirms the critical role of the technology-intensive industry contexts in strategic asset-seeking. In addition, our study contributes to existing IB theory on internationalization. IB studies looking at the EMNCs' experience have focused primarily on the pace of the internationalization process of these firms and the role of the home country in this process. This literature has acknowledged the relevance of the industry context (Ramamurti 2009), but failed to elaborate an argument related to specific internationalization paths. Our study advances this stream of research by providing an argument on the role of the industry context in the strategic asset-seeking internationalization path of EMNCs. Finally the study confirms extant IB research that highlights the critical role of home country disadvantage in EMNCs internationalization.

2. Strategic asset-seeking FDI

The literature on FDI distinguishes between asset exploitation and asset-seeking FDI. This distinction originates from the debate on how a firm exploits its existing assets and explores new assets. Traditional IB theory regards FDI as the exploitation of assets developed in the home country and subsequently transferred to host countries (Vernon 1966, Hymer 1968). Internalization theory (Buckley and Casson, 1976) and more recently Kogut and Zander (1993) reach the same conclusions. Although these two streams of research disagree on the public-good nature of the rent-yielding resources, both share the idea that FDI take place when firms possess certain types of proprietary resources at home to exploit in the host country. Early studies on FDI departing from less developed countries and targeting much less developed countries share this view (Wells 1983, Lecraw 1983, Lall 1983).

More recently, a growing number of scholars in different fields regard multinationals not as exploiters of home country-specific advantage, but as explorers of strategic assets in different host countries (Fosfuri and Motta 1999, Almeida, 1996; Chang, 1995; Dunning, 1993, 1995; Frost, 2001;

Shan and Song, 1997; Teece, 1992). Strategic resources and capabilities that firms seek are often spatially determined rather than simply existing within any single firm (Enlight, 1998). Due to the localized nature of technology (Jaffe et al. 1993, Almeid 1996), firms offset a weak home country-specific comparative advantage by learning and/or gaining access to the necessary strategic assets available in the host country. Underlying this perspective is that firm-specific advantage relies not only on the possession of proprietary resources but also on the firm's capacity to understand and acquire new assets that are superior or not available in their home countries (Cohen and Levinthal 1990). A number of studies have acknowledged the asset-seeking nature of a large amount of FDI. In particular, Kogut and Chang (1991) document that Japanese firms primarily enter the US to source local technology not available at home. Almeida (1996) provides empirical evidence that FDI in the US is directed towards offsetting home country comparative technological weaknesses. Cantwell (1993) suggests that foreign subsidiaries in the UK invest in areas of host technological expertise. Shang and Song (1997) find that foreign investors are likely to target American biotechnology firms with high levels of patenting activity.

This literature has developed initially in relation to North-North FDI patterns. The surge of outward FDI from emerging markets has spurred a large number of studies acknowledging that EMNCs increasingly engage in strategic assets-seeking FDI (Makino et al. 2002, Deng 2007, Kumar 1998, Chen and Chen 1998, Belderbos, 2003; van Hoesel, 1999). The rapid internationalization of EMNCs has been primarily pursued through aggressive acquisitions, and existing research has unanimously interpreted it as a deliberate and systematic springboard to acquire strategic resources and reduce EMNCs technological constraints at home (Luo and Tung 2007, Mathews 2006, Ramamurti 2009a, b, Sauvant 2008). Traditionally, acquisitions are an effective means to access an existing and value-proven knowledge (Empson 2001), to faster opportunities for learning (Barkema and Vermeulen 1998), to obtain useful knowledge for developing new products and reducing the commercialization time of these products (Ganesan, Malter and Rindfleisch 2005). These arguments especially apply to acquisitions in advanced countries by EMNCs. Firms from emerging countries lack the intangible assets that characterized US, European and Japanese firms (Lall 1983) as confirmed by their lower score on, for example, technology skills (e.g. Lall, 1983; Lecraw, 1977; Wells, 1983).

EMNCs rely indeed on a much smaller home technological base than the long-established MNCs (Luo & Tung, 2007; Mathews, 2006; Ramamurti, 2009a,b; Sauvant, 2008, Barnard, 2010). The strong technological and scientific base (e.g. number of universities, research centers and doctoral students) (Almeida et al. 2002) that characterizes advanced countries enables domestic firms to develop unique capabilities and resources that give them absolute advantage over emerging market firms (Erramilli et al. 1997). Emerging market acquirers have great incentives indeed to preserve their targets in order to fully exploit learning opportunities (Guillén and Garcia-Canal 2009, Knoerich 2010). In particular, acquisitions of advanced country firms enable EMNCs to gain intangible resources that are difficult to obtain through market transactions (Gubbi et al. 2010) by simultaneously overcome the liability of foreignness (Barnard, 2010). Makino et al. (2002) document that newly industrialized country firms engage in FDI to address country-specific assets comparative disadvantage. Kumar (1998) suggests that Asian firms investing in advanced countries tend to use outward FDI to strengthen their non-price competitiveness. Chen and Chen (1998) find a similar pattern in outward FDI of Taiwanese firms. Other studies acknowledge that strategic asset-seeking acquisitions in advanced countries offset the lack of a strong home country-specific comparative advantage by securing established brand names, novel product technology, and extensive networks of distributors (van Hoesel, 1999). In sum, this literature suggests a negative relationship between the home country-specific comparative advantage and the likelihood that EMNCs will engage in strategic asset-seeking FDI in advanced countries.

2.1 The relevance of the technology-intensive industry context

The strategic asset-seeking perspective has failed to investigate strategic asset-seeking acquisition by EMNCs operating in different technology-intensive sectors. However, existing research on EMNCs internationalization has acknowledged the relevance of the industry context (Ramamurti 2009).

A critical aspect in the acquisition of strategic asset is the acquirer's absorptive capacity (Cohen and Levinthal 1990). Although emerging market firms are increasingly eager to secure strategic assets to offset their weak home country-specific comparative advantage, they require the capabilities to evaluate, acquire, and integrate strategic assets from external sources (Garcia-Canal 2009, Narula and Nguyen 2011). Innovation studies acknowledge that firm's absorptive capacity is a

function, among others, of the home country knowledge base (Patel and Pavitt 1999, Criscuolo and Narula 2008). A firm's perception of what is relevant and valuable in a host country tends to be constrained by the home country's knowledge base and technological specialisation (Cantwell and Janne 1999). The home country provides the necessary knowledge and advanced infrastructures that feed domestic firms' absorptive capacity and support strategic asset-seeking (Narula and Nguyen 2011). Firms of each country tend to embark on a path of technological accumulation that has certain unique characteristics and that sustains a distinct profile of national technological specialization (Cantwell 1989). In relation to emerging market firms, IB scholars have also recognized that firms typically build their original resource endowments in their home country and this original resource endowment drives their international growth (Tan and Meyer, 2011).

The critical knowledge threshold that emerging countries are able to supply to their firms unequally influences firms' strategic asset-seeking strategy across different technology-intensive industries. In particular, non-high-tech sectors, such as medium-tech industries, traditionally rely on codified knowledge and standardize products and processes, while high-tech sectors are characterized by a more complex and tacit underlying knowledge (Cantwell and Santangelo 2000). In addition high-tech firms usually tend to seek abroad equally complex assets (Cantwell and Santangelo 1999). Although emerging markets are technologically catching-up, the critical knowledge threshold that they can offer to domestic firms remains still modest (Narula and Nguyen 2011) and more suitable to strategic asset-seeking of non-high-tech firms. Emerging markets are effective knowledge producers indeed in medium and low technology-intensive sectors, but not in high-tech ones (D'Agostino et al. 2010). Although operating in a variety of sectors (Bonaglia et al. 2007), EMNCs dominate in non-high-tech ones such as medium-tech industries that were mature or declining in the West (Ramamurti 2009a). Thus, the bulk of EMNCs can leverage on their modest home knowledge base to develop the absorptive capacity required in order to acquire strategic asset in advanced countries. That is, on average a weak home knowledge base drives EMNCs' strategic asset seeking acquisitions.

A handful of EMNCs operate in high-tech sectors especially in the BRIC economies (Ramamurti and Singh 2009). Embraer from Brazil, Huawei from China and Ranbaxy from India are well-known cases. The weak home country specific comparative technological advantage critically

constrained the competitiveness of the firms operating in high-tech sectors, where emerging markets still lag behind more advanced countries (D'Agostino et al. 2010, D'Agostino and Santangelo 2012). High-tech EMNCs are especially eager to acquire complex strategic assets that are superior or not available at home to offset their home country-specific comparative disadvantage. However, due to the nature of the knowledge characterizing these industries, for high-tech EMNCs the home country knowledge base needed to develop the capacity to evaluate, acquire, and integrate strategic assets from external sources would notably be greater than for EMNCs operating in non-high-tech sectors. As a result, high-tech EMNCs willing to augment their strategic assets through the acquisition of valuable advanced countries targets would require a stronger home country knowledge base than non-high-tech ones. Thus, we posit that high-tech emerging markets firms are likelier to engage in strategic assets-seeking acquisitions than non-high-tech ones when the former are supported by a high home country knowledge base.

Hypothesis 1: High-tech EMNCs are likelier to engage in strategic asset-seeking acquisitions in advanced economies than non-high-tech ones are for high levels of home country knowledge base.

3. Methodology

3.1 The sample

To test out hypotheses, we resort on a sample of 104 acquisitions undertaken by EMNCs from BRIC in Europe, North America and Japan between 1999 and 2008. Our sample is drawn from the population of 1,405 deals undertaken by firms located in any of the BRIC countries in Europe, North America and Japan between 1985 and 2008. For these deals, we collected information from different sources such as Orbis (Bureau Van Dijk) and Thomson OneBanker (Thomson Financial).

A meticulous screening procedure was followed to select our sample. In particular, a first deeper analysis of the data brought us to exclude 64 M&As that have been identified as being part of a round tripping phenomenon. In a second step, we exclude 372 M&As undertaken by BRIC firms ultimately controlled by non-BRIC firms, or vice-versa undertaken by non-BRIC firms ultimately controlled by BRIC EMNCs. Strategic decisions concerning international investments are generally made at the headquarter level and, then, they are implemented either directly by the parent firm or by a subsidiary. Such a process would be deeply influenced by the presence of a non-BRIC firm, either at

headquarter or subsidiary level, and this contamination would not allow us to clearly identify the strategies underlying M&As from BRIC to advanced countries. We also excluded 14 M&As undertaken by single investors because they stem from individual holdings that are structurally different from, and hence not comparable with, the rest of M&As undertaken by corporate investors. We then excluded 62 deals that involved (target and/or acquiring parent company) firms operating in primary and natural resource sectors, because they are mainly driven by other logics besides technology and complementary abilities strategies, such as the presence of natural resources or the vertical integration of the supply chain. This implies that the cross-border activity of Russian and Brazilian firms, which primarily operate in these sectors, is under-represented in our sample. Finally, since balance sheet data provided by Orbis and Thomson OneBanker are available only since 1999, we considered only deals from this year onwards and, as a result, excluded other 96 investments. We finally ended up with a population of 797 deals. However, only for 104 deals it was possible to rely on a complete set of data concerning the industry of the acquiring firm, the home country variables and the balance sheet indicators of the target and acquiring firm. To check for the representativeness, we performed a chi-square test to compare the sample of distribution of 104 deals with the whole population distribution of 797 deals across home and host countries, and the year of the deal. Table 1 shows that our sample is representative across all the three dimensions.

(Insert Table 1 about here)

3.2 Variables

3.2.1 Dependent variable

Unlike several previous studies, which identify strategic asset-seeking investments by comparing the technological intensity of the home and host countries (Anand and Delios, 2002; Driffield and Love, 2007), we use a more fine-grained proxy that compare the technological intensity at the firms level which is measures as intangible assets over total assets[3]. Specifically, we resort on a dummy variable (*Asset Seeking*) which takes value 1 when: (i) technological intensity of the target firm is higher than the technology intensity of the acquiring firm, and (ii) the difference between the

[3] Xu and Lu (2009) also use intangible over total assets as proxy to measure the technology intensity at industry level.

technological intensity of the target and acquiring firm is larger than the average difference computed across the whole sample. This second condition introduces a threshold over which the distance between the intangible assets of the target and acquiring firm is likely to substantially augment the acquiring firm's existing capabilities with respect to a situation where the target firm is only marginally more technological advanced than the acquiring firm (Caves, 1996). Following this criterion, we classified 51 out of 104 deals as asset seeking investments.

The advantage of relying on intangible assets is that it allows to provide a more comprehensive definition of strategic asset-seeking, since this measure takes into account not only upstream capabilities that arise from R&D activity (e.g. the patents), but also downstream capabilities that arise from advertising and distribution activities (e.g. the brands) (Anand and Delios, 2002). Therefore, the variable *Asset Seeking* takes value 1 when the difference between the intangible over total assets of the target and acquiring firms is larger than the average distance computed across the sample.

3.2.2 Explanatory variables

Drawing on Rabbiosi, Elia and Bertoni (2012), we measure the home country knowledge base of acquiring EMNCs by employing a variable (*Home country knowledge base*) computed as the linear combination of three items through an exploratory factor analysis based on principal components and varimax rotation. The three items relate to: (i) R&D expenditure as percentage of GDP; (ii) number of patent applications from residents (iii) exports of high-tech goods as a percentage of manufactured exports[4]. The first item reflects the input of the home countries' knowledge base, while the second and the third ones account for the scientific and tangible output of the home country knowledge base, respectively. Therefore, the variable resulting from the exploratory factor analysis turns out to be inclusive and comprehensive of different dimensions of the BRIC knowledge base. The validity of the exploratory factor analysis is confirmed by the high factor loadings and by the high total variance explained, as shown by Table 2.

[4] Given that these variables are available for each country as time series, we run the exploratory factor analysis by employing the three items lagged by one year with respect to the year of the deal. This procedure enable us to circumvent endogeneity problems that could arise from unobserved factors simultaneously affecting a country's general economic condition and the acquisition decisions (e.g. a major regulatory change).

(Insert Table 2 about here)

To account for EMNCs belonging to high-tech industry, we classified the acquirer and target industries according to the Eurostat-OECD (2007) classification of manufacturing and services. In particular, *High-tech industries EMNCs* takes value 1 if the acquiring firm operates in high-technology manufacturing or knowledge-intensive high-technology services sectors, and 0 otherwise[5].

3.2.3 Controls

We include a number of controls in the model to account for factors influencing the likelihood of strategic asset-seeking acquisitions.

To control for the fact that previous experience in cross-border M&As may affect both learning and developing absorptive capacity (Levinthal and March, 1993; Barkema and Vermeulen, 1998), we drawn on Thomson OneBanker database and include a variable (*EMNCs' previous experience*) that accounts for the number of previous M&As undertaken by each EMNC until the year of the deal . The effect of experience on the likelihood to undertake asset-seeking investments might be twofold. On the one hand, the lower the experience the higher the probability that firms seek location-specific assets, such as technology, abroad (Li, 2003; Fosfuri & Motta, 1999). On the other hand, previous experience allows EMNCs developing those absorptive capacities that are required to disentangle and to capture the knowledge transferred by local firms (Castellani and Zanfei, 2002), thus increasing the capability, as well as the likelihood, to undertake asset-seeking investments.

The literature has widely debated the benefits arising from industrial diversification, by claiming that this strategy enables firms to access new technological opportunities (Penrose, 1959; Chandler, 1962) and to trigger economies of scope (Kamien and Schwartz, 1982; Porter, 1985). EMNCs that are willing to undertake asset-seeking investments are likely to be more attracted by larger and industrially diversified target firms, which tend to provide the acquirer with a wider range of assets and capabilities. To control for this aspect, we rely on a measure of industrial diversification of the target firm (*Target firms' industrial diversification*), which counts the number of 3-digit SIC

[5] In some cases, acquisitions have been undertaken by a subsidiary operating in an industry different than the industry of parent company's operations. In these cases, we classified an acquirer as high-tech if either the parent company or the subsidiary directly involved in the deal operate in the OECD High-technology manufacturing industries or knowledge-intensive high-technology services sectors.

codes industries where the target firm operate according to the sectorial data provided by Thomson OneBanker database.

To control for country-specific factors (others than the knowledge base), we consider home country dummies (i.e. *Brazil*, *Russia*, *India*, *China* with *India* used as benchmark). Country dummies have been introduced also for the host economies to account for host location-specific advantages and historically privileged relationships that may affect the investments decisions of EMNCs. The historical ties between India and the UK, for instance, may help to explain the predominance of Indian investments in Europe in manufacturing. To this end, three dummy variables are considered: *Europe*, *North America*, and *Japan,* by using the first one as benchmark[6].

Table 3 reports the correlation matrix and descriptive statistics of the variables included in the model. The only variables that exhibit a high correlation are *Home Country Knowledge Base* and the dummy *China*. As explained below, we checked for potential multicollinearity problems by computing the uncentered variance inflation factors (VIF).

(Insert Table 3 about here)

4. Results

Given the nature of our dependent variable, we employed a robust probit econometric model, which allows controlling for the heteroskedasticity that may arise from the heterogeneity of home and host countries and of the industries involved in the deals. Table 4a and 4b show the coefficients and the marginal effects of the robust probit regression analyses applied to different models.

(Insert Table 4a and 4b about here)

Columns 1 and 2 (Model 1) provide the coefficients and the marginal effects of only the control variables, respectively, while in columns 3 and 4 (Model 2) we introduced the Home Country Knowledge Base. We performed a likelihood chi-square test to verify whether the restricted model (Model 1) is nested in the unrestricted model (Model 2). The likelihood ratio test statistic of the chi-square is 10.06 and, hence, the null hypothesis is rejected ($p<0.01$), thus showing that adding the *Home Country Knowledge Base* results in a statistically significant improvement in the model fit.

[6] For the dummy *North America* the following countries have been considered US and Canada. For the dummy *Europe*, we consider Austria, Belgium, Czech Republic, France, Germany, Italy, Netherland, Poland, Sweden, Switzerland and UK

Columns 5 and 6 (Model 3) provide the coefficients and marginal effects, respectively, when introducing the *High Tech Industry EMNCs* variable . Columns 7 and 8 (Model 4) show the coefficients and marginal effects, respectively, of the full model, where we added the interaction term. To test for potential multicollinearity problems that the high correlation between the variables *China* and *Home Country Knowledge Base* could signal, we compute the uncentered VIF. The highest VIF value refers to the variable *China* and amounts to 3.94, thus below the value of 10.00, which is considered the threshold above which multicollinearity problems may arise (O'Brien, 2007).

The *Home Country Knowledge Base* variable is confirmed to be negative and significant in all models, thus supporting the argument that EMNCs are likelier to engage in strategic asset-seeking acquisitions in advanced countries for low levels of home country knowledge base. The interaction between *Home Country Knowledge Base* and *High Tech Industry EMNCs* is positively and significantly ($p<0.05$) associated to the likelihood of strategic asset-seeking strategy (Model 4). That is, EMNCs operating in high-tech industries are likelier to engage in strategic asset-seeking acquisitions in advanced countries than EMNCs operating in non-high-tech industries for high levels of home country knowledge base as suggested by our hypothesis.

As far as the controls are concerned, *EMNCs Experience* exhibits a negative and significant association with the dependent variable in all the models, thus providing evidence that previous investments enable EMNCs to accumulate knowledge and capabilities that allows decreasing the distance with respect to the intangible assets of the target firm and, hence, reducing the need, as well as the likelihood, of asset-seeking investments. Conversely, *Target firm industry diversification* shows, as expected, a positive but not significant association with the dependent variable. As for the home country variables, EMNCs from China and Brazil undertake more asset seeking investments than EMNCs from India. This results is probably due to country-specific FDI policies. In China, for example, the *Go Global* governmental policy pushes Chinese firms to undertake aggressive cross-border acquisition strategies including asset-seeking investments that are typically more risky than other types of investments. Finally, EMNCs seems to prefer Europe than North America and Japan to undertake their asset-seeking investments. This is probably due to the historical ties that three out of

four BRIC countries (i.e. Brazil, India and Russia) share with European countries. Investing in Europe involves a lower liability of foreignness and outsidership (Johanson and Vahlne, 2009).

4.1 Robustness check

We finally performed a robustness check as regards the marginal effect of the interaction. Indeed, according to Ai and Norton (2003) and to Norton, Wang e Ai (2004), the introduction of an interaction term in a non-linear model implies at least four problems. First of all, the interaction effect could be nonzero even when the coefficient of the coefficient is zero, due to the presence of two additive terms in the cross-partial derivative of the expected value of the dependent variable. Secondly, the statistical significance of the interaction effect cannot be tested with a simple t-test on the coefficient of the interaction term. Thirdly, the interaction effect is conditional on the independent variable unlike the interaction effect in non-linear model. Finally, the interaction effect can have different signs for different values of covariates[7].

To account for the above factors we follow the procedure suggested by Ai and Norton (2003) and Norton, Wang e Ai (2004). In particular, Table 5 shows the value of the mean cross-partial derivative of the interaction term computed through the procedure suggested by the authors, which allow identifying the conditional probability that the dependent variable is 1 for a change of *Home Country Knowledge Base* as the *High Tech Industry EMNCs* variable change from 0 to 1. The mean interaction effect takes an average value of 0.187, thus confirming the positive sign.

(Insert Table 5 about here)

Graph 1 plots the interaction effect (y-axis) according to the predicted probability that the dependent variable is equal to 1 (x-axis). The graph shows that interaction effects are negative only when the probability to undertake an asset-seeking investment is low (around 0.2), while they are always positive when the probability to undertake an asset-seeking investment ranges from medium to high values. As far as the significance of the positive interaction effect is concerned, Graph 2 plots the z-statistics of the interaction effect (y-axis) according to the predicted probability that the dependent variable is equal to 1 (x-axis). The graph shows that the z-statistics lie on the upper band (=1.96) when

[7] For more details see Ai and Norton (2003) and to Norton, Wang e Ai (2004).

the predicted probability ranges from medium to high values. That is, the positive sign of the interaction effect is, on average, significant at 5% or at least at 10%.

(Insert Graph 1 and Graph 2 about here)

Finally, as suggested by Karaca-Mandic, Norton and Dowd (2012), we computed also the two single derivatives with respect to the variable *Home Country Knowledge Base* at the two different values of *High Tech Industry EMNCs* (i.e. at 0 and 1). The difference between these two values, which are displayed in Table 6, provides the interaction effect, which is exactly 0.187 (i.e. the same positive value that resulted above). We applied a chi-squared square test to verify whether the difference between the two single derivatives (i.e. the interaction effect) is equal to zero. The chi-squared statistics, which takes the value of 4.52, reject the null hypothesis at $p<0.05$, thus providing a further confirmation that the interaction effect is positive. That is, the change in the conditional probability to undertake an asset-seeking investment is positively correlated to a change of the *Home Country Knowledge Base* as the *High Tech Industry EMNCs* variable goes from 0 to 1.

(Insert Table 6 about here)

5. Discussion and conclusions

The strategic asset-seeking perspective has looked recently at South-North strategic asset-seeking FDI and acknowledged the role of the home country knowledge base (Deng 2007, Makino et al. 2007, Kumar 2008, Chen and Chen 1998, von Hoesel 1999, Belderbos 2003). In particular, these studies document that underdeveloped home markets for technology and other intangible assets motivate EMNCs' asset-seeking FDI. However, this stream of research has failed to account for the role of the industry context although research on EMNCs internationalization has acknowledged the relevance of this dimension. Our study advances the strategic asset-seeking perspective by focusing on the critical role of the acquirer's industry context. Specifically, we provide evidence that the weak home country knowledge base is on average a sufficient condition to explain asset-seeking investment by EMNCs. However, EMNCs operating in high-tech sectors require a strong home country-knowledge base to be able to undertake asset-seeking investments. High-tech EMNCs rely on and look for more complex and tacit knowledge (Cantwell and Santangelo, 2000) and, as a result, need to possess some absorptive capabilities (Cohen and Levinthal, 1990). To this end, the home country can

provide the necessary knowledge and advanced infrastructure to feed and support the development of such capabilities by domestic firms (Narula and Nguyen 2011).

The study also offers a contribution to existing IB theory concerned with the internationalization process of EMNCs. This literature has mostly focused on the pace of such a process and merely acknowledged the relevance of the industry context (Ramamurti 2009). Imbalance theory (Moon and Roehl, 2001), the LLL paradigm (Moon and Roehl, 2001) and the springboard approach (Luo and Tung 2007) fail to account for this dimension. Our study advances this stream of research by providing a theoretical argument and supportive evidence of the crucial role of the industry context in explaining the rising power of EMNCs. In particular, we show that the industry context may constrained the internationalization of high-tech EMNCs which need a strong home country knowledge base to undertake successfully strategic asset-seeking investments.

Finally, our study, together with Rabbiosi et al. (2012), provides one of the first empirical evidences concerning the relationship between asset-seeking investments undertaken by EMNCs and the home country dimensions. Specifically, we confirm extant IB research highlighting the critical role of home country disadvantage in EMNCs internationalization (Moon and Roehl, 2001, Mathews 2006, Luo and Tung 2007). Specifically, we provide supporting evidence to the argument that EMNCs invest abroad to balance those disadvantages and reduce those constraints that arise from the weak knowledge base of their home country.

Our analysis bears also a relevant managerial implications. The study warns EMNCs managers that the success of their asset-seeking strategies in advanced country critically depends on the industry context where they operate. Thus, high-tech EMNCs' managers would need to devote corporate resources to compensate for poor home country knowledge base in order to increase their chances of successfully acquired valuable advanced country targets.

Our analysis exhibits some limits that might set the avenue for future research. First of all, the analysis of the sectorial dimension could be better disentangled by considering more fine-grained industry contexts. Secondly, a larger sample of firms would be desirable, by including not only BRIC firms but also firms from other emerging economies. This would allow to have understanding of asset-seeking strategies by EMNCs from a large number of emerging economies displaying different levels

of development. Thirdly, our analysis could be also developed by investigating other home country dimensions such as the institutional one.

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TABLES AND FIGURES

Table 1
Chi-square tests of the representativeness of the sample (H0: The sample is representative)

Time			Home and host countries		
Year	**Sample**	**Population**	**Home**	**Sample**	**Population**
1999	2.88%	2.01%	Brazil	3.85%	5.77%
2000	5.77%	4.14%	China	25.96%	28.11%
2001	4.81%	5.77%	India	57.69%	51.57%
2002	4.81%	5.65%	Russia	12.50%	14.55%
2003	2.88%	4.89%	Chi-square: 1.89 – P-Value: 0.59		
2004	4.81%	7.03%			
2005	15.38%	12.42%	**Host**	**Sample**	**Population**
2006	17.31%	16.44%	Europe	45.19%	52.32%
2007	19.23%	21.46%	Japan	2.88%	3.14%
2008	22.12%	20.20%	North America	51.92%	44.54%
Chi-square: 4.16 - P-Value: 0.90			Chi-square: 2.30 – P-Value: 0.32		

Table 2
Loadings of the exploratory factor analysis after Varimax rotation

Items of the Home County's Knowledge Base	**loadings**
R&D expenditure as percentage of GDP	0.9529
Number of patent applications from residents	0.9614
Exports of high-tech goods as a percentage of manufactured exports	0.9412

All eigenvalues >1, total variance explained 90.6 %

Table 3
Correlation matrix and descriptive statistics of the variables employed in the model

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(1) Asset Seeking	1.000									
(2) Home Country Knowledge Base	-0.292	1.000								
(3) High Tech Industry EMNCs	0.037	-0.191	1.000							
(4) Experience	-0.235	0.312	0.023	1.000						
(5) Target firm industrial diversification	0.043	0.042	-0.168	-0.016	1.000					
(6) Brazil	0.104	-0.047	-0.189	0.097	-0.013	1.000				
(7) China	-0.098	0.759	-0.076	0.195	-0.044	-0.118	1.000			
(8) Russia	-0.196	0.138	-0.357	0.155	0.039	-0.076	-0.441	1.000		
(9) North America	-0.250	0.278	-0.248	0.079	0.035	0.092	-0.357	0.247	1.000	
(10) Japan	-0.054	0.023	-0.048	-0.052	-0.025	0.264	-0.201	-0.065	-0.179	1.000
Observations	104	104	104	104	104	104	104	104	104	104
Mean	0.490	0.000	0.471	3.625	1.817	0.038	0.577	0.125	0.519	0.029
Std. Dev.	0.502	1.000	0.502	5.429	1.041	0.193	0.496	0.332	0.502	0.168
Minimum	0.000	-0.727	0.000	0.000	1.000	0.000	0.000	0.000	0.000	0.000
Maximum	1.000	3.619	1.000	28.000	6.000	1.000	1.000	1.000	1.000	1.000

Table 4a
Results of the robust probit regression analyses

Variables	Model 1		Model 2	
	1	2	3	4
	Coefficients	**Marginal Effects**	**Coefficients**	**Marginal Effects**
Home Country Knowledge Base	-	-	-0.882**	-0.351**
			(-2.29)	(-2.29)
EMNCs' Experience	-0.071**	-0.028**	-0.076**	-0.030**
	(-2.02)	(-2.02)	(-2.39)	(-2.39)
Target Firm Industrial Diversification	0.066	0.026	0.133	0.053
	(0.54)	(0.54)	(1.00)	(1.00)
Home country dummies				
Brazil	1.558**	0.470***	2.105**	0.536***
	(2.04)	(3.97)	(2.34)	(6.59)
China	0.100	0.040	1.741***	0.588***
	(0.29)	(0.29)	(2.58)	(3.59)
Russia	-0.424	-0.165	0.462	0.182
	(-0.92)	(-0.96)	(0.75)	(0.78)
Host country dummies				
North America	-0.731**	-0.285***	-0.744**	-0.290***
	(-2.49)	(-2.60)	(-2.54)	(-2.66)
Japan	-1.550**	-0.438***	-2.094***	-0.477***
	(-2.24)	(-4.43)	(-2.58)	(-7.21)
Constant	0.481	-	-0.182	-
	(1.57)		(-0.43)	
N.	104	104	104	104
chi2	19.382***	19.382***	23.450***	23.450***

* p<0.10, ** p<0.05, *** p<0.01

Table 4b
Results of the robust probit regression analyses

Variables	Model 3		Model 4	
	5	6	7	8
	Coefficients	Marginal Effects	Coefficients	Marginal Effects
Home Country Knowledge Base	-0.882**	-0.351**	-1.360***	-0.540***
	(-2.27)	(-2.27)	(-3.77)	(-3.79)
High Tech Industry EMNCs	-0.051	-0.020	0.103	0.041
	(-0.16)	(-0.16)	(0.33)	(0.33)
EMNCs' Experience	-0.076**	-0.030**	-0.077***	-0.030***
	(-2.36)	(-2.36)	(-2.71)	(-2.71)
Target Firm Industrial Diversification	0.128	0.051	0.170	0.067
	(0.98)	(0.98)	(1.17)	(1.17)
Home country dummies				
Brazil	2.071**	0.533***	2.112**	0.540***
	(2.26)	(6.40)	(2.25)	(6.70)
China	1.731***	0.586***	1.965***	0.639***
	(2.58)	(3.58)	(3.19)	(4.94)
Russia	0.432	0.170	0.741	0.284
	(0.71)	(0.73)	(1.23)	(1.36)
Host country dummies				
North America	-0.748**	-0.291***	-0.854***	-0.330***
	(-2.52)	(-2.65)	(-2.82)	(-3.00)
Japan	-2.092***	-0.477***	-2.196***	-0.478***
	(-2.58)	(-7.20)	(-2.60)	(-7.48)
Home Country Knowledge Base High Tech Industry EMNCs*	-	-	0.757**	0.301**
			(2.14)	(2.13)
Constant	1.590***	-	1.696***	-
	(2.82)		(3.27)	
N.	104	104	104	104
chi2	23.921***	23.921***	33.745***	33.745***

* p<0.10, ** p<0.05, *** p<0.01

Table 5
Cross-partial derivative effect of the interaction term computed according to the methodology suggested by Ai and Norton (2003) and by Norton, Wang e Ai (2004)

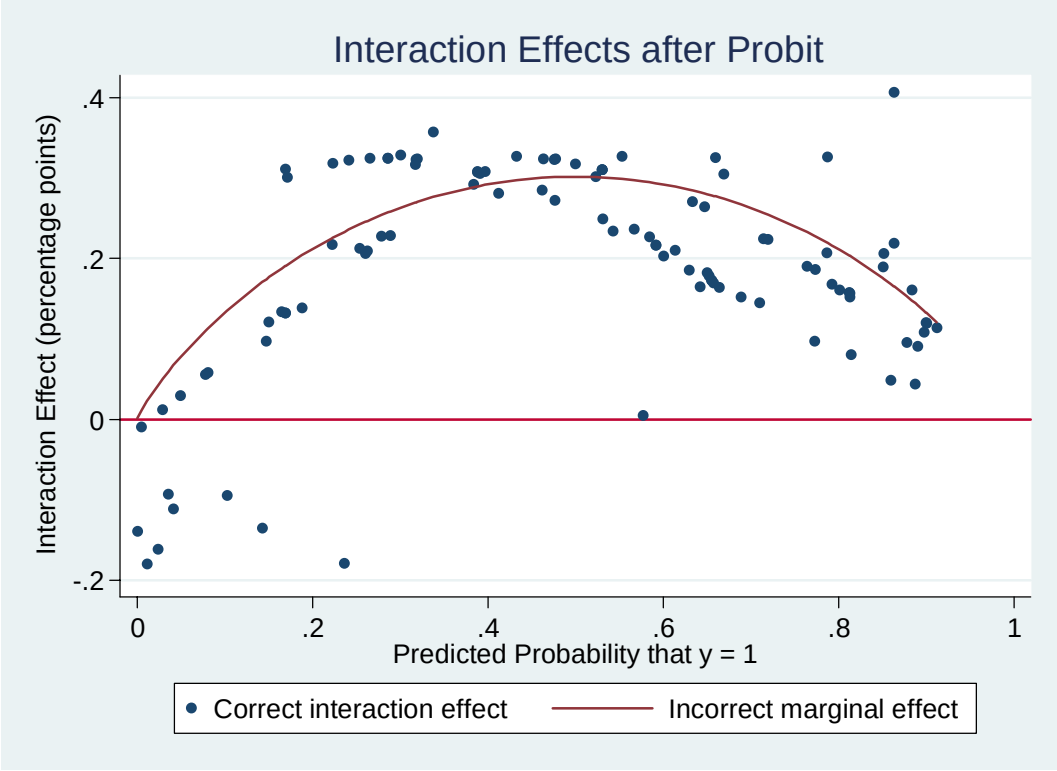
Values	Obs.	Mean	Std. Dev.	Min	Max
Cross partial derivative effect	104	0.187	0.131	-0.180	0.407
Standard error	104	0.133	0.034	0.020	0.294
Z-statistics	104	1.301	0.999	-2.681	2.312

Table 6
Derivative with respect to the variable *Home Country Knowledge Base* computed at the two different values of *High Tech Industry EMNCs*

	Derivative (dy/dx) of Home Country Knowledge Base	Chi-square Test, hypothesis: B – A =0
A. High Tech Industry EMNCs=0	-0.382***	4.52**
	(-4.62)	
B. High Tech Industry EMNCs=1	-0.195**	
	(-2.08)	

* p<0.10, ** p<0.05, *** p<0.01

Graph 1
Plot of the interaction effect (y-axis) according to the predicted probability that the dependent variable is equal to 1 (x-axis)



Graph 2
Plot of the z-statistics of interaction effect (y-axis) according to the predicted probability that the dependent variable is equal to 1 (x-axis)