Patent- and Trademark-Seeking Outward Foreign Direct Investment by Chinese Firms: The Role of Business Group Affiliation

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Abstract

We examine the relationship between business group affiliation of Chinese firms and their foreign acquisitive behaviour in terms of technology and brand-oriented strategic assets. Drawing on new internalization, business group and international business theory, we assert that Chinese business group affiliated firms will more likely pursue foreign acquisitions to seek strategic assets including patents but less likely to pursue foreign acquisitions to seek trademarks. Patents have non-location-bounded (NLB) properties which mean they can be exploited by the business group - not just the firm - back in the domestic market, while trademarks have location bounded (LB) properties which mean they are less easy to exploit by a business group domestically. Using a sample of 779 Chinese cross-border acquisitions between 2006 and 2015, we find support for arguments relating to the differences in relative attractiveness of targets holding patents vs. trademarks for Chinese firms linked to business groups. We discuss how this better helps us understand emerging market MNEs and related theory.

Key words: Foreign Direct Investment; Cross-border M&As; Strategic Asset Seeking; Business Group Affiliation; China

1. Introduction

Emerging-market Multinational Enterprises (EMNEs) have been actively engaged in strategic-asset-seeking (SAS) outside of their home countries, and they have been using cross-border mergers and acquisitions (CBM&A) for this purpose (Deng and Yang, 2015). Scholars historically argued such firms' relative disadvantage in technology and intellectual property (sometimes referred to as 'technological backwardness') has been a main factor behind this trend and that CBM&A allows them to augment, rather than exploit, the firm's technology and intellectual property. This phenomenon has challenged extant theory on internationalization and foreign direct investment (FDI) (Buckley, 2018; Luo and Tung, 2007, 2018; Mathews, 2006, 2017; Ramamurti, 2009). Various perspectives have emerged in the literature – including the 'late-comer' (Child and Rodrigues, 2005), 'springboard' (Luo and Tung, 2007), and 'strategic intent' perspectives (Rui and Yip, 2008). The springboard approach is relevant to EMNE CBM&A because it argues that EMNEs (and particularly those from countries like China, considered to be among the most aggressive of strategic asset seekers), undertake 'spring-board' steps in 'aggressive' but 'recursive' stages. The earlier stages are primarily motivated by the goal of acquiring and using foreign targets to capture further domestic market share through technological upgrading. Nevertheless, scholars have called for more research to understand foreign SAS by EMNEs (Buckley et al. 2007; Child and Rodrigues, 2005; Cuervo-Cazurra, 2012; Luo and Tung, 2007; Mathews, 2006; Narula, 2012; Yiu, 2011).

One line of enquiry is to explain acquisitive FDI strategy of EMNEs as a function of business group affiliation in the home country, given the high prevalence of business groups in many emerging economies. While there are many definitions of business groups, a common

definition is that they are groups of legally independent firms that cross multiple industries (i.e., are diversified) and are connected with each other through persistent formal (such as equity) and informal (such as family and cultural) ties (Khanna and Rivkin, 2001). Their ability to address institutional voids via internal capital, labour and product markets is often noted (Carney, Essen, Estrin, and Shapiro, 2017; Choi, Lee and Williams, 2011; Granovetter, 1995; Kedia, Mukherjee, and Lahiri, 2006; Khanna and Palepu, 1997; Lee, Peng, and Lee, 2008). This allows business group affiliated firms to have more channels and potentially stronger capacities than non-affiliated firms. Given a predominance of institutional voids in emerging economies, the presence of business groups is seen as a way of filling these institutional voids and providing resources and benefits to member firms. Importantly, business group attributes such as internal markets for resources, knowledge and technology, inward linkages between firms, and institutional support have been argued to support SAS FDI by member firms (Yiu, 2011).

Our specific focus is on China and in this country business groups occupy a dominant position (Sutherland, 2009). However, there is still limited research on exactly how business group affiliation determines SAS FDI activity of firms in China. In particular, there is no empirical research that has explored the extent to which business group affiliation in China influences the likelihood of different types of intellectual property acquisition by Chinese firms in foreign countries. Furthermore, while many studies rely upon patents as the key proxy for SAS orientation, in reality other forms of intellectual property - such as registered brands - are sought by Chinese acquirers (Buckley et al. 2007; Li, Li, and Shapiro, 2012; Ramasamy, Yeung, and Laforet, 2012).

We address these gaps in the current study. Drawing from new internalization theory (Rugman and Verbeke, 1992, 2001) as well as the literature on business groups (Carney, Essen, Estrin, and Shapiro, 2017; Kedia, Mukherjee, and Lahiri, 2006; Khanna and Palepu, 1997) we argue that the location-boundedness of the target asset (patent vs. trademark) has an important influence on whether the asset can be augmented into the asset base *not only of the acquiring Chinese firm, but also that of its business group.* In other words, it is important to distinguish between different types of target strategic asset in foreign countries and to link these to business group affiliation in the home country. Using patent and trademark data on acquired firms we examine 779 CBM&A deals made by Chinese firms between 2006 to 2015 to test three central hypotheses. These tests relate to the role of business group affiliation in China on overall strategic asset seeking, as well as differences between patent and trademark related acquisitions in foreign countries. Findings reveal strong support for an effect of business group affiliation in China on acquiring foreign firms with strategic assets, and in particular for technology-oriented non-location bound assets (patents). We find no support for an opposite prediction for brand-oriented location bound assets (trademarks). Furthermore, we find business groups with an R&D centre to raise the likelihood that group member firms will seek to acquire non-location bound assets abroad.

The study contributes new insights on the determinants of SAS FDI by EMNEs. Firstly, while business groups are an important source of resource and competence to member firms, they also expect to benefit from member firms' foreign acquisition of technology. Firms that may lack longstanding R&D capability are able to gain a foothold in new technological areas through foreign acquisition and then become a source of technology and knowledge for the

wider business group. Business group affiliation matters to how firms in emerging economies seek foreign knowledge and intellectual property. Nevertheless, and secondly, we show how there will be important differences between different types of foreign knowledge and intellectual property and the role played by business groups. Targeted strategic assets that contain trademarks are not necessarily sought simply because of home country business group affiliation, while those that contain patents are. This implies a more nuanced take on foreign strategic asset acquisition by EMNEs is needed in research on this topic. Thirdly, the location-boundedness of targeted strategic assets is an important determinant of how business groups influence the decision by member firms to acquire strategic assets. Business groups in emerging economies are more likely to encourage their member firms to be acquisitive for codified knowledge that can be more easily transferred and augmented, particularly when there are pre-existing R&D capabilities in the business group.

2. Literature review and hypotheses

2.1 The location boundedness of strategic asset seeking

Drawing from Rugman and Verbeke's (1992) work on internalization, we distinguish two types of strategic assets: non-location bounded (NLB) and location bounded (LB). The former are defined as firm-specific advantages (FSAs): "…*that can be exploited globally, and lead to benefits of scale, scope or exploitation of national differences. In the context of FDI, the nonlocation-bound FSAs typically lead to scope economies and can be transferred abroad at low marginal costs and used effectively in foreign operations without substantial adaptation.*" (Rugman and Verbeke, 2001: 241). NLB assets typically contain high levels of codified knowledge. In comparison with tacit knowledge, codified knowledge is more easily transferred

between countries. By comparison, the latter are defined as: "*FSAs that benefit a company only in a particular location (or set of locations), and lead to benefits of national responsiveness. In the context of FDI, these location-bound FSAs cannot easily be transferred as an intermediate good and require significant adaptation in order to be used in other locations.*" (Rugman and Verbeke, 2001: 241). LB assets indicate a market-orientation in a specific location or set of locations. When acquiring market-oriented FSAs, acquiring firms need to consider market characteristics, external country-level institutions, national culture and so forth. As opposed to codified knowledge, acquired firms' 'reputational resources' are less easily transferable as they can lose value when transferred across borders (Verbeke and Kano, 2015).

Brands and trademarks are important instances of firm reputational assets; they act as an identifiable signaling mechanism regarding the firm's market intentions (Castaldi, 2020; Llerena and Millot, 2020; Mendonça, Pereira and Godinho, 2004; Sandner and Block, 2011). They act to prevent hostile firms infringing upon their reputation (Llerena and Millot, 2020) and indicate an actual use in a market (Castaldi, 2020), a key difference with patents. Castaldi (2020: 4) notes: "trademarks are geographically bound to national borders." Patents are less concerned with protection of reputational assets, less constrained to national borders but more concerned with the protection of technological assets (Castaldi, 2020) and more easily transferable across national borders. On this basis, in the current analysis we align patents with NLB assets and trademarks with LB assets.

While there are some internationally known brands or trademarks that are popular across countries, most are not easily diffused internally within or repatriated by EMNEs to an emerging market. Mendonça, Pereira and Godinho (2004) note the trend for trademark filings

to be away from goods and towards services, which are mainly rooted in a specific country, catering for local institutional norms regarding service production and consumption. Frey, Ansar and Wunsch-Vincent (2015) note how emerging market firms can acquire foreign brands as part of their 'catch-up' strategy, although this encounters portfolio integration costs.

Consequently, FSA location boundedness has become a core focus of 'new' internalization theory (Rugman and Verbeke, 2001; Rugman and Verbeke, 1992). Nevertheless, scholars have noted how empirical studies have "failed to identify empirically or explain precisely the difference" between NLB and LB strategic assets (Collinson and Rugman, 2008:7). While some scholars suggest that new internalization theory focuses on the explanation of FSA attributes and their diffusion within member firms (Li and Oh, 2016), the theory has not been applied to studying EMNEs and their affiliation to business groups in a home country.

2.2 The role of business groups

A separate body of empirical evidence shows that EMNEs benefit from reverse knowledge transfer related to outward technology seeking FDI, implying the successful integration of knowledge assets acquired from abroad. Anderson et al. (2015), for example, consider the impact of foreign acquisitions on patenting activity in Chinese MNE parent firms, finding positive outcomes for them. Similarly, Fu et al. (2018) find positive impacts of Chinese FDI in developed countries on domestic innovation outputs (using survey data from MNEs in Guangdong province in 2010). They conclude that FDI 'serves as an effective channel for latecomer firms to overcome internal resource constraints and leapfrog toward the technology frontier' (Fu, Hou, & Liu, 2018: 111). Amendolagine, Giuliani, Martinelli and Rabellotti (2018) look at acquisitions of medium and high-tech firms in Europe and the US (during 2003–2011).

They too find positive influences on innovation outcomes, particularly in cases where Chinese acquirers had sufficient absorptive capacity (Amendolagine et al., 2018). Li, Strange, Ning, and Sutherland (2016) consider the effects of outward FDI on innovation performance using regional panel data from Chinese provinces. They find that outward FDI had a strong impact on domestic innovation (contingent again on provincial absorptive capacity). Taking a different but complementary angle, Piperopoulos, Wu and Wang (2018) find that Chinese MNEs use outward FDI as a strategy to globalize R&D and enhance their innovation performance in their foreign subsidiaries, with potential links to parent firms (Piperopoulos, Wu, & Wang, 2018). This recent empirical research clearly shows EMNEs do gain domestically from strategic asset seeking FDI, and that characteristics of the EMNE in the home country environment such as state vs private ownership (Anderson et al., 2015), ability to mobilize knowledge resources (Amendolagine et al., 2018) or prior R&D expenditure in the home country (Fu et al., 2018) can influence this. However, this literature does not examine the role of business groups.

Compared with foreign investors and domestic independent firms, business groups in emerging economies may provide advantages including resources and knowledge, labor and capital assets for EMNEs as they internationalize. Economists regard business groups as functional substitutes for market failure of resource allocation in production (Leff, 1978). Entrepreneurs use business groups to internalize the market failure and to address the difficulties of obtaining capital, talent, and technology in emerging economies (Guillén, 2000). Business group affiliation can facilitate member firms' innovativeness by providing them with access to group-level shared resources, including internal financial capital, technology, labor and other service (e.g., Carney, Essen, Estrin, and Shapiro, 2017; Choi, Lee and Williams, 2011;

Chang, Chung, and Mahmood, 2006; Mahmood and Mitchell, 2004).

In terms of internationalization, business groups can obtain privileged treatment from home country governments in encouraging FDI when compared to independent firms, due to their dominant positions in the domestic markets and relationships with governments (Gaur, Kumar, and Singh, 2014; Sachwald, 2001; Singh, 2011). Chari (2013), for example, shows a positive relationship between Indian firms' business group affiliation and their outward FDI. Compared with independent firms, firms affiliated to business groups are supported in the process of *linking, leveraging,* and *learning* (LLL) from foreign investments (Yiu, 2011). Research suggests that business groups have greater capacities in leveraging accessed resources or acquired assets (Chari, 2013). Indeed, capital market imperfections might allow Chinese firms within business groups to raise finance at below-market rates, encouraging their outward FDI.

Our baseline hypothesis is thus:

H1: Chinese business group affiliated firms are more likely to acquire foreign strategic assets than non-business group affiliated firms.

While business group affiliation in emerging economies may facilitate related SAS FDI (Chari, 2013; Sutherland, 2009; Yiu, Bruton and Lu, 2007), the literature is silent on how business group affiliation interacts with the nature of targeted assets when making foreign investment decisions, especially amongst Chinese firms. We consider the distinction between patents and trademarks as key features of strategic assets in our main hypotheses below, arguing

that business group affiliation will influence foreign acquisition due to the differences in the underlying nature of these different knowledge assets (Sandner and Block, 2011).

2.2.1 Business group affiliation and patent-seeking acquisitions

Scholarly work on business groups has suggested that business groups are an ideal organizational form for internalizing and exploiting acquired foreign technologies, and that they would be supportive of their member firms seeking foreign technology through acquisition. Amsden and Hikino (1994), for instance, argue that business groups increasingly internalize the capability to execute projects within the business group. This includes pre-investment feasibility studies, project engineering and operational start up (Amsden and Hikino, 1994). According to Castellacci (2015), a related form of internationalization relates to human resources and how group affiliated firms contribute to the efficient allocation of human resources internally within the group. Consequently, business groups can employ and allocate technical talent into R&D projects in order to facilitate the planning, integrating and absorbing of acquired technologies (Amsden and Hikino, 1994). In one Chinese case, Geely Group had its own research institute in Hangzhou, China. After it acquired Volvo, it started to build a joint R&D centre in Gothenburg, Sweden for exploiting and sharing technologies within the entire group (Milne and Correspondent, 2013). Geely group integrated and transferred new technologies to domestic subsidiaries or R&D centres across the group.

This effect of efficient technology transfer across borders is also reinforced in literature on patents and spillovers, including spillovers through FDI (Branstetter, 2006). Griliches, Pakes and Hall's (1986) well-cited work shows how R&D can 'spill' from one firm to another, enabling a receiving firm to benefit from the R&D work previously conducted by another firm.

Building on the earlier work of Jaffe (1986), Griliches et al. (1986) show how firms in technological clusters are more productive in terms of patent generation compared to what might be expected as an industry norm. Technology does spill over from one firm to another, assuming proximity and ability to absorb such knowledge (Jaffe, 1986). Importantly, research has extended this to international contexts and has shown how FDI acts as a channel for knowledge spillovers under hierarchical control when entities are not geographically close (Branstetter, 2006). Using patent data and Japanese firms investing in the U.S., Branstetter (2006) shows how FDI encourages bidirectional international knowledge flows (although the direction from home country to host country is stronger through greenfields in the host country). Patents are clearly NLB in this sense, and internalization of knowledge channels through a hierarchical acquisition makes their international transfer and spillover effects both more likely and more efficient than would be the case through market-based mechanisms. We argue that, for codified NLB technology (i.e., patents), business group affiliation will create appropriate capacity for an acquiring firm to plan, leverage and benefit from acquired strategic assets (Chari, 2013) that are particularly amenable for spillovers through FDI. In other words, we expect a positive impact of business group affiliation on the propensity of Chinese firms to acquire NLB strategic assets. Hence:

H2a: Chinese business group affiliated firms are more likely to acquire foreign strategic assets holding patents than non-business group affiliated firms.

2.2.2 Business group affiliation and trademark-seeking acquisitions

Some argue that acquiring foreign brands and their trademarks is one way to allow EMNEs to 'catch-up' with their developed country counterparts (Frey, Ansar and Wunsch-Vincent, 2015; Hennart, 2012; Luo and Tung, 2007, 2018; Petersen and Seifert, 2014; Rudy, Miller and Wang, 2016). Indeed, some research indicates foreign brands to be perceived as higher quality and associated with a higher brand value than local brands in China (Zhou, Yang and Hui, 2010). But what role does business group affiliation play in EMNE acquisition of foreign firms holding trademarks? We argue emerging economy business groups will be more reluctant to take on foreign trademarks. Restraining factors include portfolio integration costs (Frey, Ansar and Wunsch-Vincent, 2015) and the fact that marketing investments associated with trademarks are typically made after the granting of the trademark (Sandner and Block, 2011). Business groups in the emerging economy may not be able to accurately predict portfolio integration costs and subsequent marketing investments required in relation to the trademark in order to continue developing the brand in the domestic setting (Sandner and Block, 2011). Business groups form and develop owing to imperfect markets and institutional voids in the domestic market (Khanna and Palepu, 1997; Carney, 2008a). One such imperfect market relates to product markets. Developing an internationally-acquired trademark domestically and building brand reputation is a costly and difficult process, particularly in emerging economies.

Information concerning product attributes such as quality can also be rather limited in emerging economies. Researchers highlight the effect of brand origin confusion on the propensity of consumers to prefer local brands, this effect being amplified where there is low knowledge of the brand (Zhuang, Wang, Zhou and Zhou, 2008). Given that the vast majority

of foreign trademarks are associated with brands or services for which domestic consumers will have little knowledge, local brands will still wield tremendous power. By enforcing reputation of local brands, business groups develop their own brand value across different sectors. Acquisition of foreign trademarks could undermine this position. In addition, most Western trademarks are associated with specific logos and symbols and are written using the Roman alphabet. *Pinyin* is the equivalent in Chinese, but it is not generally recognized. Rather Chinese *hanzi* (characters) are used and understood by most. This adds weight to the LB nature of brands and illustrates that if Chinese firms acquire foreign brands/trademarks, they will likely have to adapt them to the Chinese market, something their business group may oppose.

In this sense, business group affiliation places a constraint on the already-difficult task of integrating a foreign acquired trademark for domestic exploitation. Brand origin confusion and low consumer knowledge of the brand will exacerbate this (Zhuang, Wang, Zhou and Zhou, 2008). We argue this constraint is more prevalent with business group affiliated firms because of their preference for sustaining local brands that require domestic marketing investment. This is especially important because of the trend for trademarks to be increasingly filed to protect reputation in services (Mendonça, Pereira and Godinho, 2004), these being difficult to transfer across national borders because of reputational stickiness of services (Greenwood, Prakash and Deephouse, 2005) rooted in the location in which they are delivered. Chinese firms affiliated to a business group are less likely to acquire a trademark to expand domestic markets as their business group already has considerable brand power over local brands and services specific for the Chinese market. Independent firms in China, however, would lack this constraint and would have more autonomy to seek foreign trademarks as part of their catch-up strategies.

Hence:

H2b: Chinese business group affiliated firms are less likely to acquire foreign strategic assets holding trademarks than non-business group affiliated firms.

3. Methodology

3.1 Data collection

Two ways have been used in empirical research of Chinese outward FDI: (1) to investigate FDI activities using aggregate-level FDI data; (2) to use firm-level FDI data. Researchers have argued that empirical treatment of China's FDI is compromised by the reliability of aggregate data (Amighini et al., 2014; Sutherland and Anderson, 2015). Aggregate FDI data largely ignores relevant features including industry composition, ownership structure and the modes of foreign entry. Indeed, FDI data has been seen as a biased measure of MNE activity (Beugelsdijk, Hennart, Slangen, and Smeets, 2010). Sutherland and Ning (2011) find that aggregate FDI data largely ignores the issue of 'round-tripping' and 'onward-journeying' investment, which is highly important for understanding the true determinants of Chinese FDI.

Previous studies on Chinese firms' outward FDI use listed firms (Sutherland and Ning, 2011; Yang, Yang, Chen and Allen, 2014). However, our study focuses on listed, delisted and unlisted firms that have completed cross-border M&A (CBM&A) deals. Yang, Yang, Chen and Allen (2014) exclude FDI projects in tax havens and offshore financial centres as they argue those entities are simply investment holding companies. Using the Orbis database, we found that some target firms located in tax havens also owned some patents and trademarks.

Subsequently, achieving firm-level evidence is critically important to understand the true determinants of Chinese FDI.

The data for this study was obtained from two different sources: Thomson One Banker (TOB) and the Orbis Database. TOB provided data on the CBM&As completed by Chinese firms between 2006 and 2015. Orbis (Bureau van Dijk) covered 200 million companies around the world (Bureau van Dijk, 2016). We obtained the supplementary firm-level details about both acquirers and target firms from the Orbis database. We arrived at a sample of 840 Chinese CBM&As following four stages of processing described in Appendix A. After accounting for missing variables, the final sample for analysis was 779 CBM&As. Appendix B shows the distribution of the data by country of target firm.

3.2 Variables

3.2.1 Dependent variables

We employ the target firm's patent information (taken from Orbis) to proxy NLB assets and the trademarks owned by a target firm as a proxy for LB assets. As the purpose is to investigate the extent to which business group affiliation determines Chinese firms' specific SAS strategies, we created a categorical variable called *Specific_SAS* as the main dependent variable, specifying four different strategic choices. This took the value '1' to indicate that the target firm holds neither patents nor trademarks; the value '2' when the target firm holds one or more patent(s) but no trademarks; the value '3' when the target firm holds one or more trademark(s) but no patents; and the value '4' when the target firm holds both one or more patent(s) and trademark(s). As an additional robustness test we also created and tested log transformed continuous variables for counts of patents (*TNPAT*) and trademarks (*TNTRADM*)

in the acquired firms (reported below).

3.2.2 Independent variables

Following prior research, we measured business group affiliation (*BGA*) using an indicator variable with value 1 if the firm is affiliated to a business group, and 0 otherwise (Buckley, Munjal, Enderwick, and Forsans, 2016; Chari, 2013; Chittoor, Kale, and Puranam, 2015; Choi, Lee and Williams, 2011; Kim and Lui, 2015; Ma, Yao, Xi, 2006; Ramaswamy, Li and Petitt, 2005; Wang, Yi, Kafouros, and Yan, 2015).

We followed four stages to check and confirm Chinese acquirers' business group affiliation. Firstly, the State Administration for Industry & Commerce of the People's Republic of China launched the '*Interim Provisions on the Administration of Enterprise Group Registration*' in 1998 (Enterprise Registration Bureau, 2017). According to this business law, one condition that an enterprise group should meet refers to the parent company of an enterprise group having a registered capital of fifty million RMB and at least five subsidiaries. Then we identified each firm's business group affiliation according to the information provided by Orbis database concerning the number of companies in a corporate group. Because some acquirers' information in Orbis was not present, we used other viable approaches to identify business group affiliation. Prior studies also identify a firm's group affiliation through checking whether its ultimate controlling entity had more than one firm in that year (He, Mao, Rui and Zha, 2013). Following He et al.'s (2013) approach, we checked each acquirer's global ultimate owners in the Orbis database and searched their group-affiliated information. Thirdly, following Xia, Ma, Lu, and Yiu (2014), we identified the enterprise group information from various editions of '*Large Corporations of China'*; a list from the State-Owned Assets Supervision and

Administration Commission of the State Council (SASAC). Fourthly, we double-checked this measure of business group affiliation through using further related secondary sources (such as corporate websites, media reports, company annual reports reported in Chinese).

In addition to the above measure of group affiliation, we further checked whether any of the business groups in our sample had set up their own group-wide R&D centre. Such centres may facilitate the internal sharing of knowledge (Amsden and Hikino, 1994) and can provide important know-how during an acquisition preparation and evaluation phase (pre-deal), as well as assistance in transferring knowledge from acquired strategic assets into the business group post-deal (Amsden and Hikino, 1994). Wang et al. (2015) show how R&D intensity in Chinese firms leads to subsequent innovation performance. Amendolagine et al. (2018) also put a spotlight on absorptive capacity of Chinese acquirers. Moreover, it is generally believed business groups address institutional voids via the intra-group mechanisms to coordinate knowledge sharing. We thus also created a dummy variable '*BG_RD*' with a value '1' if the acquirer was affiliated to a business group having its own group-wide R&D centre, and '0' otherwise (data sources shown in the Appendix).

3.2.3 Control variables

We controlled for factors at firm, industry and country level. Firm heterogeneity was controlled through the age and size of the firm. The firm's age (*AGE*, log-transformed) is based on total years since its incorporation (Buckley et al. 2016; Cui, et al., 2014). A firm's age may determine the nature of its FDI decision due to the accumulation of knowledge and experience (Wang, Hong, Kafouros, and Boateng, 2012). Longer established firms have a greater

propensity to engage in SAS FDI than traditional FDI (Cui, Meyer and Hu, 2014; Xia, Ma, Lu, and Yiu, 2014; Yang et al. 2014). Following Cui et al. (2014)'s approach, firms' total assets in US dollars (*TASSET*, log-transformed) was used to measure acquirers' firm size. In terms of financial performance, Yang et al. (2014) suggested that better performing firms have a greater likelihood of engaging in relatively long-term investment, including SAS FDI. Acquirers' prior profit margin (*PROFIT*) was employed.

Yang et al. (2014) use intangible asset quantity and R&D capability to measure firms' absorptive capacity. Accordingly, the log-transformed number of patents *ANPAT* and trademarks *ANTRADM* were used to account for the acquiring firm's absorptive capacities. Prior research also used an indicator variable to measure whether a firm is listed in a stock exchange and under market scrutiny or not (Chittoor, Kale, and Puranam, 2015). Cui, Meyer & Hu (2014) found that private ownership determines Chinese firms' intent to seek strategic assets through FDI. We included private ownership (*PRIVATE*) as a control variable taking the value '1' when the acquirer was privately controlled and '0' otherwise. We used public status (*PUBLIC*), as a control variable, measured as a dichotomous dummy. If firms had been listed in a stock market, they would be more capable of raising external finance to support SAS FDI activities. We used the ownership level of the acquirers (*OWNTRANS*) as a control variable, accounting for differences between acquirers' ownership levels and their potential influence on patent seeking and trademark seeking activities.

Furthermore, foreign experience was also used as a control (Buckley et al. 2016; Cui, Meyer and Hu, 2014; Yang et al. 2014). We measured firms' foreign experience (*FEXPE*) as a dummy variable with the value '1' meaning Chinese acquirers had established at least one

foreign subsidiary before acquiring a foreign company, and '0' otherwise. In terms of industry, we followed Jones and Temouri (2016)'s approach in classifying two-digit NACE industry codes into high technology (*HITECH*), medium technology (*MEDTEC*) and low technology (*LOWTEC*) manufacturing industries, knowledge intensive (*KNINTEN*) and less knowledge intensive (*LEKNIN*) service industries. Yang et al. (2014) argue that industry factors might lead to EMNEs' distinct SAS FDI behaviors. We also accounted for country-level factors by including the target country's GDP (*TGDP*, log-transformed) (e.g., Buckley et al., 2007; Kolstad & Wiig, 2012) as well as an indicator of the target country's institutional quality (*INSTION*) (Kolstad & Wiig, 2012) based on the Rule of Law indicator from the World Bank's Governance Indicators for the closest year to each target firm's host country. Institutional quality matters - Frey et al. (2015) note a tendency towards non-OECD firms becoming more important as acquisition targets. Lastly, we controlled for time heterogeneity using year dummies for each year in which the foreign M&A deals completed (Williams and Vrabie, 2018).

Table 1 shows variables descriptions including measurement and data source.

Insert Table 1 Here

3.3 Research models

A pooled unbalanced data set was used as first and foremost acquisitions are not a regular activity for most of the firms (although we found a few Chinese firms acquired foreign companies several times in the same year). The average number of foreign acquisition deals by Chinese firms was 1.76 (840 deals by 478 Chinese firms) over the decade period. Thus, there is dispersion in the data. As Buckley et al. (2016) suggest, such data is not best captured by

employing panel data estimation models but rather pooling is appropriate.

To test the main effects of business group affiliation on Chinese firms' strategic choices of seeking specific strategic assets (i.e., patent only, trademark only, or both), we ran a multinomial logistic regression model (Sutherland, Anderson, & Hu, 2020). The equation is expressed as follows:

$$y(Specific\_SAS_{it}) = \beta_0 + \beta_1 \times BGA_{i,t-1}/BG\_RD_{i,t-1} + \beta_2 \times AGE_{i,t-1} + \beta_3 \times PROFIT_{i,t-1} + \beta_4 \times TASSET_{i,t-1} + \beta_5 \times ANPAT(acq)_{i,t-1} + \beta_6 \times ANTRADM(acq)_{i,t-1} + \beta_7 \times FEXPE_{i,t-1} + \beta_8 \times PRIVATE_{i,t-1} + \beta_9 \times PUBLIC_{i,t-1} + \beta_{10} \times OWNTRANS_{i,t-1} + \beta_{11} \times HITECH_{i,t-1} + \beta_{12} \times MEDTEC_{i,t-1} + \beta_{13} \times LOWTEC_{i,t-1} + \beta_{14} \times KNINTEN_{i,t-1} + \beta_{15} \times LEKNIN_{i,t-1} + \beta_{16} \times TGDP_{i,t-1} + \beta_{17} \times INSTION_{i,t-1} + \varepsilon$$

$Specific\_SAS_{it}$ represents four categories of strategic asset information about the target firm *i* in year *t,* including (1) neither patents nor trademarks; (2) patents only; (3) trademarks only; (4) both patents and trademarks. $BGA_{i,t-1}$ is the main independent variable referring to that '1' means the target firm *i* is affiliated to a business group, and '0' otherwise. We followed Chari (2013) and Williams and Vrabie (2018) adding dummy variables for each year to control for unobserved time period effects.

3.4 Robustness and further diagnostic checks

Analysis of pairwise correlations suggested multicollinearity was not a serious concern in the interpretation of our modelling results. Furthermore, while multinational logistic regression is a powerful approach to model choices within a group of alternatives, it does require the assumption of the independence of irrelevant alternatives (IIA). Following standard testing

procedures, a Hausman-McFadden test was conducted to check the validity of the IIA assumption (Estrin, Meyer, and Pelletier, 2018). We first estimated the model on the full set of all SAS alternatives and re-ran it on the subset of alternatives (i.e., excluding both patent- and trademark-seeking alternatives (partial)). We found that two sets of estimates (full vs. partial) were not statistically different, implying that the IIA assumption was met. In addition, to address any potential endogeneity problems, all independent variables were lagged one year, in line with similar prior research (e.g., Choi, Lee and Williams, 2011; Deng and Yang, 2015; Elango and Pattnaik, 2007).

Finally, in addition to the multinomial choice modelling we also conducted a Seemingly Unrelated Regression (SUR) analysis (Zellner, 1962) on multiple equation models for patent and trademark seeking volumes (i.e. not using a discrete choice model). We used a log transformed measure of the count of patents and trademarks acquired as continuous dependent variables, accounting for the possibility that targets contain both patents and trademarks and that residuals will not be independent using a dual equation specification with the same independent and control variables. We ran the Breusch-Pagan test of independence on the SUR models. The results of this exercise were broadly supportive of our main findings.

4. Results

Table 2 shows the sample characteristics. There are 177 target firms owning patents, 63 of them having patents only. There are 196 target firms owning trademarks and 82 of them having trademarks only. As expected, from 2006 to 2015, we see the number of patent-driven M&As and trademark-driven M&As increasing steadily. There are 636 firms affiliated to business

groups, of which 495 are affiliated to a business group with an identified R&D centre. Table 3 shows descriptive statistics and pairwise correlations for all main variables. As expected, we see SAS deals being conducted in countries with larger market sizes and higher levels of institutional quality (r=0.29, p<0.001 for *TGDP* and r=0.11, p<0.001 for *INSTION*) (Buckley et al., 2007). We see the number of patents correlating positively with the number of trademarks acquired (r=0.26, p<0.001) and these also positively correlating with the acquirers prior stock of patents and trademarks. This is also as expected due to the absorptive capacity constraints on acquired strategic assets. Similarly, *BG_RD* positively correlates with numbers of patents acquired (r=0.07, p<0.05), although not for trademarks. In general, business group affiliation is associated with older firms (r=0.19, p<0.001), larger firms (r=045, p<0.001) and non-privately owned (i.e., state-owned) firms (r=-0.46, p<0.001). These all reflect conventional understanding of Chinese firms and business groups.

Insert Table 2 Here

Insert Table 3 Here

Table 4 reports the results of the main multinomial logistic regression models on the full sample. Model 1 shows the effects of control variables. Looking at the coefficients in these models, they imply that the economic size of the host country has a positive and significant impact for all three categories, a pattern seen in subsequent models. The level of acquirer's prior patents (ANPAT) has a positive effect on targets owning patents and trademarks, also seen in subsequent models. *BGA* and *BG_RD* are added in Models 2 and 3 respectively. *BGA* in Model 2 is positive and significant for the patents only category and the patents + trademarks

category. This indicates Chinese business group affiliated firms are more likely than independent firms to engage in general strategic asset seeking FDI than targets firms holding both technological and brand assets, supporting H1. It also shows they have a higher propensity to seek NLB technological assets, supporting H2a. As for the LB argument, the *BGA* coefficient in Model 2 is negative as expected, but insignificant, providing only equivocal support for H2b. In Model 3, the *BG_RD* coefficients are all positive and significant (1.400, $p<0.001$; 0.522, $p<0.10$; 1.135, $p<0.001$ respectively). As a robustness test, this provides strong support for H1 and H2a, but does not support H2b since the sign for the category of trademark only targets is not negative.

Wulff (2015) notes that caution is required in using coefficients alone in determining the direction and scale of the relationship between independent variables and the likelihood of choosing specific alternatives when using multinomial models. Instead, to be able to reach conclusions concerning such relationships, marginal effects estimates should be used (Wulff, 2015). Using these estimates our baseline hypothesis, H1, again finds support: business group affiliated firms are more likely to seek foreign strategic assets holding patents and trademarks. H2a is only supported at the 10% for general *BGA* and finds full support for *BG_RD*. A target firm holding patents increases the probability of an acquisition by a Chinese business group affiliated firm by 3.6%, while the existence of holding both patents and trademarks increases it by 7.3% (at 1% significance level). As regards LB brand orientation only, the *BGA* coefficient in Table 5 is indeed negative but also insignificant. Thus H2b is not supported. As for the existence of target firms holding patents only, the likelihood of an acquisition increases by 6.7% for those Chinese firms that are affiliated to business groups having internal R&D centres. By

contrast, for targets holding patents and trademarks together, the likelihood of an acquisition by a firm affiliated to a business group with an R&D centre is increased by an additional 1%. This indicates brand assets are not as attractive to Chinese firms as technology assets when the acquiring Chinese firm is affiliated to a business group with an R&D centre. Figure 1 shows margins plots for these effects for H1 and H2a.

Insert Table 4 Here

Insert Table 5 Here

Insert Figure 1

The robustness tests using SUR modelling are shown in Table 6. In Models 4a and 4b, we test the effect of *BGA* on acquiring foreign patents and trademarks. In Models 5a and 5b, *BG_RD* is used. The Breusch-Pagan test of independence are chi2 = 258.66 ($p<0.001$) and chi2 = 256.85 ($p<0.001$) respectively for each of these two tests. This supports our use of SUR as residuals are not independent. The *BGA* coefficient in Model 4a (patents) is positive and significant at the 10% significance level, but insignificant in Model 4b (trademarks). This is in accordance with the results shown from multinomial logistic model. The *BG_RD* coefficients in Models 5a and 5b are positive and significant. These results further demonstrate that Chinese business group affiliated firms are more likely to seek NLB technological assets rather than LB brand assets. They also provide further evidence for the role of R&D centres in Chinese business groups, where the argument of H2b becomes more nuanced and is indeed more in line with H2a in the presence of an R&D centre. These SUR results do not fully disentangle the impact of patents and trademarks alone, as many firms owning trademarks also own patents

(and vice versa) (discussed below).

Insert Table 6

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5. Discussion

The current study finds that business group affiliation, an important characteristic of some firms in emerging economies, to be an important determinant of Chinese firm SAS through acquisition in foreign countries. We find business group affiliation to be positively linked with firms' technology-oriented outward FDI as operationalized through acquisition of firms with patents. However, we do not find support for our hypothesis that there will be a negative association with brand-oriented FDI as operationalized through acquisition of firms with trademarks. Indeed, some of the post-hoc analysis using SUR on volumes of patents and trademarks may suggest trademark seeking can actually be a motive for acquisitive FDI by Chinese firms that are affiliated to a business group with an R&D centre (Table 6). However, there is large degree of overlap between patent and trademark ownership in a number of the target firms, meaning these post-hoc tests must be treated with caution. Our preferred interpretation of the results are those found in Table 5, namely that business group affiliated firms gravitate towards targets owning patents and trademarks or patents alone, and away from firms that do not own these types of assets. Overall, these results can be used to support the argument that Chinese firms have been guided in their foreign SAS strategies by the need to repatriate acquired foreign technologies to their domestic market and exploit them within the wider business groups to which they belong. This argument, moreover, is in line with the 'springboard theory' (Luo and Tung, 2007) currently popular within the International Business

literature. Implicit in the springboard theory is the idea that springboard MNEs tend to acquire NLB assets at earlier stages of their development, only later moving to LB assets (like brands), where expansion becomes more ambitious (i.e., in terms of entering developed markets and establishing brands recognizable to developed market consumers). This would seem an accurate reflection, to us, of where Chinese MNEs were in the timeframe of our data collection, with such examples of Chinese owned brands that are recognized by developed market consumers remaining very much the exception (like Lenovo, Huawei, Tik Tok) rather than the rule[1].

This study is therefore amongst the first to examine how home country business group affiliation and the characteristics of this affiliation determine foreign acquisitive strategy at firm-level across different types of target assets. Prior influential work on FDI from emerging economies has either neglected to account for business group affiliation (e.g., Buckley et al., 2007; Cui et al., 2014; Drogendijk and Blomkvist, 2013; Ramaswamy et al., 2015) or has not attempted to differentiate (theoretically or empirically) between types of SAS (e.g., Buckley, 2018; Cui et al., 2014; Deng, 2009; Drogendijk and Blomkvist, 2013; Luo and Tung, 2007). Also, prior work, because it does not consider business group affiliation in detail, has not delved more deeply into the absorptive capacity of the business group (rather than the firm) as it pertains to R&D capability (e.g., Amendolagine et al., 2018; Chari, 2013; Gaur et al., 2014; Fu et al., 2018). Some work ignores home country characteristics completely (e.g., Kolstad and Wiig, 2012). We address these deficiencies and extend the literature on EMNE internationalization by clarifying the effects of business group affiliation on the seeking of

[1] It is also consistent with the positive and significant coefficients for the ANPAT variable (acquirer previously owning patents) for cases where the target firm has patents and trademarks (Table 4)

different types of foreign strategic assets. In doing so we show that the logic of location-boundedness found in new internalization theory (Rugman and Verbeke, 1992, 2001; Verbeke and Kano, 2015) (in particular, the extent to which the foreign strategic assets are non-location bound, i.e., patents (Branstetter, 2006)), can help in our understanding of how foreign intellectual property can be attractive for EMNEs in general and Chinese firms in particular.

There are a number of further theoretical contributions from this study. Firstly, while business groups should not only be seen as a source of resource and competence for their member firms, they will also have their technological assets updated as a consequence of the foreign acquisitive strategies of their member firms. The idea that asset augmentation in terms of foreign acquired technology happens at the firm level should also be extended to the business group level. Chen, Li and Shapiro (2012), for instance, find that increasing foreign R&D investments in host countries that are rich in technological resources significantly improve EMNEs' technological capabilities. Our theory goes beyond this line of thinking to include the linkage to the wider business group, rather than just the focal firm. In the context of emerging economies, the prevailing assumption about business groups suggests that their emergence is to internalize various transactions as a response to address market failures or institutional voids (Khanna and Palepu, 1997). Our results are supportive of the view that business groups may facilitate technological 'catch-up' by member firms and that they play a role in absorbing foreign knowledge assets acquired by member firms (Carney, 2008a; Kock and Guillén, 2001). We see a strong indication of this argument in our tests involving business groups with internal R&D centres, which have a stronger propensity to acquire NLB technological assets.

Secondly, we highlight the differences between different types of foreign technology and

intellectual property when member firms of Chinese business groups acquire strategic assets abroad. Our finding supports the idea that business groups in emerging economies have become able to internalize acquired technology in the form of non-location bound patents. But the findings also show that they have comparatively little role to play in seeking out or internalizing location bound trademarks (in the timeframe of our data). The incentives to seek strategic assets are - in part - because they have access to local complementary resources at home (Amsden and Hikino, 1994; Hennart, 2012; Petersen and Seifert, 2014) or what Luo and Tung (2007) refer to as 'home court advantages'. The logic is that access to these domestic complementary resources (i.e., a large and fast-growing domestic market) are part of the encouragement given to member firms to go overseas and acquire new strategic assets (Hennart, 2012). The EMNE literature frequently alludes to the strong orientation of EMNEs towards *all* types of strategic assets (e.g. Child and Rodrigues, 2005; Deng, 2009; Luo and Tung, 2007; Rui and Yip, 2008). Advanced technologies and known brands are invariably bundled together as 'strategic assets' (Deng, 2009; Luo and Tung, 2007; Ramamurti, 2012). However, what we find is that this argumentation certainly applies in the situation when the assets have NLB properties, but it is not clear whether it applies when the assets have LB properties (Castaldi, 2020), are heavily skewed towards localized services (Mendonça, Pereira and Godinho, 2004) and potentially confounded by brand origin confusion (Zhuang, Wang, Zhou and Zhou, 2008). One explanation for our central finding relating to trademarks could be the different effects that different characteristics of trademarks ultimately have on innovation (Flikkema, Castaldi, de Man and Seip, 2019) or value, including their seniority and oppositions (Sandner and Block, 2011). These were not picked up in our firm-level measurement. Another explanation could be

methodological: it is difficult to disentangle motives for acquiring patents versus trademarks using secondary data where the target firm has both. We elaborate on this issue below. Nevertheless, our findings add a nuance to EMNE theory that suggests EMNEs tend to repatriate foreign strategic assets they acquired to the home market for exploitation (Hennart, 2012; Luo and Tung, 2007, 2018; Petersen and Seifert, 2014; Rudy, Miller and Wang, 2016). We show that this is likely to depend on the type of asset as well as pre-existing levels of R&D competence not in the firm, but in the business group to which it belongs.

Thirdly, our study emphasizes the role of location-boundedness of targeted strategic assets and how this relates to business group affiliation in the home country. Unlike prior work that makes little attempt to disaggregate firms' strategic assets by their types or properties, we draw on the new internalization theory proposed by Rugman and Verbeke (1992, 2001) to assert the importance of location-boundedness of foreign assets. While business groups have capacities for combining financial, technical and managerial resources into business operations (Carney, 2008b) they will be challenged by foreign strategic assets that are difficult to fit and integrate – which we argue is more likely to be the case with trademarks (Mendonça, Pereira and Godinho, 2004). Our study raises questions about the expected loss of value associated with the transfer of reputational assets from a foreign source into a business group within an emerging economy context (Rugman and Verbeke, 1992; Verbeke and Kano, 2015). In the specific context of China, the domestic market is so large that Chinese firms have to initially focus on it. Chinese business groups, moreover, already have their own established and renowned domestic brands (Zhuang, Wang, Zhou and Zhou, 2008). Thus, to maintain the competitive position in the home country market, Chinese business group member firms are

more likely to acquire NLB assets such as sophisticated technologies than LB assets. We provide support for Rugman and Verbeke (1992, 2001) in this respect while also adding to the debate on how Chinese firms have been able to internationalize so rapidly.

The findings can assist policy makers and managers in understanding the real determinants of emerging economy firms' SAS FDI. The findings can help managers in advanced countries to assess the competitive threat from EMNEs, especially from those affiliated to business groups. Our findings imply that emerging economy firms affiliated to business groups are more likely to pose a competitive threat in international markets by seeking to acquire firms with strategic assets. Understanding the extent to which business group affiliation facilitates emerging economy firms' strategic asset oriented FDI is important. There is a growing need for policy makers and managers in the West to determine the threat from emerging economy firms and our findings can help them to foresee where potential acquisition bids may originate and to which types of target firms they will be focused. Moreover, owing to asymmetric market access, it may well be in the interests of a foreign target firm to be acquired by a Chinese group. For example, Kuka, the high profile German robotics national champion, has seen its market share grow in China since it was acquired by Midea Group.

Our study has important methodological implications. When studying EMNE FDI strategies, there are two main issues. Firstly, as noted above, aggregate FDI data – which has been commonly used - is a biased measure of MNE subsidiary activity (Beugelsdijk, Hennart, Slangen, and Smeets, 2010; Sutherland and Anderson, 2015). The reality is that if we are to better understand the role of foreign technology and IP in firm internationalization decisions, we need to collect and analyze data at firm-level (both acquirer and target). We would argue

the use of firm-level data can better assist us to understand the determinants of Chinese outward FDI than aggregate data. A second issue lies in the measurement of strategic assets. Alon (2010:11) states that "there is no theoretically established variable best suited to capture strategic-asset-seeking FDI". Existing empirical research cannot reach a consensus here. One plausible explanation may be attributed to the difficulties of collecting firm-level patent or trademark information. This study marks a methodological step forward by capturing in detail SAS FDI activity at firm-level from an important emerging economy.

There are several research limitations in this study to be addressed in future research. This study used the affiliation to a business group, as well as an indicator for the business group having an R&D centre, as the main independent variables. There are other aspects of business groups, including their size and degree of diversification (Chari, 2013) that may also play a role. Also, with respect to measurements of strategic assets, we used acquired firms' asset presence as our measure and were not able to tap into their value. In future, acquired firms' brand values or market values can be used and links made to trademark seniority, filed oppositions and classes covered (Sandner and Block, 2011) as these more nuanced characteristics could explain why we did not find significance for H2b in the main models. Nasirov (2020) uses registration, maintenance and renewal at the level of the trademark as indicators of value. Following Nasirov (2020), these types of indicators could be used in future research as a reliable proxy for brand values of the underlying LB strategic assets acquired through FDI. Relatedly, there are challenges in separating NLB and LB assets using patents and trademarks respectively in situations where firms hold both. In common with Llerena and Millot (2020), our sample had more firms with patents and trademarks than with either only

patents or only trademarks. Patents and trademarks work in different ways (i.e., protection against competitor copying or use of a technology vs protection against threats to an owner's reputation) and the protective effect of trademarks can last long after the expiration of a related patent (Llerena and Millot, 2020). Indeed, trademarks can last indefinitely as long as they are renewed (Castaldi, 2020). However, patents and trademarks can be used in combination as part of a firm's overall competitive strategy (Grazzi, Piccardo and Vergari, 2020), creating protection through substitutability and complementarity effects (Llerena and Millot, 2020), and signaling a range of underlying capabilities (Castaldi, 2020). This means it can be difficult for researchers to separate their effects on the value of strategic assets sought by an acquiring firm. While our study clearly shows differences between targets only owning patents and only owning trademarks (Table 4, models 2 and 3, and Table 5), future work can examine more precisely the interesting case of where EMNEs deliberately seek both types of strategic assets in the same target firms. Our findings suggest the business group effect is particularly strong for patents + trademarks, a possible indication of a counter-balancing of LB aspects with NLB ones, and of strong underlying firm capabilities. Grazzi et al. (2020) provide an approach to measure this concordance (proximity) between trademarks and patents at firm level by mapping them onto International Standard Industrial Classification (ISIC) codes. Even though their study does not find a significant effect of concordance on firm performance in Italian firms, this does not necessarily mean that Chinese acquirers related to domestic business groups will not acquire targets that have this concordance. Future work can use Grazzi et al.'s (2020) method to test this. Researchers can also consider a different methodological approach using primary data (e.g., interviews with executives in both acquiring and target firms) to uncover

any constraints exerted by acquirer business group affiliation on the motives for acquisition in the situation where the target holds both patents and trademarks. Our results may encourage researchers to think about how firms in emerging economies integrate acquired brands and continue to develop their marketing investments based on the acquired brands. To the best of our knowledge, there is limited research on this question. We hope these new lines of enquiry will further develop our understanding of how business groups influence the strategy of firms in emerging economies as it pertains to patented technology and other forms of intellectual property originating in other countries.

APPENDIX A

Data collection

In the first stage, we collected the data on Chinese firms' CBM&A activity from the TOB database. We needed to ensure that all target firms were located outside of China. All acquirers had to be firms which originated from the mainland of China. In this case, we ensured that the acquirer's ultimate parent nation was in China. According to the standard OECD/IMF definition of FDI, we placed one condition for each acceptable M&A deal that the percent, namely the value of the shareholdings after transaction stood between 10 to 100% of total. In other words, Chinese acquirers owned more than 10% ownership of target firms. In this stage, we found 1,736 such deals from 2006 to 2015 in the TOB database.

In the second stage, we obtained the Chinese acquirers' firm-level information. Firstly, having isolated the target and acquiring firms from TOB, we used the 'batch-search' function in Orbis to match each pair of firms. We manually checked each firm's details. For example, we discarded target firms that were actually representing single locations and some of them that were originally Chinese firms; this amounted to 255 ineffective target companies in total. We discarded target firms that are originally other Chinese foreign-based subsidiaries. Furthermore, there were 25 repeat M&A deals and these were excluded. Another 89 target firms were part assets such as wind farms, oil, gold projects for which we could not find any actual company registration information.

In the third stage, we checked acquirers. Firstly, we excluded 136 Chinese acquirers which had been dissolved, according to the information given by Orbis. Secondly, checking acquirers' global ultimate ownership (GUO), we found 26 acquirers were not indigenous Chinese firms. Thirdly, we excluded another 92 Chinese acquirers because they consisted of individual investors. Finally, we double-checked the remaining data sample, leaving finally 840 valid Chinese CBM&As to enter into the empirical tests.

APPENDIX B

Target firm distribution by country

Country	Patent only (count of deals)	Country	Trademark only (count of deals)	Country	Patent & trademark (count of deals)
Germany	17	USA	16	USA	41
Australia, USA	10	UK	9	Germany	24
Bermuda, Japan	3	Australia	7	Japan	8
Canada, Denmark, Italy, Israel, South Africa	2	Japan	5	Italy	7
Austria, Czech Republic, France, Korea, New Zealand, Norway, Switzerland, Taiwan, UK	1	Canada, Korea	4	Spain	5
		France, Germany, Netherlands, Portugal, Spain	3	UK	4
		Bermuda, Czech Republic, HK, Italy, New Zealand, Singapore, Sweden, Switzerland	2	Austria, Canada, France, Korea	3
		Chile, Denmark, Israel, Luxembourg, Russia, Virgin Islands	1	Hungary, Netherlands, Sweden	2
				Belgium, Cayman Islands, HK, New Zealand, Norway, Russia, Singapore	1

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TABLES

Table 1. Variable definition and data sources

Variable name	Measurement	Data source
Specific_SAS	1 when the target does not have any patents nor trademarks, 2 when the target has patents only, 3 when the target has trademarks only, 4 when the target has both patents and trademarks	ORBIS Database
T_PAT	1 when the foreign target has at least 1 patent, 0 otherwise	ORBIS Database
T_TRADM	1 when the foreign target has at least 1 trademark; 0 otherwise	ORBIS Database
Log_TNPAT	Log-transformed number of target firms' patents	ORBIS Database
Log_TNTRADM	Log-transformed number of target firms' trademarks	ORBIS Database
BGA	1 when the Chinese firm is affiliated to a business group, 0 otherwise	Large Corporations of China 2008; China National Knowledge Infrastructure (CNKI); ORBIS Database; Corporate websites
BG_RD	1 when the Chinese firm is affiliated to a business group having its own R&D center(s), 0 otherwise; all group firms' industry classifications were checked for scientific R&D and cross-checked with corporate websites to positively identify an R&D centre	Large Corporations of China 2008; China National Knowledge Infrastructure (CNKI); ORBIS Database; Corporate websites
ANPAT	log(1+Acquirers' number of patents)	ORBIS Database
ANTRADM	log(1+acquirer's number of trademarks)	ORBIS Database
AGE	log(Firm's age)	ORBIS Database
PROFIT	Profit margin%	ORBIS Database
TASSET	log(Total assets)	ORBIS Database

Variable name	Measurement	Data source
PUBLIC	1 when the Chinese firm is listed, 0 otherwise	ORBIS Database
OWNTRANS	Ownership level (%) after M&A transaction	Thomson One Database
PRIVATE	1 when the Chinese firm is privately owned, 0 otherwise	ORBIS Database
FEXPE	1 when the Chinese firm already has one foreign subsidiary, 0 otherwise	ORBIS Database
HITECH	Dummy variable where manufacturing firms included in NACE 2-digit codes: 21 and 26 =1 and 0 otherwise	ORBIS Database
MEDTEC	Dummy variable where manufacturing firms included in NACE 2-digit codes:19; 20; 22; 23; 24; 25; 27; 28; 29; 30 and 33 =1 and 0 otherwise	ORBIS Database
LOWTEC	Dummy variable where manufacturing firms included in NACE 2-digit codes: 10; 11; 12; 13; 14; 15; 16; 17; 18; 31 and 32 =1 and 0 otherwise	ORBIS Database
KNINTEN	Dummy variable where manufacturing firms included in NACE 2-digit codes: 50; 51; 58; 59; 60; 61; 62; 63; 64; 65; 66; 69; 70; 71; 72; 73; 74; 75; 78; 80; 84; 85; 86; 87; 88; 89; 90; 91; 92 and 93 =1 and 0 otherwise	ORBIS Database
LEKNIN	Dummy variable where manufacturing firms included in NACE 2-digit codes: 45; 46; 47; 49; 52; 53; 55; 56; 68; 77; 79; 81; 82; 94; 95; 96; 97; 98 and 99 =1 and 0 otherwise	ORBIS Database
TGDP	Log-transformed GDP value at the prior MA year	World Bank
INSTION	Rule of law	Governance Indicators, World Bank

Table 2. Sample characteristics

Category	Neither patents nor trademarks	Patents only	Trademarks only	Patents and trademarks	Total
Target firms holding patents	0	63	0	114	177
Target firms holding trademarks	0	0	82	114	196
Business group affiliated firms	441	48	56	91	636
Business groups having R&D centres	324	45	46	80	495
Year 2006	23	3	2	3	31
Year 2007	40	0	3	4	47
Year 2008	51	2	2	7	62
Year 2009	63	4	6	4	77
Year 2010	58	8	8	6	80
Year 2011	65	7	6	17	95
Year 2012	74	6	11	11	102
Year 2013	65	10	14	16	105
Year 2014	73	10	13	26	122
Year 2015	69	13	17	20	119

Table 3. Descriptive statistics and correlations

No.	Variable	Obs	Mean	Std.Dev.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1	Specific_SAS	840	1.68	1.11	1														
2	TNPAT	840	472.63	5612.06	0.17***	1													
3	TNTRADM	840	7.02	46.13	0.30***	0.26***	1												
4	BGA	840	0.76	0.43	0.01	0.04	0.05	1											
5	BG_RD	840	0.59	0.49	0.09*	0.07*	0.05	0.66***	1										
6	AGE	840	2.81	0.57	-0.07*	0.03	0.02	0.19***	0.26***	1									
7	PROFIT	779	8.52	26.94	0.05	-0.01	0.02	0.03	0.07*	0.06+	1								
8	TASSET	796	22.01	2.64	-0.03	0.04	0.07+	0.45***	0.33***	0.29***	0.21***	1							
9	ANPAT	840	2.01	2.85	0.13***	0.13***	0.11***	0.19***	0.30***	0.15***	0.05	0.34***	1						
10	ANTRADM	840	0.56	0.98	0.16***	0.13***	0.08*	0.17***	0.25***	0.18***	0.12***	0.36***	0.53***	1					
11	PRIVATE	840	0.49	0.50	0.12***	0.00	0.01	-0.46***	-0.41***	-0.25***	0.00	-0.46***	-0.12***	-0.01	1				
12	PUBLIC	840	0.53	0.50	-0.02	-0.07*	0.04	-0.06+	-0.08+	-0.08*	0.03	0.03	0.10***	0.03	0.09*	1			
13	FEXPE	840	0.73	0.44	0.03	-0.03	0.02	0.14***	0.10***	0.10***	0.04	0.28***	0.15***	0.16***	-0.15***	0.16***	1		
14	OWNTRANS	840	73.44	32.88	0.01	0.05	-0.02	-0.04	0.00	0.01	0.09*	-0.14***	-0.04	0.03	0.15***	0.06+	-0.06+	1	
15	TGDP	840	27.54	2.25	0.29***	0.06+	0.14***	-0.08*	0.02	-0.01	0.07+	-0.05	0.08*	0.13***	0.09*	-0.02	0.00	0.11***	1
16	INSTION	840	1.35	0.65	0.11***	0.01	0.04	-0.04	-0.02	-0.15***	-0.03	-0.17***	-0.07*	-0.10***	0.07*	-0.01	-0.04	0.07*	0.38***

*p<0.10 +, p<0.05 *, p<0.01 **, p<0.001 ****

Table 4. Multinomial logistic regression results

	Model 1			Model 2			Model 3		
	Target owns patents	Target owns trademarks	Target owns patents & trademarks	Target owns patents	Target owns trademarks	Target owns patents & trademarks	Target owns patents	Target owns trademarks	Target owns patents & trademarks
BGA				0.761+	-0.134	0.946*			
				(0.42)	(0.35)	(0.39)			
BG_RD							1.400***	0.522+	1.135***
							(0.37)	(0.29)	(0.31)
AGE	-0.142	-0.093	-0.403+	-0.144	-0.091	-0.417+	-0.249	-0.140	-0.492+
	(0.32)	(0.26)	(0.24)	(0.32)	(0.26)	(0.24)	(0.33)	(0.26)	(0.25)
PROFIT	0.005	0.002	0.006	0.005	0.002	0.005	0.004	0.002	0.004
	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)	(0.01)	(0.00)	(0.01)
TASSET	-0.034	-0.002	0.096	-0.075	0.007	0.044	-0.060	-0.010	0.078
	(0.09)	(0.06)	(0.08)	(0.09)	(0.07)	(0.08)	(0.09)	(0.06)	(0.08)
ANPAT	0.094	-0.029	0.114*	0.096	-0.028	0.119*	0.094	-0.035	0.11+
	(0.07)	(0.06)	(0.06)	(0.07)	(0.06)	(0.06)	(0.07)	(0.06)	(0.06)
ANTRADM	-0.117	0.193	0.194	-0.135	0.198	0.164	-0.224	0.154	0.103
	(0.21)	(0.16)	(0.15)	(0.21)	(0.16)	(0.15)	(0.21)	(0.16)	(0.16)
PRIVATE	-0.162	0.421	0.338	0.034	0.393	0.509+	0.244	0.576+	0.644*
	(0.34)	(0.29)	(0.30)	(0.33)	(0.32)	(0.30)	(0.35)	(0.30)	(0.31)
PUBLIC	0.293	-0.315	-0.672*	0.366	-0.339	-0.574*	0.443	-0.252	-0.535*
	(0.31)	(0.27)	(0.26)	(0.31)	(0.27)	(0.27)	(0.31)	(0.27)	(0.27)
FEXPE	-0.379	0.163	-0.0628	-0.39	0.17	-0.104	-0.435	0.146	-0.107
	(0.33)	(0.33)	(0.31)	(0.33)	(0.33)	(0.31)	(0.33)	(0.33)	(0.32)
OWNTRANS	-0.006	-0.009*	-0.003	-0.007	-0.008*	-0.004	-0.007	-0.009*	-0.004
	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)

	Model 1			Model 2			Model 3		
	Target owns patents	Target owns trademarks	Target owns patents & trademarks	Target owns patents	Target owns trademarks	Target owns patents & trademarks	Target owns patents	Target owns trademarks	Target owns patents & trademarks
HITECH	1.949**	0.750	1.312*	2.061***	0.724	1.504*	2.173***	0.830	1.563*
	(0.61)	(0.55)	(0.57)	(0.62)	(0.55)	(0.60)	(0.64)	(0.55)	(0.61)
MEDTEC	1.282*	0.451	1.360**	1.221*	0.461	1.319**	1.384*	0.488	1.473**
	(0.52)	(0.47)	(0.49)	(0.53)	(0.48)	(0.50)	(0.55)	(0.48)	(0.52)
LOWTEC	1.607*	1.254*	1.674*	1.559+	1.255*	1.642*	1.938*	1.367*	2.033**
	(0.77)	(0.61)	(0.66)	(0.80)	(0.61)	(0.68)	(0.82)	(0.62)	(0.72)
KNINTEN	0.643	0.121	0.021	0.684	0.12	0.0637	0.968	0.227	0.29
	(0.61)	(0.52)	(0.58)	(0.62)	(0.52)	(0.60)	(0.64)	(0.52)	(0.63)
LEKNIN	0.603	0.107	0.137	0.519	0.127	0.0595	0.86	0.194	0.33
	(0.70)	(0.57)	(0.66)	(0.71)	(0.57)	(0.68)	(0.73)	(0.58)	(0.70)
TGDP	0.233**	0.172*	0.616***	0.253**	0.169*	0.638***	0.259**	0.175*	0.625***
	(0.09)	(0.08)	(0.10)	(0.09)	(0.08)	(0.10)	(0.09)	(0.08)	(0.10)
INSTION	0.382+	0.305	0.116	0.347	0.312	0.0482	0.351	0.287	0.069
	(0.23)	(0.22)	(0.22)	(0.24)	(0.22)	(0.22)	(0.24)	(0.22)	(0.22)
Constant	-7.848*	-6.915**	-20.53***	-8.090*	-6.941**	-20.68***	-8.813*	-7.122**	-21.06***
	(3.35)	(2.41)	(3.80)	(3.39)	(2.41)	(3.88)	(3.66)	(2.42)	(4.02)
Year controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Wald chi2		3714.12***			4238.02***			3521.23***	
Pseudo R2		0.1494			0.1556			0.1658	
Log likelihood		-638.9607			-634.302			-626.645	
AIC		1433.9			1430.6			1415.3	
Max VIF		4.46			4.47			4.47	
Observations		779			779			779	

*Robust standard errors in parentheses, +p<0.10, *p<0.05, **p<0.01, ***p<0.001; Base: target holds neither patents nor trademarks.*

Table 5. Average marginal effects on the probability of acquiring specific kinds of strategic assets

	No patents or trademarks	Patents only	Trademarks only	Patents and trademarks
Business Group Affiliation (*BGA*)	-0.078+	0.036+	-0.032	0.073**
Affiliation with Business Groups having own R&D centre (*BG_RD*)	-0.160***	0.067**	0.015	0.077**

*Based on Model 2 and Model 3 in Table 3; p<0.10 +, p<0.05 *, p<0.01 **, p<0.001 ****

Table 6. SUR results for continuous dependent variables

	Model 4a Patent seeking	Model 4b Trademark seeking	Model 5a Patent seeking	Model 5b Trademark seeking
BGA	0.322+	0.185		
	(0.17)	(0.12)		
BG_RD			0.430**	0.213*
			(0.14)	(0.09)
AGE	-0.023	-0.0494	-0.0608	-0.068
	(0.12)	(0.08)	(0.12)	(0.08)
PROFIT	0.000591	-0.0003	0.00004	-0.0006
	(0.00)	(0.00)	(0.00)	(0.00)
TASSET	0.003	0.030	0.015	0.038
	(0.03)	(0.02)	(0.03)	(0.02)
ANPAT	0.096***	0.031+	0.091***	0.028
	(0.03)	(0.02)	(0.03)	(0.02)
ANTRADM	0.036	0.060	0.009	0.047
	(0.08)	(0.05)	(0.08)	(0.05)
PRIVATE	0.201	0.223*	0.252	0.242*
	(0.15)	(0.10)	(0.15)	(0.10)
PUBLIC	-0.215+	-0.193*	-0.200	-0.189*
	(0.13)	(0.08)	(0.13)	(0.08)
FEXPE	-0.114	0.00461	-0.112	0.00599
	(0.14)	(0.09)	(0.14)	(0.09)
OWNTRANS	-0.001	-0.002	-0.001	-0.002
	(0.00)	(0.00)	(0.00)	(0.00)
HITECH	0.517*	0.243	0.525*	0.242
	(0.25)	(0.17)	(0.25)	(0.17)
MEDTEC	0.477*	0.172	0.527**	0.199
	(0.20)	(0.13)	(0.19)	(0.13)
LOWTEC	0.498+	0.668***	0.605*	0.724***
	(0.29)	(0.19)	(0.29)	(0.19)
KNINTEN	0.0344	0.071	0.108	0.106
	(0.22)	(0.15)	(0.22)	(0.15)
LEKNIN	0.073	0.028	0.180	0.0828
	(0.24)	(0.16)	(0.24)	(0.16)
TGDP	0.163***	0.105***	0.158***	0.103***
	(0.03)	(0.02)	(0.03)	(0.02)
INSTION	0.003	0.044	-0.003	0.042
	(0.10)	(0.07)	(0.10)	(0.07)
Constant	-4.370***	-3.281***	-4.502***	-3.350***
	(1.10)	(0.74)	(1.09)	(0.74)
Year control	YES	YES	YES	YES
R-sq	0.1466	0.1263	0.1533	0.1292

	Model 4a Patent seeking	Model 4b Trademark seeking	Model 5a Patent seeking	Model 5b Trademark seeking
chi2	133.79***	112.56***	141.07***	115.62***
Max VIF	4.47		4.47	
Breusch-Pagan test of independence				
chi2	258.663		256.851	
P value	0		0	
Observations	779		779	

*Standard errors in parentheses; p<0.10 +, p<0.05 *, p<0.01 **, p<0.001 ****

FIGURES

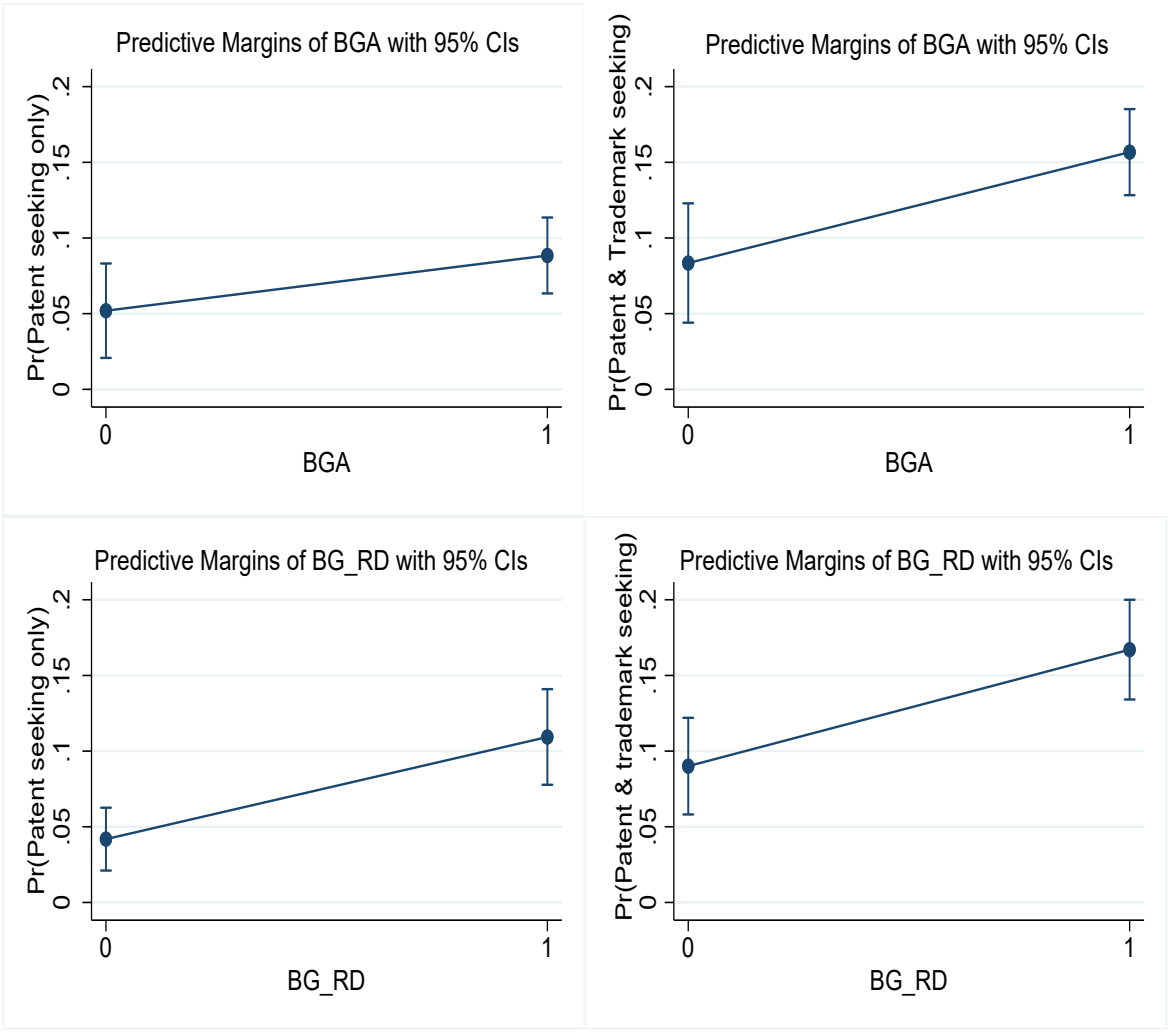

Figure 1. Predictive marginal effects of BGA and BG_RD