

# Acquiring Innovation - Do Chinese acquisitions in developed countries spur innovation at home?

By

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**Abstract:** Chinese multinationals' acquisitions of Western firms have increased dramatically in recent years. However, relatively little is known about the effects of these acquisitions on the acquirers' innovation. Using Chinese acquisitions in Western countries during 2000-2017 and applying matching and difference in difference methods we find that Chinese acquirers innovate more after acquisitions. Their patenting activity significantly picks up after the acquisitions of high-tech firms in developed countries. The results give support to the widespread view that Chinese companies are acquiring foreign technologies through acquisitions; they also show that Chinese companies successfully transfer and incorporate the newly acquired technologies at home, especially if the parent company was an innovator before the acquisition. The results also show that the degree of product complexity of the target firms matters and increases the innovation activity of Chinese acquirers.

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**Keywords:** *M&As, emerging markets MNEs, innovation*

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## Introduction

Chinese acquisitions in developed countries have increased exponentially over the past decades. The phenomenon captured the attention of policymakers who worry that Chinese multinationals (MNEs) acquire domestic firms' strategic assets such as patents and technology. Ever since the Going Global Strategy<sup>2</sup>, Chinese MNEs have used outwards foreign direct investments (OFDI) to acquire brands, advanced technologies, sophisticated management, and marketing skills in developed countries through aggressive strategic asset seeking M&As (Anderson et al, 2015). Targeted industries in developed countries include artificial intelligence, robotics, semiconductors, and financial technology (Brown & Singh, 2017), with the purpose of transferring knowledge from abroad to develop or strengthen domestic innovation capabilities.

So far relatively little is known about the effects of these Western acquisitions on the Chinese acquirers' innovation output. Whether Chinese MNEs can absorb and effectively utilize the intangible strategic assets of their Western acquisitions is uncertain. This paper furthers the existing literature on emerging markets multinationals (EMNEs) by focusing on Chinese acquisitions in developed countries and asking whether they spur innovation at home. The focus is on innovation, as it is crucial to firm survival and competitiveness and key to long term economic growth.<sup>3</sup> Innovation is also the new direction of the Chinese economy, and acquiring innovation is one of the main goals of the Chinese OFDI. This paper investigates whether these Western acquisitions have been successful in fostering patenting in Chinese acquirers.

A priori it is not clear what the effect of the developed countries' acquisitions is on the innovation capabilities of Chinese MNE acquirers. There are several possible scenarios. First, it may be hard for the acquirer to incorporate and productively utilize Western firms' strategic assets (Rugman & Li, 2007; Rugman, 2009). EMNEs are relatively newcomers when it comes to cross border acquisitions and lack post-acquisition integration experience. Evidence suggest that integrating such assets is challenging even for developed countries' acquirers (Ahuja & Katila, 2001; Cassiman et al, 2005). While acquisitions bring the sought-after newer, more sophisticated technologies, better managerial and marketing skills, and other important intangible assets, they may have little applicability to the majority of EMNE's line of business (Narula, 2012). Whether

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<sup>2</sup> [https://link.springer.com/chapter/10.1007/978-1-137-57813-6\\_6](https://link.springer.com/chapter/10.1007/978-1-137-57813-6_6)

Lenovo, the Chinese electronics firm bought IBM's personal computer division more than a decade ago. The \$1.75 billion purchase was China's first significant foreign technology acquisition. It led to Lenovo becoming world's largest PC manufacturer, and to China becoming one of the world's largest foreign investors in the technology sector. For example, about half of all 2014 Chinese FDI in the U.S. is in the information communication technology industry. Almost all investment in some of the high-tech sectors (semiconductors, biotechnology and green energy) came from privately owned Chinese firms.

<sup>3</sup> Innovation is critical, especially because of its contribution to growth. Theoretical endogenous growth models starting with Arrow, 1962 and Frankel, 1962 and especially Romer, 1986 and Romer, 1990 emphasize how improvements in innovation and knowledge lead to increased productivity, positively impacting long run economic growth. The empirical literature linking innovation and productivity in firms has also a long history. Early papers, starting with Griliches, 1979 and Griliches, 1986 show how research and development generate productivity improvements. More recent empirical papers on this issue, reviewed by Mohnen and Hall, 2013 provide compelling "evidence regarding the effects of technological and non-technological innovations on the productivity of firms and the existence of possible complementarities between these different forms of innovation". Innovation leads to higher productivity thus more output is generated with the same inputs. More goods and services are produced, consequently the economy grows.

a firm can exploit these acquired sources of knowledge depends on a variety of factors, including its innovation capacity, its absorptive capacity, how new and sophisticated the acquired knowledge is, and whether it is complementary to the firm (Cohen & Levinthal, 1990). Since EMNEs often lack these capabilities, they may not succeed in integrating the intangible acquired assets (Narula, 2012). Second, it is possible that Chinese MNEs are aware of these challenges and may try mitigating them by often giving acquired firms significant autonomy post acquisition. Third, it is also possible that Chinese MNEs successfully incorporate the newly acquired strategic assets and learn from their high-tech acquisitions (Mathews, 2006; Rui & Yip, 2008). EMNEs may learn from foreign firms or may utilize reverse knowledge transfers of technologies, modify, and use these technologies in the domestic market production. EMNEs may also exploit their firm-specific advantages, like the capability to produce high-quality products at low cost, which are destined for many emerging markets. EMNEs have also specialized in incremental manufacturing process innovation, that could help adapt the newly acquired technologies for domestic markets.<sup>4</sup>

It is therefore uncertain whether Chinese acquisitions in developed countries improve acquirers' patenting capability. This is an important topic considering the recent exponential increase in Chinese acquisitions of developed countries firms' and considering the meteoric rise in Chinese firms' patenting activity. Our paper thus asks two important questions: do Chinese acquisitions in developed countries increase innovation in Chinese acquirer firms? Second, which factors magnify or mitigate Chinese MNEs' post-acquisition patenting output? We focus on the degree of product complexity of the target and ask whether it impacts innovation in the Chinese acquirer. We also consider the innovation experience of the acquirer firms. To answer these questions we use data about Chinese M&As in developed countries and domestically, combined with detailed firm level data from China.

The econometric challenge to such analysis is the counterfactual - what would have happened with the innovation output of these Chinese MNEs if they did not acquire abroad in developed countries? We thus use a matching technique to find similar firms before the acquisitions. We end up with two control groups of Chinese firms with similar characteristics as those that acquired in developed countries, i.e. Chinese firms which are *i)* non-acquirers, or *ii) domestic* acquirers (Chinese firms that acquired other Chinese firms). We then use a difference-in-difference estimation to investigate the post-acquisition innovation performance in the treatment group (Chinese acquirers in Western countries) relative to the two aforementioned control groups, and post relative to pre-acquisition innovation performance. Our results show that acquisitions in developed countries pay off in terms of increased innovation output for acquirer firms - the number of patents awarded to Chinese acquirers in developed countries significantly increases in the 3- and 5-years post acquisition compared to our control groups of non-acquirers, or Chinese firms which acquired domestically. The results are robust to our definition of innovation performance - we use both the log of the number of patents applied per year and a patent dummy. The results are also robust to using various cut offs for the number of shares of the

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<sup>4</sup> Deng (2010) has shown that sometimes Chinese MNEs have successfully used their existing capabilities to transfer and integrate new acquisitions' strategic assets. OFDI is often seen as a way of acquiring capabilities, knowledge and technologies, which are then imitated using lower cost production techniques to compete against the developed markets MNEs domestically.

target firms owned by the Chinese MNE after the acquisition – we consider both 10% or more ownership, and 50% or more (i.e. majority acquisitions). The results also hold for various samples of firms. The results are even stronger if the Chinese parent firm was an innovator prior to the Western acquisitions. We also account for the degree of product complexity of the target and show that it significantly affects the innovation activity of the acquirer.

The structure of the paper is as follows: the next section provides a brief overview of the most recent trends in Chinese OFDI; the existing literature linking M&As and innovation is reviewed in Section 2. Section 3 presents the data and econometric methodology. The results are presented in Section 4 alongside with robustness checks. Section 5 concludes.

## **Trends in Chinese OFDI**

China's OFDI has increased exponentially over the past decades, from \$2.1 billion in 2005 to a whopping \$119.1 billion in 2017<sup>5</sup>. In the US alone, Chinese FDI reached 46 billion in 2016. In 2016, China became the second-largest source of OFDI in the world, second only to US.<sup>6</sup>

There were several reasons for this meteoric increase in Chinese OFDI, starting with the Chinese Government's Going Global Strategy in 2000, which made "the outward expansion of business enterprises a major strategic initiative for the future economic development of the country".<sup>7</sup> In addition, in 2001 China entered the World Trade Organization, which made it easier for its firms to move into global markets. An increase in the number of privately owned companies relative to state owned firms, capital control liberalization and the increased competition at home incentivized domestic companies to go global. The Chinese economy has also experienced a structural change, transitioning from manufacturing to an innovation driven economy, which led to increased demand for know-how and advanced technologies, especially from developed countries. North America and Europe are among the top destinations for Chinese OFDI, accounting for more than half of all Chinese OFDI during 2005-2017.

Interestingly, instead of establishing fully owned subsidiaries abroad, Chinese firms prefer cross-border mergers and acquisitions in developed countries, as M&As are the best ways for the Chinese MNCs to obtain valuable intangible assets, advanced technologies, managerial and marketing know-how. For example, in US alone 93% of the Chinese inflows in 2017 were in the form of acquisitions. The similar figure for the EU in 2015 is more than 95%. China's global outbound M&As increased from 2.2 billion in 2004 to 93 billion in 2015.<sup>8</sup>

Furthermore, privately owned Chinese firms account for  $\frac{3}{4}$  of these acquisitions, with state owned enterprises being responsible for the remaining  $\frac{1}{4}$ . In addition, the bulk of Chinese acquisitions in developed countries are majority acquisitions in which the Chinese firms acquire more than 50% of the target's shares (Rhodium Group, 2020).

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<sup>5</sup> <https://chinapower.csis.org/china-foreign-direct-investment/>

<sup>6</sup> [http://www.xinhuanet.com/english/2017-06/08/c\\_136350164.htm](http://www.xinhuanet.com/english/2017-06/08/c_136350164.htm).

<sup>7</sup> [https://link.springer.com/chapter/10.1007/978-1-137-57813-6\\_6](https://link.springer.com/chapter/10.1007/978-1-137-57813-6_6)

<sup>8</sup> <https://www.researchgate.net/publication/315497771>.

The distribution of Chinese FDI by industry has changed substantially over time, from sectors like real estate, hospitality, energy and automotive initially, to finance and business services and more high-tech manufacturing sectors (robotics, semiconductors, healthcare and biotech, ICT, etc) more recently. Similar trends are observed in US and Europe. The US ICT sector alone attracted close to 7 billion Chinese investments in 2016<sup>9</sup>, while the similar figure for Europe is close to 3 billion<sup>10</sup>. The above trends reflect China's shifting interests abroad and the new direction of the Chinese economy.

## Literature review

Despite the general finding that strategic assets acquisition is one of the most important motivations for Chinese firms' M&As in Western countries, surprisingly studies on Chinese acquirers' post acquisition innovation performance are relatively scarce.

In general, there is relatively little evidence on the effects of cross border M&As on innovation activities of the acquirer, and the majority of the studies that exist focus on *developed* countries MNEs. The evidence is conflicting.<sup>11</sup> Empirical studies that focus mostly on developed countries acquisitions provide mixed evidence: Bertrand & Zuniga, 2006 use industry level data from the OECD countries and find positive impact on R&D in the acquirers' sector for industries with a high technological intensity. Stiebale, 2013 focus on German SMEs and find a positive effect on the post-acquisition R&D intensity of the acquirers. Marin & Alvarez, 2009 study foreign acquisitions in Spain and find that they have a negative impact on the acquirers' innovation performance compared to acquisitions by domestically owned firms, but their focus is not on the impact of cross-border acquisitions explicitly. Desyllas & Hughes, 2010 compares domestic and foreign M&As and find that cross-border M&As negatively impact acquirer's R&D intensity, more so than domestic M&As. Stiebale, 2016 study on European M&As finds that the effect of M&As on the acquirers' post acquisition is unclear and depends on the pre-existing stock of patents in the acquirer.

Studies that focus on Chinese acquisitions are relatively scarce. Most of the existing research takes the form of case studies, which bring anecdotal evidence mostly about Chinese takeovers of major developed countries' firms. While they bring useful information, it is hard to generalize from these case studies alone.

Beyond these studies, research on the consequences of acquisitions on the acquiring EMNEs' innovation capabilities is relatively limited. A few notable exceptions are recent work by Davies, 2018 who examines acquirers' R&D activity and how it is affected by industry competition, the characteristics of the target, and the industrial overlap. Davies also allows the

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<sup>9</sup> Hahneman et al (2018)

<sup>10</sup> Hanemann & Huotari (2016)

<sup>11</sup> A priori it is unclear how innovation changes after M&As. It depends on whether innovation across parts of the expanded MNE is complementary or substitute. It could increase in the former and decrease in the latter case. Complementarity of innovative activity across the new subsidiaries and the parent of the MNE could unleash knowledge synergies, or make innovation relatively more profitable by spreading the fixed costs over a larger market. However, post-acquisition innovation may fall if subsidiaries' innovation activities are substitutes or if the MNE moves innovation to its headquarters (Davies, 2018)

effects to vary by the country of origin of the acquirer, and in a robustness check examines Chinese acquisitions (which only make up to 8% of the overall acquisitions in their sample, focused mostly on developed countries' acquisitions by US (more than half the sample), UK and other developed countries). He does not find evidence of increased post acquisition innovation in China and concludes that "it appears that concerns over Chinese acquisitions leading to a Chinese takeover in global innovation may be unfounded."

Hou & Mohnen, 2013 use World Bank Investment Climate Surveys in 2003 and find complementarity between firm's R&D and external technology sourcing on firms' innovation in Chinese manufacturing SMEs. They find that firms' R&D increase the absorption of external know-how while external technology sourcing improves the efficiency of firms' innovation. However, this cross-section empirical paper uses survey data from 2003, and does not account for most of the Chinese OFDI which sharply increased after 2005; it also cannot control for any selection issues in estimation.

Dong et al, 2021 investigate the relationship between Chinese OFDI and innovation and find significantly positive impact of OFDI on firms' innovation in the OFDI initial year and one year later, especially OFDI in developed countries. However, this paper uses an OFDI dummy as explanatory variable. We use detailed M&As data of Chinese firms, which is better than an OFDI dummy, as it more precisely captures the primary motive for Chinese acquisitions in developed countries, i.e. access to superior technologies and know how. An OFDI dummy captures both greenfield and brownfield FDI and does not distinguish, rather lumps together the various reasons for OFDI like resource or market seeking, efficiency seeking, etc.

Howell et al, 2020 analyze the effects of Chinese firms' OFDI on the innovation and economic performance of Chinese listed companies. Their findings are mixed: OFDI has a positive impact on firms' R&D spending, but a negative impact on firms' economic performance. Their results are also mixed when they use other measures of innovation. The authors conclude that their "findings bring into question whether China's going-out strategy will significantly boost its indigenous innovation capabilities". The paper does not explain what may have caused these mixed effects, and it does not account for other firm specific factors that may have affected the results.

Fisch et al, 2019 investigate the impact of acquisitions on Chinese acquirers' innovation performance and find no significant overall effect of acquisitions on patent output. They do highlight factors that could impact post-acquisition innovation – the acquired knowledge base, relatedness of the acquired knowledge base. However, this paper does not distinguish between Chinese acquisitions in developed and developing countries. It also does not address important selection issues in estimation, and it does not account for firm fixed effects that could affect firm innovation output.

This paper improves upon the existing research by focusing on the most recent, timely and relevant data on Chinese acquisitions abroad. It uses patents as a measure of innovation, which is better than R&D spending as it captures the output of the innovation activities rather than the input. It uses matching and difference-in-difference to deal with important selection and endogeneity in estimation econometric issues. It accounts for firm specific fixed effects as well as industry trends to properly capture all possible factors that may have impacted firms' innovation. It provides

convincing evidence that innovation does increase in the Chinese parent firms post acquisitions in developed countries, thus providing evidence for the contribution of OFDI to the exponential increase in the innovation output of Chinese MNEs. Finally, it argues that the degree of product complexity of the target firm matters, as does the innovation capability of the acquirer firm, both of which spur innovation in Chinese MNEs.

## Data Description and Summary Statistics

The data for this paper comes from several sources: the SDC Thompson Reuters mergers and acquisitions database which captures all Chinese<sup>12</sup> acquisitions in developed countries, Chinese domestic acquisitions (as additional control group); the WIPO Patent database for patents granted to Chinese firms, and the Orbis database from Bureau Van Dijk, which contains firm level financial variables.

We focus on Chinese acquisitions in manufacturing sector during 2000-2017. Our focus is on Chinese acquisitions in developed countries (the *treatment* group)<sup>13</sup>. The two *control* groups are: i) domestic acquirers and ii) Chinese firms that were never acquirers<sup>14</sup>.

There are 545 Chinese acquirers for which there is an Orbis ID (these firms have at least one year of employment and at least one year of total assets), did acquisitions in developed countries during 2000-2017<sup>15</sup>, our sample period, out of which 109 innovated at least once during the sample period. The similar numbers for the control groups is 3653 firms, out of which 986 innovated at least once.

Interestingly, among the sectoral foreign acquisitions in developed countries most are in Electronic and Electrical Equipment (25% of the total observations in our sample), followed by Machinery (10%), Metal and Metal Product (10%), Computer and office equipment (6%). These are highly innovative sectors.

To make a meaningful analysis we narrow the analysis to firms that acquired only in developed countries, and discard those that acquired both domestically and in developing countries as well. We focus on the first year of an acquisition in developed countries and investigate whether the innovation performance of the acquirers changed post acquisition relative to pre-acquisition. Since our focus is on innovation, our sample includes only Chinese acquisitions of developed countries' firms which have been granted at least one patent either before or after being acquired by a Chinese firm. We then restrict the sample to acquirer firms for which we have observations at least two years before and 3 as well as 5 years after acquisitions.

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<sup>12</sup> For foreign acquisitions we focus on Chinese, Hong Kong and Taiwan acquiror firms (Chinese firms account for 50% of the total number of acquirers). For domestic acquisitions we focus on Chinese firms only (not Hong Kong or Taiwanese acquirors).

<sup>13</sup> It seems that few Chinese acquirers made acquisitions both domestically and abroad: only about 230 firms made acquisitions both domestically and abroad. We discard these firms as it is unclear where the post-acquisition increase in innovation comes from.

<sup>14</sup> Defined as firms that never acquired or acquired during the last two years of the sample.

<sup>15</sup> The list of acquisitions in developed countries is in Appendix, Table 1.

In similar prior studies there is a concern about potential selection bias. Chinese MNEs that acquire in developed countries may be systematically different from the ones that acquire domestically, or do not acquire at all. To account for selection issues, we follow Stiebale, 2016 and others and use a matching algorithm - for all the treated firms (developed country acquirer firms) we find control firms that match most closely based on observable characteristics. In this way, we construct a sort of counterfactual for all the Chinese acquirer firms in developed countries. For each developed country Chinese acquirer, we find a match based on pre-acquisition data, i.e., a domestic acquirer or a non-acquirer firm closest in size, innovation output, and in the same industry. We thus find similar firms that differ only in terms of their acquisition targets and investigate their post-acquisition innovation performance.

Second, we use a difference-in-differences method to compare the post-acquisition relative to pre-acquisition performance of Chinese firms that acquired in developed countries with the performance of firms that acquired domestically or didn't acquire at all. We thus remove the influence of all observable and unobservable non-random aspects of the acquisition that are constant over time.

The summary statistics of the main variables are presented in Table 1. It seems that in the case of developed countries' acquisitions the 10th percentile lists 13.04% of the shares acquired, the median is 100%, mean is 75%, thus when the Chinese MNEs acquire, they tend to acquire a substantial chunk of the foreign firm. For the PercentageSharesOwned *after* transaction the numbers are even higher: in only 5% of acquisitions in Developed countries the shares owned by the Chinese acquirer are 10% or less. This is important information, as it shows that the Chinese MNEs mostly acquire controlling stakes in the target firm.

For domestic acquisitions the numbers are somewhat similar (in less than 10% of acquisitions the % shares acquired is 11.27, median 60% shares acquired; in terms of percentage shares owned after transaction in less than 5% of domestic transactions the shares owned after transaction are 12%, median is 85%, mean 72%.

The mean number of patents applied by Chinese MNEs that acquired in developed countries is significantly greater than the number of patents applied by Chinese MNEs which acquired domestically, or by non-acquirers.



## **Econometric Strategy**

In our empirical analysis we use difference-in-differences to examine whether acquirer firms innovate more in the post-acquisition period, relative to the pre-acquisition period, and to other control group firms. We use the following firms control groups: domestic acquirers (i.e. firms that only acquired other Chinese firms), non-acquirers (i.e. firms which never made acquisitions).

We estimate the following empirical model:

$$\text{Log}(\text{nr. patents per year} + 1)_{ijt} = \alpha + \beta_0 \text{DevelopedAcquirers}_{it} * \text{PostAcquisition}_{it} + \gamma_i + \gamma_{jt} + \varepsilon_{ijt}$$



where  $i$  = firm,  $j$  = 3-digit NACE industry code,  $t$  = year

The dependent variable is the log (nr. patents/year+1) in the main regressions. As a robustness check we also use a *Patent dummy* $_{it}$  that takes the value 1 if a firm patented in year  $t$ , zero otherwise. The standard errors are robust and clustered by acquirer.

DevelopedAcquirer $_{it}$  is a dummy variable that takes the value 1 if the firm has done M&As in developed countries throughout the sample period (2000-2017), 0 otherwise. It is a dummy that flags firms that made acquisitions only in developed countries (i.e. OECD countries). We consider *two* variants of the DevelopedAcquirer $_{it}$  dummy, depending on the percentage shares acquired: for 10%+ and for 50%+ acquisitions, i.e. DevelopedAcquis10 $_{it}$  is a dummy variable that takes the value 1 if the Chinese firm owns 10% or more of the target after the acquisitions, respectively DevelopedAcquis50 $_{it}$  for 50% or more. PostAcquisition3 $_{it}$ , respectively PostAcquisition5 $_{it}$  is a dummy variable that takes the value 1 for 3, respectively 5 years (including the acquisition year) after acquisition, 0 otherwise.

We include firm fixed effects to account for any time invariant firm specific characteristics that may have affected the M&As choice, and firm's innovation performance (i.e. management skills, etc.). We also include industry-year fixed effects to account for industry trends and all shocks affecting innovation in a particular sector, and year.

We focus on firms that patented at least once during our sample period (2000-2017) to avoid selection issues. We thus define innovators as those firms that patented at least once throughout the sample period. We also estimate the regressions on a sample of firms that patented at least once *before* the acquisition.

We start by imposing no restriction on the number of pre-acquisition years available to be included in the sample, so all available pre-acquisition years are included. We then restricted the sample only to acquirers observed for at least 2 years before acquisition, and 3, respectively 5 years after acquisition. The Post acquisitions dummies equal 1 for 3, respectively 5 years after the acquisition in developed countries.

We estimate the regressions on samples of developed countries acquirers (treatment group) and two control groups: domestic acquirers, or non-acquirers. We also tried a third control group, or Rest of the World acquirers (non-domestic, non-developed countries) but the number of observations is relatively small.

## Results

We start by presenting the basic results in Table 2. We start with firms that patented at least once during the sample period and estimate the effects on the post-acquisition innovation output, distinguishing between acquisitions of 10% or more of the shares of the target, respectively 50% or more (i.e. majority acquisitions). The difference-in-difference estimation shows positive and statistically significant effects on the patenting performance of the acquirer firms - the number of patents awarded to the Chinese acquirers goes up after acquisitions of developed countries'

companies relative to before acquisitions, and relative to other similar Chinese domestic acquirers (columns 1-2, 5-6) or to Chinese firms that never acquired (columns 3-4, 7-8). We estimate the effect 3, respectively 5 years after the acquisitions. The effects are positive and highly statistically significant. They suggest an increase in the innovation capabilities of the acquirer rather than technology looting. If the later was the case we would have possibly seen a spike in innovation immediately after the acquisition, but no longer terms effects<sup>16</sup>.

The results are very robust across the various samples of control firms - Chinese firms that acquired in developed countries innovate more after acquisition than similar Chinese firms that acquired domestically, or than Chinese non-acquirers.

The effect is similar for minority and for majority acquisitions, i.e. the coefficients of the interaction terms  $\text{DevelopedAcquis}_{it} * \text{PostAcquisition}_{it}$  are of roughly similar magnitudes, which suggest that what matters is access to the target firms' technologies and control over the target firms, not necessarily having a majority ownership over the target. Majority acquisitions do not produce a significant difference in the post-acquisition performance of the acquirer. It is possible that a 10% ownership in developed countries' firms gives Chinese acquirers enough control and access to superior targets' technologies that impacts their innovation.

Next, we re-estimate the regressions and keep only acquirers that were observed at least 2 years before the acquisitions, and 3, respectively 5 years after the acquisitions. The results, presented in Table 3 confirm our previous findings. The various columns refer to different control groups: domestic acquirers (columns 1-4, 7-10), respectively non acquirers (columns 5-6, 11-12), and to acquirers observed for 5 / respectively 3 years after acquisition (columns 1-4/ respectively 7-10). We follow the same order in the next tables as well.

Table 4 focuses on acquirers that innovated at least once *before* the acquisition.<sup>17</sup> In other words, we want to know whether Chinese MNEs that were innovators before the acquisition experience an increase in their innovation performance after acquisitions in developed countries. We thus capture the *absorptive capacity* of the acquirer, as it may affect the post M&A performance of the Chinese parent firm. Again, the results confirm that the number of patents granted to Chinese acquirers in developed countries increase 3, respectively 5 years after acquisitions. The coefficients of the interaction terms  $\text{DevelopedAcquis} * \text{PostAcquisition}$  are positive and statistically significant in all regressions (3, respectively 5 years after acquisition, and after 10%, respectively 50% ownership shares), and their magnitude is slightly larger than in the

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<sup>16</sup> Case studies of acquisitions of firms in developed economies by Chinese firms found that in almost all these acquisitions, a major objective for Chinese acquirers is to use the newly obtained knowledge to improve their position on the Chinese market. This transfer of technology requires an increase in R&D in China, to adapt the foreign technology to the Chinese plants. Arguably, the combination of foreign and Chinese knowledge and ideas and Chinese market characteristics may lead to more innovation as well. These ideas are illustrated by the acquisition of Volvo by the Chinese firm Geely in 2010. The acquisition significantly improved the quality of the cars produced by Geely, mainly for the Chinese market. Equally important, the acquisition changed the R&D process of the Chinese company (Yakob et al, 2018). The company created two research centers, in Sweden and in China and hundreds of Chinese researchers have benefitted from short term transfers to Sweden for training and learning. The cooperation between these centers and the transfer of knowledge between them allows Geely to substantially increase their innovative capabilities in China.

<sup>17</sup> We continue to focus on acquirers that were observed at least 2 years before the acquisitions, and 3, respectively 5 years after the acquisitions.

previous table (were pre-acquisition, innovative and non-innovative acquirers were lumped together) and confirm our previous findings. The innovative capacity of the acquirer matters, having been an innovator before M&A allows the Chinese acquirers to better absorb the newly acquired knowledge and increase their patenting after acquisition<sup>18</sup>.

We provide significant evidence that the Chinese MNEs patent number increases after acquisitions in developed countries. One possible explanation for this finding is that we use patents, which are the preferred measure of innovation. Patents are highly codified forms of intangible strategic assets and less tacit in nature, thus more easily transferable than other, more tacit forms of intangible assets. Our findings are consistent with more recent research which makes the case that EMNEs pursue M&As to access the superior foreign technology which they, at least initially exploit in their domestic markets (Hennart, 2012; Awate et al, 2012; Buckley et al, 2014; Luo & Wang, 2012).

We next ask whether product complexity matters for the impact of acquisitions in developed countries on the innovation of the acquirer firms. Product complexity index (PCI) measures the relative knowledge intensity of a product. It ranks the diversity and sophistication of the productive know-how required to produce a product. Products with a high PCI value (the most complex products) include electronics and chemicals. As Chinese companies favor primarily targets in knowledge intensive industries, we ask to what extent the degree of product complexity of the target firms affects the innovation performance of the acquirer post acquisition. This is an important question especially considering the Chinese firms' quest for advanced technologies and their charge to innovate. The PCI comes from the Atlas of Economic Complexity database from Harvard University.<sup>19</sup> Product complexity uses HS96 classification at 4 digits for each year from 2000 to 2017. We matched each of the HS industry codes with the firm level USSIC codes in our database. We re-estimate our regressions and introduce an interaction of the difference in difference term with Product Complexity Index – the results, presented in Table 5 show that Chinese acquirers innovate more after acquisitions of product complex targets in developed countries. The higher the relative knowledge intensity of target's products, the greater is the innovation impact on the acquirer firm. The coefficients of all the interaction terms are positive and highly statistically significant.

As robustness checks we also use a Patent dummy as dependent variable. The Patent dummy takes the value 1 if the firm patented in year  $t$ , 0 otherwise. We want to know if there is an increase in Chinese innovation after acquisitions in developed countries. The results presented in Table 6 confirm our previous findings. Indeed, Chinese acquirers become more innovative after acquisitions of firms from developed countries.

As further robustness checks we distinguish between state owned enterprises and private firms. However, the majority of Chinese MNEs that pursue acquisitions in developed countries

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<sup>18</sup> Deng, 2009 & 2010 make an interesting point by highlighting the impact of inward FDI in China on the absorptive capacity of the Chinese firms that later engage in M&As in developed countries. One of the best examples is Lenovo. While Lenovo produced its own computers, by 1990 the company distributed PCs for MNCs and engaged in strategic alliances with companies like IBM or Intel. These activities helped Lenovo innovate and gain knowledge before the acquisition of the IBM-PC division. As Deng, 2009 mentions, a senior manager from Lenovo said, "Our earliest and best teacher was foreign MNCs and especially Hewlett-Packard".

<sup>19</sup> <https://atlas.cid.harvard.edu/rankings/product>

are private firms. The sample decreases significantly when we only focus on SOEs. In addition, we also account for the change in firm size after acquisitions by introducing in the regression another variable - the log of total assets. The results, available upon request do not change the findings of the paper. The coefficients of the interaction terms are still positive and highly statistically significant in all regressions, confirming our previous findings.

## **Conclusion**

This paper explores the link between the recent surge in Chinese OFDI in developed countries and the exponential increase in Chinese firms' patenting activities. In particular, this paper analyzes the effect of cross-border acquisitions of developed countries' firms on the post-acquisition innovation activities of the Chinese acquirers. We focus on patents as our measure of innovation and find that Chinese MNEs innovate more after acquisitions of firms from developed countries. We also find that Chinese MNEs which innovated before the foreign acquisitions in developed countries significantly increase their innovation post acquisition, thus highlighting the importance of the absorptive capacity of the acquirer. Innovation increases in the Chinese MNE acquirer regardless of the percentage of shares acquired. What matters is control over the target firm. Moreover, the increase in innovation lasts for at least 3, respectively 5 years after acquisitions in developed countries, and it does not depend on the number of shares acquired - the results are similar for 10%+ respectively 50%+ shares owned after acquisition. The degree of product complexity of the target firms matters, as acquiring more technologically sophisticated and complex targets leads to more innovation at home. These findings are consistent with a growing body of work arguing EMNEs engage in international acquisitions for the purposes of acquiring strategic assets in developed countries, accessing foreign technology, and possibly exploiting it in the domestic markets.

The effects of international M&As on innovation are important and have policy implications since innovative activity is key to firms' survival and competitiveness and a key determinant of productivity and economic growth. The results indicate that the policy measures that increased the incentives for Chinese firms to acquire foreign targets in developed countries are beneficial to the source country's domestic technology base, as it significantly increased the innovation capabilities of Chinese firms.

## **References**

Ahuja, G., & Katila, R. (2001). "Technological acquisitions and the innovation performance of acquiring firms: A longitudinal study". *Strategic Management Journal*, 22(3): 197–220.

Anderson J., Sutherland D., Severe S. (2015). "An event study of home and host country patent generation in Chinese MNEs undertaking strategic asset acquisitions in developed markets". *International Business Review* 24:758–771

Arrow K. J., (1962), *The Economic Implications of Learning by Doing*, *Review of Economic Studies*, 29: 155-173.

Awate, S., Larsen, M. M., & Mudambi, R. (2012). "EMNE catch-up strategies in the wind turbine industry: Is there a trade-off between output and innovation capabilities". *Global Strategy Journal*, 2(3): 205–223.

Awate, S., Larsen, M. M., & Mudambi, R. (2014). "Accessing vs sourcing knowledge: A comparative study of R&D internationalization between emerging and advanced economy firms". *Journal of International Business Studies*, 1–24.  
<http://dx.doi.org/10.1057/jibs.2014.46>

Bertrand, O. & Zuniga, P. (2006). "R&D and M&A: Are cross-border M&A different? An investigation on OECD countries," *International Journal of Industrial Organization*, 24(2): 401-423

Brown, M and Singh, P. 2017. "China's Technology Transfer Strategy: How Chinese Investments in Emerging Technology Enable A Strategic Competitor to Access the Crown Jewels of U.S. Innovation" Discussion Paper at [link: <https://new.reorg-research.com/data/documents/20170928/59ccf7de70c2f.pdf>]

Buckley PJ, Elia S, & Kafouros M. (2014). "Acquisitions by emerging market multinationals: implications for firm performance". *Journal of World Business*, 49: 611–632

Cassiman, B., Colombo, M. G., Garrone, P., & Veugelers, R. (2005). "The impact of M&A on the R&D process". *Research Policy*, 34(2): 195–220. <http://dx.doi.org/10.1016/j.respol.2005.01.002>

Cohen, W. M., & Levinthal, D. A. (1990). "Absorptive capacity: A new perspective on and innovation learning". *Administrative Science Quarterly*, 35(1): 128–152.

Davies, R. (2018). "From China with Love: The Role of FDI from Third Countries on EU Competition and R&D Activities", UCD Centre for Economic Research Working Paper Series; WP2018/13

Deng, P. (2009). "Why do Chinese firms tend to acquire strategic assets in international expansion?". *Journal of world Business*, 44(1): 74-84.

Deng, P. (2010). "What determines performance of cross-border M&As by Chinese companies? An absorptive capacity perspective" *Thunderbird International Business Review*, 52(6): 509–524.

Desyllas, P., Hughes, A. (2010). "Do high technology acquirers become more innovative?" *Research Policy*, 39 (8): 1105–1121.

Dong, Z., Zhuang M., & Yan Z. (2021). "The impact of China's outward foreign direct investment on domestic innovation", *Journal of Asian Economics*, 75 (2021): 101307

Fisch, C., Block , B., & Sandner P. (2019). "The impact of acquisitions on Chinese acquirers'

innovation performance: an empirical investigation of 1545 Chinese acquisitions”, *Journal of Business Economics*, 89:125–153

Frankel M., (1962), *The Production Function in Allocation and Growth: A Synthesis*, *American Economic Review*, 52: 995-1002.

Griliches, Z. (1979). "Issues in Assessing the Contribution of Research and Development to Productivity Growth," *Bell Journal of Economics*, The RAND Corporation, vol. 10(1): 92-116

Griliches, Z. (1986). "Productivity, R&D, and the Basic Research at the Firm Level in the 1970's," *American Economic Review*, American Economic Association, vol. 76(1): 141-154

Hahneman, T., Rosen H. D., & Gao C. (2018). “Two-way street. US-China Direct Investment Trends” Rhodium Group. <https://rhg.com/research/twowaystreet-2021/>

Hanemann, T., Rosen, D. H. (2016). *Chinese Investment in the United States Recent Trends and the Policy Agenda*. Rhodium Group. <https://rhg.com/research/chinese-investment-in-the-united-states-recent-trends-and-the-policy-agenda/>.

Hanemann, T., & Huotari, M. (2016) “A New Record Year for Chinese Outbound Investment in Europe,” Rhodium Group. [http://rhg.com/wp-content/uploads/2016/02/A\\_New\\_Record\\_Year\\_for\\_Chinese\\_Outbound\\_Investment\\_in\\_Europe.pdf](http://rhg.com/wp-content/uploads/2016/02/A_New_Record_Year_for_Chinese_Outbound_Investment_in_Europe.pdf)

Hennart, J.-F. (2012). “Emerging market multinationals and the theory of the multinational enterprise”. *Global Strategy Journal*, 2(3): 168–187. <http://dx.doi.org/10.1111/j.2042-5805.2012.01038>.

Hou, J., Mohnen, P. (2013). “Complementarity between in-house R&D and technology purchasing: evidence from Chinese manufacturing firms”. *Oxford Development Studies*, 41 (3):347-371

Howell, A., Lin J., & Worack, S. (2020). “Going out to innovate more at home: Impacts of outward direct investments on Chinese firms' domestic innovation performance”, *China Economic Review*, (60): 101404

Liu, Y., Deng, P. (2014). “Chinese Cross-Border M&A: Past Achievement, Contemporary Debates and Future Direction”. *Advances in Mergers and Acquisitions*, 13: 85–107. <https://doi.org/10.1108/S1479-361X20140000013004>.

Luo, Y., & Wang, S. (2012). “Foreign direct investment strategies by developing country multinationals: A diagnostic model for home country effects”. *Global Strategy Journal*, 2: 244–261.

Marin, R., Alvarez, I., 2009. “Technological effects of M&As in Spanish manufacturing”. *Industrial Corporate Change*, 18 (4): 761–784.

- Mathews, J. A. (2006). “Dragon multinationals: New players in 21st century globalization”. *Asia Pacific Journal of Management*, 23(1): 5–27. <http://dx.doi.org/10.1007/s10490-006-6113-0>
- Mohnen, P., Hall, B.H. (2013) “Innovation and Productivity: An Update”. *Eurasian Business Review* 3: 47–65 <https://doi.org/10.14208/BF03353817>
- Narula, R. (2012). “Do we need different frameworks to explain infant MNEs from developing countries?”, *Global Strategy Journal*, 2(3): 188–204. <http://dx.doi.org/10.1111/j.2042-5805.2012.01035.x>
- Perea, J. R. & Stephenson M. (2018). “Outward FDI from Developing Countries”, chapter 4, *Global Investment Competitiveness Report 2017/2018*: 101-134
- Ramamurti, R. (2012). “What is really different about emerging market multinationals?” *Global Strategy Journal*, 47: 41–47
- Rhodium Group. (2020). *The US-China Investment Hub: Chinese FDI in All US Industries from 1990- December 2020*. <https://www.us-china-investment.org/fdi-data>.
- Romer, P. M. (1986). “Increasing Returns and Long-Run Growth”. *Journal of Political Economy*, 94: 1002-1037  
<https://doi.org/10.1086/261420>
- Romer, P.M. (1990). “Endogenous Technological Change”, *Journal of Political Economy*, 98 (5): S71-S102
- Rugman, A. M. (2009). “Theoretical aspects of MNEs from emerging countries”. In R. Ramamurti & J. Singh (Eds.), *Emerging multinationals in emerging markets* (1st ed., pp. 42–63). Boston: Cambridge University Press.
- Rugman, A. M., & Li, J. (2007). “Will China’s multinationals succeed globally or regionally?” *European Management Journal*, 25(5): 333–343. <http://linkinghub.elsevier.com/retrieve/pii/S0263237307000709>
- Rui, H., & Yip, G. S. (2008). “Foreign acquisitions by Chinese firms: A strategic intent perspective”. *Journal of World Business*, 43(2): 213–226. <http://linkinghub.elsevier.com/retrieve/pii/S1090951607000818>
- Stiebale, J., 2013. “The impact of cross-border mergers and acquisitions on the acquirers' R&D—firm-level evidence”. *International Journal of Industrial Organization*. 31 (4): 307–321
- Stiebale, J., (2016). “Cross-border M&As and innovative activity of acquiring and target firms”. *Journal of International Economics*, 99: 1-15

Yakob, R., Nakamura, R. & Ström, P. (2018). “Chinese foreign acquisitions aimed for strategic asset-creation and innovation upgrading: The case of Geely and Volvo Cars”. *Technovation*. 70-71. 10.1016/j.technovation.2018.02.011.

Table 1: Summary statistics		
	Median shares acquired	Mean Nr. Patents
Developed country acquirers 10%+ shares	100%	98
Developed country acquirers 50%+	100%	110
Domestic acquirers 10%+ shares	60%	18
Domestic acquirers 50%+	85%	19
Non acquirers	-	7





Table 2. Basic Regressions, using log nr patents applied per year, estimated on firms that patented at least once during the sample

	1	2	3	4	5	6	7	8
DevelopedAcquis50_PostAcq50_5y	0.117*** [3.125]		0.105** [2.543]					
DevelopedAcquis50_PostAcq50_3y		0.116*** [2.683]		0.106** [2.254]				
DevelopedAcquis10_PostAcq10_5y					0.127*** [3.591]		0.120*** [3.140]	
DevelopedAcquis10_PostAcq10_3y						0.126*** [3.094]		0.116*** [2.659]
Observations	17,910	17,910	5,202	5,202	19,710	19,710	5,382	5,382
R-squared	0.269	0.269	0.262	0.262	0.262	0.262	0.256	0.256
Firm fixed effects	yes	yes	yes	yes	yes	yes	yes	yes
Industry*Year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes

Note: The regressions are estimated on the sample of Chinese Acquirers in Developed countries (Treatment) and Domestic acquirers (Control group) - (columns 1-2, and 5-6); Chinese Acquirers in Developed countries and non-Acquirers (columns 3-4 and 7-8). The sample includes acquirer firms that patented at least once during the sample period.

DevelopedAcquis50\_PostAcq50\_5y is an interaction term between: DevelopedAcquis50 which is a dummy variable taking the value 1 if the Chinese MNE acquired 50%+ of the target firm's shares in developed countries and

PostAcq50\_5y is a dummy variable which is 1 for the 5 years post acquisition period;

Similarly, DevelopedAcquis50\_PostAcq50\_3y refers to 50%+ acquisitions and 3 years post acquisition period; DevelopedAcquis10\_PostAcq10\_3y refers to 10%+ acquisitions and 3 years post acquisition period.

Table 3. Regressions, using log nr patents applied per year, estimated on firms that patented at least once during the sample, and were observed for 2 years before, and 5 / respectively 3 years after acquisition

	1	2	3	4	5	6	7	8	9	10	11	12
DevelopedAcquis50_PostAcq50_5y	0.180*** [3.839]		0.125*** [2.871]		0.105** [2.543]							
DevelopedAcquis50_PostAcq50_3y		0.210*** [3.751]		0.122** [2.390]		0.106** [2.254]						
DevelopedAcquis10_PostAcq10_5y							0.173*** [3.855]		0.134*** [3.293]		0.120*** [3.140]	
DevelopedAcquis10_PostAcq10_3y								0.197*** [3.667]		0.132*** [2.796]		0.116*** [2.659]
Observations	10,116	10,116	14,166	14,166	5,202	5,202	11,124	11,124	15,642	15,642	5,382	5,382
R-squared	0.255	0.255	0.267	0.267	0.262	0.262	0.249	0.249	0.26	0.26	0.256	0.256
Firm fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry*Year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Note: The regressions are estimated on the sample of Chinese Acquirers in Developed countries (Treatment) and Domestic acquirers (Control group) - (columns 1-2,3-4, 7-8, 9-10); Chinese Acquirers in Developed countries and non-Acquirers (columns 5-6 and 11-12).

The sample includes acquirer firms that patented at least once during the sample period.

The sample includes acquirer firms observed for 2 years before and 5 / respectively 3 years after acquisition (columns 1-4/ respectively 7-10); non acquirers the rest (columns 5-6 /11-12)

DevelopedAcquis50\_PostAcq50\_5y is an interaction term between: DevelopedAcquis50 which is a dummy variable taking the value 1 if the Chinese MNE acquired 50%+ of the target firm's shares in developed countries and

PostAcq50\_5y is a dummy variable which is 1 for the 5 years post acquisition period;

Similarly, DevelopedAcquis50\_PostAcq50\_3y refers to 50%+ acquisitions and 3 years post acquisition period; DevelopedAcquis10\_PostAcq10\_3y refers to 10%+ acquisitions and 3 years post acquisition

Table 4. Regressions using log nr patents applied per year, estimated on Innovators *before acquisitions*; firms were observed for 2 years before, and 5/ respectively 3 years after acquisition

	1	2	3	4	5	6	7	8	9	10	11	12
DevelopedAcquis50_PostAcq50_5y	0.201*** [3.316]		0.120** [2.219]		0.109** [2.211]							
DevelopedAcquis50_PostAcq50_3y		0.276*** [3.810]		0.139** [2.216]		0.131** [2.374]						
DevelopedAcquis10_PostAcq10_5y							0.188*** [3.242]		0.136*** [2.730]		0.109** [2.390]	
DevelopedAcquis10_PostAcq10_3y								0.238*** [3.434]		0.140** [2.429]		0.126** [2.464]
Observations	6,840	6,840	10,674	10,674	4,932	4,932	7,416	7,416	11,700	11,700	5,076	5,076
R-squared	0.273	0.274	0.286	0.286	0.274	0.275	0.277	0.277	0.283	0.283	0.274	0.274
Firm fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry*Year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Note: The regressions are estimated on the sample of Chinese Acquirers in Developed countries (Treatment) and Domestic acquirers (Control group) - (columns 1-2,3-4, 7-8, 9-10); Chinese Acquirers in Developed countries and non-Acquirers (columns 5-6 and 11-12).

The sample includes acquirer firms that were innovators *before acquisition*.

The sample includes acquirer firms observed for 2 years before and 5 / respectively 3 years after (columns 1-4/ respectively 7-10); non acquirers the rest (columns 5-6 /11-12)

DevelopedAcquis50\_PostAcq50\_5y is an interaction term between: DevelopedAcquis50 which is a dummy variable taking the value 1 if the Chinese MNE acquired 50%+

of the target firm's shares in developed countries

and

PostAcq50\_5y is a dummy variable which is 1 for the 5 years post acquisition period;

Similarly, DevelopedAcquis50\_PostAcq50\_3y refers to 50%+ acquisitions and 3 years post acquisition period; DevelopedAcquis10\_PostAcq10\_3y refers to 10%+ acquisitions and 3 years post acquisition

Table 5. *Product Complexity* - Specification using log nr patents applied per year, sample of Chinese Acquirers which were Innovators *before* acquisitions, Chinese acquirers observed 2+ years before and 5+/3+ years after acquisition

	1	2	3	4	5	6	7	8	9	10	11	12
DevAcquis50_PostAcq505yProdComplexity	0.227**		0.183**		0.145*							
	[2.393]		[2.155]		[1.828]							
DevAcquis50_PostAcq503yProdComplexity		0.401***		0.289***		0.241***						
		[3.532]		[2.880]		[2.696]						
DevAcquis10_PostAcq105yProdComplexity							0.191**		0.168**		0.124*	
							[2.142]		[2.152]		[1.659]	
DevAcquis10_PostAcq103yProdComplexity								0.320***		0.232**		0.207**
								[2.992]		[2.547]		[2.462]
Observations	4,879	4,879	7,165	7,165	3,564	3,564	5,221	5,221	7,813	7,813	3,672	3,672
R-squared	0.28	0.281	0.291	0.291	0.281	0.282	0.28	0.281	0.289	0.289	0.282	0.282
Firm fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry*Year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Note: The regressions are estimated on the sample of Chinese Acquirers in Developed countries (Treatment) and Domestic acquirers (Control group) - (columns 1-2,3-4, 7-8, 9-10); Chinese Acquirers in Developed countries and non-Acquirers (columns 5-6 and 11-12).

The sample includes acquirer firms that were innovators *before* acquisition.

The sample includes acquirer firms observed for 2 years before and 5 / respectively 3 years after (columns 1-4/ respectively 7-10); non acquirers the rest (columns 5-6 / 11-12)

DevelopedAcquis50\_PostAcq50\_5yProdComplexity is an interaction term between: DevelopedAcquis50 which is a dummy variable taking the value 1 if the Chinese MNE acquired 50%+ of the target firms' shares in developed countries and PostAcq50\_5y, which is a dummy variable which is 1 for the 5 years post acquisition period, and Product Complexity index

Similarly, DevelopedAcquis50\_PostAcq50\_3y refers to 50%+ acquisitions and 3 years post acquisition period; DevelopedAcquis10\_PostAcq10\_3y refers to 10%+ acquisitions and 3 years post acquisition

Table 6. Basic Regressions, using patent *dummy*, estimated on firms that patented at least once during the sample, and were observed for 2 years before, 5/ respectively 3 years after acquisition

	1	2	3	4	5	6	7	8	9	10	11	12
DevelopedAcquis50_PostAcq505y	0.074*** [2.848]		0.066*** [2.732]		0.063*** [3.008]							
DevelopedAcquis50_PostAcq503y		0.0564* [1.827]		0.0502* [1.782]		0.0521** [2.160]						
DevelopedAcquis10_PostAcq105y							0.067*** [2.684]		0.0550** [2.440]		0.063*** [3.249]	
DevelopedAcquis10_PostAcq103y								0.0596** [2.006]		0.0446* [1.692]		0.0538** [2.343]
Observations	10,116	10,116	14,166	14,166	5,202	5,202	11,124	11,124	15,642	15,642	5,382	5,382
R-squared	0.276	0.276	0.283	0.283	0.303	0.302	0.269	0.269	0.275	0.274	0.293	0.292
Firm fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Industry*Year fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes

Note: The regressions are estimated on the sample of Chinese Acquirers in Developed countries (Treatment) and Domestic acquirers (Control group) - (columns 1-2,3-4, 7-8, 9-10); Chinese Acquirers in Developed countries and non-Acquirers (columns 5-6 and 11-12).

The sample includes acquirer firms that patented at least once during the sample period.

The sample includes acquirer firms observed for 2 years before and 5 / respectively 3 years after (columns 1-4/ respectively 7-10); non acquirers the rest (columns 5-6 / 11-12)

DevelopedAcquis50\_PostAcq50\_5y is an interaction term between: DevelopedAcquis50 which is a dummy variable taking the value 1 if the Chinese MNE acquired 50%+

of the target firm's shares in developed countries

and

PostAcq50\_5y is a dummy variable which is 1 for the 5 years post acquisition period;

Similarly, DevelopedAcquis50\_PostAcq50\_3y refers to 50%+ acquisitions and 3 years post acquisition period; DevelopedAcquis10\_PostAcq10\_3y refers to 10%+ acquisitions and 3 years post acquisition

Appendix. Table 1. Chinese acquisitions in developed countries by year

Target country	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	Total
Australia	1	0	0	1	2	0	0	2	1	1	5	4	1	4	4	2	1	3	32
Austria	0	0	0	0	0	0	0	0	1	1	0	0	0	1	1	0	0	3	7
Belgium	0	0	0	0	0	0	1	0	1	0	0	0	0	0	0	0	1	0	3
Canada	2	0	2	0	1	2	4	0	1	2	2	4	0	3	0	1	2	2	28
Czech Republic	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Denmark	0	0	0	0	0	0	0	0	0	0	1	1	0	1	2	1	1	1	8
Estonia	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Finland	0	0	0	1	0	0	0	1	0	1	0	0	0	0	0	0	0	1	4
France	0	1	3	1	2	0	0	1	0	2	0	4	1	4	2	3	3	0	27
Germany	0	2	1	0	1	4	2	2	2	1	1	3	6	4	7	8	13	8	65
Hungary	0	0	0	0	0	0	0	1	1	0	2	0	0	0	0	0	0	0	4
Ireland-Rep	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	1
Israel	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3	0	0	2	6
Italy	0	1	0	0	1	1	0	0	1	2	0	1	1	0	4	2	7	4	25
Japan	2	1	2	1	1	0	4	2	1	4	7	3	6	2	1	5	4	5	51
Liechtenstein	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	0	2
Lithuania	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Luxembourg	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	0	0	3
Malta	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Netherlands	1	1	0	0	0	1	3	0	0	3	2	1	3	1	0	0	1	1	18
New Zealand	0	0	0	0	0	0	0	0	1	0	0	0	0	1	0	1	2	0	5
Norway	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Poland	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Portugal	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1
Singapore	3	1	0	1	3	5	0	0	3	3	2	4	1	2	4	3	0	2	37
South Korea	0	0	0	0	0	1	0	2	0	1	1	1	2	0	0	2	3	0	13
Spain	0	0	1	0	0	0	0	1	1	0	0	0	0	1	2	0	1	0	7
Sweden	0	0	0	0	0	1	0	0	0	0	0	0	1	1	1	1	0	0	5
Switzerland	0	0	0	0	0	0	0	2	0	0	1	2	2	1	0	2	2	0	12
United Kingdom	2	0	1	0	1	0	2	4	2	2	1	0	2	0	2	1	4	6	30
United States	6	4	7	7	4	8	7	9	8	9	7	7	8	9	9	9	21	6	145
Total	18	11	17	12	16	23	23	27	25	32	35	35	34	36	46	44	67	44	545